ESSAYS ON TECHNOLOGY, INNOVATION, AND GOVERNMENT

by

KYOUNG-CHEOL KIM

(Under the Direction of Andrew B. Whitford)

ABSTRACT

This dissertation intends to better understand the implications of technology and innovation as grounded in the fundamental mechanisms of administrative organizations within the institutional environment. The environments of governmental organizations involve an increasing integration of artificial intelligence (AI). The integration of AI with autonomous decision-making capabilities may change administrative organizations at the fundamental level. Specifically, first, I revisited classic studies of organization and administration to achieve a more robust and scientific understanding of organizational principles in structurization and functioning. This understanding was then applied to the context of technological innovation, with a focus on highlighting the nuanced operational dynamics of organizational administration within the institutional environment of political controls. Second, with a focus on AI as a critical modern technological innovation, I further specified the organizational operational mechanisms of managerial functioning as well as the implications of discretion that AI can hold—maintaining cognitive impacts on human agents' administrative behavior. In conjunction, I highlighted the institutional environment's significant configurational implications for administrative organizations in terms of the mode of social control. Third, I further integrated the theoretical foundations with the perspectives of organizational and political economics. This approach

highlights the significance of organizational efficiency and responsibility for the operations of organizational administration that affect organizational employees' willingness to use innovation in the context of AI intervention. These studies can help understand how humans will interact with AI throughout the administration of organizational operations, affecting performance and responsibility. Eventually, this dissertation aims to pave the road to better understand how the decisional and behavioral collaborations between humans and AI will unfold, sharing configurational effects with organizational and institutional environments.

INDEX WORDS: Administrative behavior, Bureaucracy, Democratic control, Technology, Innovation, Artificial intelligence

ESSAYS ON TECHNOLOGY, INNOVATION, AND GOVERNMENT

by

KYOUNG-CHEOL KIM

B.P.A., Konkuk University, Republic of Korea, 2010

M.P.A., Texas A&M University, College Station, 2019

A Dissertation Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

ATHENS, GEORGIA

2024

ESSAYS ON TECHNOLOGY, INNOVATION, AND GOVERNMENT

by

KYOUNG-CHEOL KIM

Major Professor:	Andrew B. Whitford
Committee:	Katherine G. Willoughby
	L. Jason Anastasopoulos

Electronic Version Approved:

Ron Walcott
Vice Provost for Graduate Education and Dean of the Graduate School
The University of Georgia
May 2024

ACKNOWLEDGEMENTS

First and foremost, I deeply appreciate my family—father, mother, younger brother, and younger sister—and future wife with her family, in advance, for their enormous support and love. I cannot thank my dissertation committee enough. I sincerely appreciate Dr. Andrew Whitford for his brilliant encouragement, endurance, and support so that my academic ambition and ability have become more mature; I have been much inspired by his specialties. I much appreciate the warm mentorship of Dr. Katherine Willoughby, who has provided resolved support for my research and academic career and has shown excellent scholastic and practical leadership. I also much thank Dr. Jason Anastasopoulos for his caring and great inspiration that motivated me to better understand detailed and expansive aspects of technology and deeper roots of social phenomena, covering matters of political philosophy.

Not only these, but I also appreciate Dr. George Krause for igniting discussions and methodological support; his help played a tremendous part in developing earlier versions of essays of this dissertation while taking his courses. Meanwhile, it was such great luck to take the Public Management course from Dr. Hal Rainey even though he is (kind of) retired; continuing research discussions with the prominent professor has significantly influenced me. I appreciate Dr. Laurence O'Toole's legacy contribution to the Ideas and Issues in Public Administration course; studying the accumulated materials, albeit not taught by him, I could achieve a further solid ground of theoretical thinking. Lessons from Dr. Edward Kellough's class covering the philosophy of science have deeply rooted in my research approaches, aiming to contribute to the

scholarship of public administration with more scientific research. Dr. Bradely Wright's research has always motivated me to reflect on detailed aspects of human behaviors.

Furthermore, I appreciate Drs. David Bradford, Emily Bell, and Gene Brewer for helping expand my academic scope to involve concrete, dynamic, and intricate aspects of police analysis and processes, which function closely with critical aspects of administrative mechanisms and dynamics. I thank Drs. Rebecca Nesbit and Michelle Lofton, as well as Elena Karahanna (Terry College of Business), for their valuable comments on an earlier version of the second essay. I sincerely appreciate the support I received from all the professors here, as well as the awesome administrative staff in our department, including Kristin Lawrence and Rebecca Blakeney.

Many thanks to Drs. Justin Bullock, Matt Young, and Hsini Huang, who shared my earlier exploration in researching AI and generously allowed me to use the survey experiment data for the second and third essays, also appreciating Professor Don-yun Chen. I also want to extend my thankfulness to Drs. Leisha DeHart-Davis and Donald Kettl. This dissertation has benefited from my earlier publication titled "Machine Intelligence, Bureaucracy, and Human Control." They provided many helpful comments as well as warm encouragement; however, as a first-time corresponding author, I missed acknowledging their contribution. So, let me thank you using this space. Also, Dr. Sanjay Pandey's encouragement on an earlier version of the second essay at the Academy of Management conference's doctoral student colloquium was a facilitating factor for the further development of the project. I would like to thank Dr. Susan Miller for valuable comments on an earlier version of the third essay. It was also very motivating to meet Dr. Donald Moynihan at conferences and get encouraged through cordial chats.

I also want to thank outstanding professors at Konkuk University, Seoul, South Korea. My major professor there, Professor Hwang-Sun Kang, shared vital knowledge and experiences

to perform valuable academic research and has inspired me to sincerely and creatively study public administration with endless support. Professor Yong Woon Kim encouraged me to choose the right place for me to pursue my second master's degree in Texas so that I could realize the rooted aspects of people and institutions there within the United States of America. I appreciate all faculties and colleagues at Konkuk University who helped me to have foundational knowledge and skills in studying public administration and policy: Professors Yongmo Lee, Young Bum Lee, Junmo Kim, Seung-Bum Yang, Yiyoon Chung, and Byungwoo Cho, as well as Dr. Dong Sang Yoo—including (currently) Professors Emeriti Jong Soon Kim and Miseung Ha, who also received their doctoral degrees from our department here at UGA. I also thank a professor of philosophy there, Professor Doesik Kim, for his valuable lessons on studies of logic and epistemology, as well as insightful life-career wisdom.

I thank the outstanding lessons and mentorship I received from professors at Texas A&M University, College Station, including Drs. Ann Bowman, Lori Taylor, Laurie Paarlberg, Joanna Lahey, Cole Graham, Robert Greer, Domonic Bearfield, Frank Ashley, William Brown, Kenneth Taylor, Raymond Robertson, Deborah Kerr, and Mary Hilderbrand. The lessons I learned from them have been vital resources to sharpen my research ideas and capabilities to this stage. I thank Dr. Kenneth Meier for his caring and great lessons to devote myself to doctoral studies.

Moreover, I much appreciate Professor David Lee for his endless help in pursuing this academic career. My meeting with Professor Sangyub Ryu was a great facilitator to devote my research to the public administration scholarship. It is my pleasure to meet Professor Eunju Roh at conferences and get encouraged. I also much thank my best American friend Vincent Barbish, whom I met everywhere in the small college town of Texas, even without appointments, for our everlasting support and true friendship—I appreciate your service on the Hill. I thank my best

friends in Korea, Young Tae Lee, Jun Hee Lee, and Byung Hoon Na, for our endless friendship. It was also an enjoyable time being here together with Colt Jensen, Alejandra Gaiter, Ju Won Park, Su Young Choi, and other colleagues. In addition, I appreciate Dr. Taesik Yun's caring for Korean students as well as his contribution to connecting us with Korean public servants in the career development program at UGA. It has been a great opportunity for me to learn from their practices and realize that I am working on an important thing that is increasingly becoming a real and critical matter of public service practices and the lives of people. My experience working with researchers at the Seoul Institute helped my research involve detailed aspects of civic interactions with the government in policy processes.

Having said that, I cannot thank enough dear my Major General Woo Hyun Hwang, retired, who was one of the chief executives of the Marine Corps, whom I served in the Ministry of National Defense as a secretary staff. His thoughtful sharing of expertise and experiences have been prodigious resources for me to better understand how governmental agencies and public service actually work. These lessons were conjoint with those from my great father, a tremendous supporter, who played important roles in the Korean National Police Agency. I thank my mother again. When I was indulging in inventing in high school, she just endlessly supported me, although she knew it was not an efficient way to get into a good university; it ended up taking more time than other students.

After all, all these streams met together, influencing me to develop my current research agenda and approaches, which I increasingly realize the significance. I may have missed mentioning some people; however, it does not necessarily correlate with their importance. This acknowledgment section is hierarchically and restrictively structured; their meaning is not so to me. Thank you again for all the help and love I have received; I will contribute back to society.

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

Technology and innovation have significantly impacted governmental administration. Technology has provided knowledge and tools to increase the productivity and quality of decision-making and execution throughout public service provisions. Innovation, in terms of novel and creative technological and administrative breakthroughs, has helped advance governmental administration operations. At the same time, technology and innovation have brought about varied effects for routinized organizational administration, which can be particularly critical for governments and their employees' behavioral features that are under constitutional, legal, and procedural controls in modern democratic nations. To better understand the sheer implications of technology and innovation for governmental organizations, which are to be responsible to their stakeholders, we need to deeply reflect on organizational operational mechanisms in conjunction with their internal and external environments, such as people and institution (Barley and Orlikowski 2023).

This dissertation intends to better understand the implications of technology and innovation as grounded in the fundamental mechanisms of administrative organizations within the institutional environment. Regarding the operational fundamentals of administrative organizations, it is worth revisiting classics of administration. In particular, this dissertation starts with revisiting Max Weber's theory of bureaucracy and Herbert Simon's Administrative Behavior.

As Weber addressed the theory of bureaucracy in the ninth chapter of his book "Economy and Society" a century ago (Weber 1978), the systematized structurization and functioning of organizations, which exchange influences with their institutional environment, are critical in actualizing social values. Addressing complex and various social matters, governments need to be systematized to some extent and degree (Waters and Waters 2015; Simon 1996). At the same time, as government gains more systematized power with a potential for abusing its authority for its own interests, it also needs to be under control and in balance with other institutions (Montesquieu 2002). Internal operational mechanisms and external controls work in tandem, checking each other; still, the internal mechanism can be the essential part to understand administrative operation and responsibility (Miller 2000).

Within this scope, the study of administration, focusing on how governmental organizations work (Wilson 1887), can help achieve the significant condition of a good society (Long 1952; Miller and Whitford 2016). Specifically, organizations have genuine structural and functional characteristics which can be underlined with the scientific principles of organization, highlighted by the specialization of jobs and hierarchical transferring of authority—critically coordinated by managers (Bullock, Huang, and Kim 2022). To this extent, Herbert Simon truly called for support being grounded in Weber's theory of bureaucracy (Simon 1946), although his further theorization diverged to highlight behavioral aspects of operations of administration differentiated from institutional aspects of control (Simon 1997). The governmental organizational adoption and use of technological innovation, bringing in novel and creative knowledge and tools, can also be understood as contextualized administrative phenomena. This dissertation unfolds how technological innovation will be adopted and used throughout the institutional-organizational mechanism.

The environments of governmental organizations involve an increasing integration of artificial intelligence (AI). Some people may consider it another innovative technology and tool, primarily similar to the conventional technologies that we humans have maintained control over in principle. However, a critical point we should consider from the perspective of organizational administration is that AI has autonomous decision-making capabilities. Decision-making, covering everything from goal setting to communication to eventual service delivery, and realizing problem solving (Newell and Simon 1972) in the entire organizational mechanisms, is the core of administration (Simon 1997).

That said, the integration of AI with autonomous decision-making capabilities may change administrative organizations at the fundamental level. Human employees who perform cognitive decision-making can have characteristic relationships interacting with AI for tasks and operations of administration, reflecting organizational mechanisms and institutional environments. For instance, informational outcomes by AI's automated decision-making can become explicit/implicit rules for human agents to execute action selections (Murray, Rhymer, and Sirmon 2021). Eventually, the integration of AI into governance can substantially transform the functioning and dynamics of humans, organizations, and society. For a thorough investigation of the implications of modern technology and innovation, this dissertation begins by delving into administrative organizational mechanisms in structuring and functioning.

Overview of Essays

In my initial dissertation essay, titled "Administrative Behavior, Accountability and Responsibility: In the Technology Innovation Use Case of US Federal Agencies," I examine the broader context of technological innovation within the US federal government. This essay delves

into the subtle conflict between achieving improved administrative performance and maintaining responsibility and accountability. The historical debate between Carl Friedrich, advocating for administrative discretion to ensure responsibility, and Herman Finer, emphasizing political-institutional control to secure accountability, serves as a foundation for the research. To gain a recalibrated understanding, I develop a robust theoretical framework for organizational operation that incorporates political factors. This entails revisiting traditional theories of organizational principles and integrating modern theories of political-institutional control and administrative reputation as significant political considerations.

My second essay, titled "Cognitive Impacts of AI on Administration," explores the differing perceptions of AI among employees in the public and private sectors, depending on their job roles. This investigation takes into account the organizational structures, mechanisms, and specific features of AI involved. Notably, there is a gap in empirical research examining how and why employees in various organizational contexts, such as different types of organizations and job positions, adopt AI. This study considers AI as a decision-making agent within organizational administration, with a particular focus on "basic AI," which involves supervised machine learning with a high degree of control. To build a theoretical framework, I draw insights from classic works in administration, information processing, and organizational sensemaking.

In my third essay, titled "Organizational Willingness to Use AI: Evaluating the Roles of AI Performance Information and Responsibility-Taking," I investigate how employees anticipate using AI in specific organizational settings and the potential risks associated with AI's decision-making autonomy and operational uncertainties. One significant concern is that despite AI's substantial role in decision-making, human users bear the responsibility for AI's operational outcomes. This study aims to understand the willingness of organizational employees, both in the

public and private sectors, and in various job positions, to use AI within their respective organizations. It highlights specific organizational contexts, such as the availability of AI performance information (positive, negative, or neutral) and the assignment of AI-related responsibilities (non-attributive or attributive, meaning self-assigned or assigned to a supervisor), that influence employee willingness to use AI. This essay is grounded in economic and political theories of organizational efficiency, job security, and administrative responsibility.

Implications

When it comes to the administration of operations in organizations, conventionally, humans have been the sole primary components, except for other natural and artificial additives that help humans' decisions and executions. With humans' bounded rational decision-making as well as the functioning of other cognitive and psychological factors, mechanisms of organization such as motivation playing with leadership roles help realize organizational operations achieving goals (Hackman and Oldham 1976; Oldham and Hackman 1981; Rainey, Fernandez, and Malatesta 2021). Furthermore, with AI as distinct decision-making systems, humans and AI will collaborate in performing different tasks or jobs (Berente et al. 2021). AI will also impact human organizational employees' cognitive-psychological perceptions and behaviors for tasks and operations of administration via information processing; AI's direct decisional recommendations and behavioral features can be additional informational pieces for humans to process for their own cognitive decisions (Murray, Rhymer, and Sirmon 2021). These collaborative performances of jobs need to be characteristically coordinated by managerial roles, going through procedural processing and systematized control (Bullock, Huang, and Kim 2022). Furthermore, it is worth noting that there is increasing attention on algorithmic management, which refers to AI's

performance in managerial roles (Schweitzer and De Cremer 2023). After all, the integration of AI in government can impact the dynamics of the entire organizational mechanism, performance, and responsibility within the institutional environment.

In modern democratic and capitalistic nations, the political control and market mechanism can be the key mode of institutional control. Relatedly, public organizations are significantly abided by constitutional, legal, and procedural control, while private firms emphasize maximizing profits substantially reflecting the market mechanism (Perry and Rainey 1988). These also indicate differential ways of being responsible to stakeholders vis-à-vis shareholders, highlighting the logics of efficiency from organizational and political-economic perspectives (Williamson 1975; 1999; Miller 2000). When it comes to interacting with AI in organizational contexts, these institutional grounds may differentially associate with the cognitive ground of governmental employees in different sectors and on positions, differentiating their willingness to engage with AI for tasks, *per se*.

Maintaining such institutional impacts on the cognitive grounds of individuals who are working in different organizations and on positions, various AI systems, which are equipped with characteristic functionalities, may have varyingly critical impacts on organizational employees' perceptions and administrative behavior. In addition, it is worth noting that the responsibility associated with AI's operational outcomes falls solely on human users despite AI's significant role in decision-making; AI's decisional autonomy and operational uncertainty may pose employee risks. Correspondingly, organizational employees in different sectors and roles, for instance, may have different perceptions interacting with AI for tasks and operations of administration.

This dissertation explores how governmental employees will work adopting and using technological innovation in institutional-organizational environments. Related to the second and third essays, AI can be substantially different from the conventional in having decisional autonomy. While AI's behavioral features are increasingly noted, implying mutual cognitive interactions between humans and AI (Rahwan et al. 2019), these essays focus only on human employees' perceptual dimensions. These studies can help understand how humans will interact with AI throughout the administration of organizational operations, affecting performance and responsibility. Eventually, this dissertation aims to pave the road to better understand how the decisional and behavioral collaborations between humans and AI will unfold, sharing configurational effects with organizational and institutional environments.

CHAPTER 2

ADMINISTRATIVE BEHAVIOR, ACCOUNTABILITY AND RESPONSIBILITY: IN THE TECHNOLOGY INNOVATION USE CASE OF US FEDERAL AGENCIES[1]

[1] Kyoung-cheol (Casey) Kim. To be submitted to the *Journal of Public Administration Research and Theory*.

Abstract

There has been a conundrum about how to better secure greater performance and responsibility in administration when these goals may seem contradictory to each other. In the scholarship of public administration and political science, a longstanding debate has persisted. Carl Friedrich argued that optimal administrative discretion can help ensure administrative responsibility, while Herman Finer's argument emphasized that legal-institutional control over administrative discretion can aid in securing accountability. To empirically understand this matter more effectively, a robust theoretical framework of organizational operation that incorporates political factors is necessary. To achieve this, I revisit classic theories of organizational principles and recalibrate them. In doing so, I delve into aspects of institutional and behavioral rationality; this approach elucidates the dynamics of discretion which essentially arises from the functional dislocation of the two dimensions of rationality. In conjunction, I consider political-institutional control and administrative reputation as significant political factors. The empirical specifications of this framework are examined within the context of technology innovation use in the US federal government as contextualized administrative behavior. For empirical testing, I utilize the Merit Principles Survey (MPS) 2016 dataset, consisting of approximately 14,000 observations. I employ ordered probit analysis to examine the impacts of organizational and political factors, both separately and in combination, on the use of innovation (measured as a degree of satisfaction). I discuss empirical findings and broader theoretical contributions within the realm of public administration scholarship.

Introduction

In modern democratic nations, it is imperative for administration to address social issues and promote societal progress by ensuring that optimal administrative outcomes align substantially with the desires of the populace as a whole. However, despite our endeavors, we have yet to definitively ascertain how to effectively achieve this alignment between effective administrative outcomes and the preferences of citizens. Approximately a century ago, Herman Finer and Carl Friedrich engaged in a debate regarding the most effective approach to achieving coherence between administrative outcomes and the values of the populace, with one emphasizing accountability and the other stressing the responsibility of administration, respectively (Finer 1936; 1941; Friedrich 1935; 1945; Plant 2011). While their arguments have enhanced our understanding of how to better achieve congruence between administrative outcomes and the collective interests of citizens, these debates remain unresolved (Plant 2011), indicating that there are still aspects we need to grasp to advance theoretical frameworks in researching modern governance.

It is crucial to note that the accountability approach emphasizes limiting administrative discretion, while administrative responsibility highlights the criticality of nuanced discretion that can optimize organizational effectiveness (Plant 2011). These two approaches are essentially at odds regarding the issue of discretion. However, specific mechanisms of discretion, emphasized by the administrative responsibility approach, have not been clearly connected to the mechanism of legal-institutional control, which is underlined by the accountability approach. Modern scholars who emphasize the accountability approach acknowledge that discretion, when accompanied by the responsibility approach, may help increase administrative performance and policy outcomes (Bertelli and Lynn 2003; Bertelli and Busuioc 2021). However, they still argue

that the constitutional implications of discretion are uncertain or potentially adversarial (Bertelli and Busuioc 2021).

Therefore, solving the lasting conundrum of administrative accountability versus responsibility first necessitates a deeper comprehension of how administration operates in terms of organizational mechanisms and dynamics, particularly in regard to discretion and its association with political environments. In other words, to theoretically and empirically understand this matter more effectively, a robust framework of organizational operation that incorporates political factors is necessary. In doing so, we may also find a pathway for more scientific study of public administration, which is substantially grounded in the significant functioning of the executive branch (Wilson 1887). This view contradicts the traditional belief held by canonical political scientists who highlighted that legislators, presidents, and interest groups hold significant influences on bureaucratic structures and functions (Moe 1989). Instead, the current paper focuses on the executive branch as a distinctively subjective yet collaborative entity that actively maintains checks and balances within the entire governance (Long 1952; Miller 2000).

To achieve this, I first revisit classic studies of organization and administration from the last century. These studies offer insights that remain relevant to modern public administration (Bullock, Huang, and Kim 2022). Among them, Max Weber's work is significantly worth contemplating, as his theory of bureaucracy is partially addressed in chapter nine of his book "Economy and Society." Weber's theory of bureaucracy is not only about rational control over an organization, predominantly realized through the application of rules and laws in the form of codified orders, but also about maintaining a systematized concentration that balances collective power in social, economic, and political realms (Waters and Waters 2015). This synthetic and

concrete feature of Weber's work is particularly salient to the scope of the present paper, covering both aspects of administration and political control.

Furthermore, in dealing with more detailed aspects of administrative mechanisms, the current paper particularly pays attention to seminal works by Max Weber, Chester Barnard, and Herbert Simon. Especially, Simon supported Weber's theoretical points, such as specialization of jobs and hierarchical transfer and acceptance of 'rational' authority; Simon considered these to be the scientific principle of organization (1946). As 'the sciences of the artificial,' the structuring and functioning of (any) 'organizational' systems aimed at achieving *goals*, involving subsystems like task units or individual agents, inherently necessitates hierarchy (Simon 1996). Given the limited capacities of subsystems or varying comparative advantages, achieving abstract (higher-level) goals in complexity ultimately requires the specialization of jobs along with hierarchical control and coordination. This hierarchy *conditions* the system to interact with both internal and external environments dynamically, facilitating its evolution through varying structural and functional specifications (Simon 1996).[2]

Simon also integrated and advanced Barnard's concept of the zone of indifference, which highlights that organizational authority is not necessarily unconditionally accepted by subordinates (human agents, as subsystems) in a one-way direction; to accept it, subordinates

[2] As Simon (1996) elaborated, the hierarchical structurization and functioning of artificial beings and things of complexity—yet organized, as different from chaos, for instance—applies to physical, biological, societal, and symbolic systems. Respective examples include particles of atoms, the human body system of organs and cells, governmental organizations, and books. Imagining the 'primary' way one constructs a complex scholarly article for knowledge development may aid understanding. The extent to which 'goals' are achieved critically distinguishes the artificial from the natural.

will consider if their organizational contribution will match tangible or intangible compensation they will receive (Barnard 1974; Simon 1997).[3] Ultimately, Simon significantly synthesized ideas of Weber and Barnard, among others, forming the theory of administrative behavior (Simon 1997), which highlights the subtlety and significance of *rational* decision-making that ends up being bounded (March and Simon 1993).

Simon's theorization of administrative behavior importantly integrated the scientific principle of organization and cognitive-psychological aspects of authority transfer-acceptance. Nevertheless, as he shifted to highlight the subtlety and criticality of rational decision-making, which is pivotal throughout the entire mechanism and dynamics of human administrative behavior, the dimension of institutional 'rationality'—underlined by Weber—is not further coherently reconciled with the dimension of behavioral *rationality*—underlined by Simon (Cyert and March 1992; Simon 1997, 177-207).[4] This point encompasses that, although Simon acknowledged the importance of values for organizational goal setting in public administration (Simon, Smithburg, and Thompson 1950), the institutional rational aspects were not substantially concerned in his further theorizations in administrative studies (Simon 1997).[5]

---

[3] Simon (1996) points out that cognitive psychological information processing is essential for human organizational agents (as subsystems) to maintain the dynamics of the hierarchical system and facilitate its evolution.

[4] This may be grounded in the fact that Simon was a scholar who basically maintained the positivist approach, highlighting the criticality of processing the factual component of information as distinguished from the value component. This informational distinction and processing form the fundamental premise of Simonian rational decision-making (Simon 1997, 55-91). Although this very approach to decision-making is related to procedural rationality, which is more frequently discussed, it is a secondary focus in the present study.

[5] The story may also be aligned with the fact that Herbert Simon drifted away from the scholarship of public administration and political science—engaging in harsh arguments with Dwight Waldo, who also emphasized the

The present paper reinterprets the scientific principle of organization by reconciling both dimensions of institutional rationality and behavioral rationality. The reinterpreted organizational principle underlines (1) the specification of order and (2) the satisfaction of interests, as detailed in a later section. This approach reveals how institutional rationality, accompanied by codified orders, interacts with the hierarchical transfer-acceptance of rational authority in the format of behaviorally rational decision-making for task accomplishments. Critically, it becomes evident that abstract rules and laws, as reflected in the institutional rationality of modern organizational administration, are inherently restricted in their application in varying and complex environments. This essentially necessitates the activation of discretion held by behaviorally rational decision-making of individual employees within the organizational domain. In this context, discretion can be more deeply understood and empirically investigated.

This alternative theoretical attempt can have significant implications for modern studies of democratic and organizational administration. First, the aspect of institutional rationality can reflect the constitutional-legal mode of political-institutional control (Bertelli and Lynn 2003; Bertelli and Busuioc 2021), elaborating its implications for administrative outcomes and accountability. Second, the alternative theory can also elucidate how another type of political control, administrative reputation, works, allowing for achieving responsible administrative outcomes accompanied by the activation of nuanced discretion with administrative dynamics in forming and sharing organizational performance and reputation with characteristic associations with citizens (Carpenter and Krause 2012; 2015).

---

significance of normative values along with the *relevance* of theories in addressing imminent social problems—heading instead toward business administration, psychology, economics, and computer science, becoming one of the founding fathers of artificial intelligence, after all.

By simultaneously considering modern approaches to political controls, such as political-institutional control (Bertelli and Busuioc 2021) and administrative reputation (Carpenter and Krause 2015), which reflected and advanced key aspects of accountability and administrative responsibility respectively, the present study's reconciled approach of institutional and behavioral rationality accompanied by the recalibrated organizational principle can shed light on better understanding how political controls and administrative mechanisms play effectively, resulting in democratic administration (Long 1952).

Finally, this research conducts an empirical investigation of the alternative theory of organizational principle, which considers political environments, utilizing the case of US federal agencies and their employees' use of innovative technology tools. It is noteworthy that the adoption and use of innovation in the context of administrative behavior critically falls onto the area of discretion. As innovation is inherently novel, it is less likely to align with the current administrative system, which is largely governed by codified rules and laws. An investigation of organizational innovation use can be effectively performed using the recalibrated lens of organizational principle as applying it to employees' decision-making. Meanwhile, individual employees may vary in their intention to use innovative technological tools to increase performance, supplementing their own capabilities in the individual domain. Such administrative implications can be examined reflecting the interplay with different modes of political controls.

The current paper can contribute to better understanding the effectiveness of various modes of modern democratic control on administration, delineating how administrative agencies function within organizational and institutional environments with detailed analyses of the dynamics of discretion. This study can also provide meaningful implications for studies of organizational innovation adoption and use that have maintained fragmented or contingent

findings (Borins 1998; Whitford et al. 2020), which may require a more generalized framework (Walker 2007).

Accountability, Administrative Responsibility and Organizational Principle

Accountability and Administrative Responsibility

The concept of accountability, as argued by Finer (1936; 1941), primarily concerns the legal and institutional oversight of administrative behaviors and outcomes, emphasizing the importance of limiting administrative discretion (Plant 2011). This accountability is ultimately grounded in citizens' sovereignty, as reflected in the constitution. While this perspective assumes that political control should monitor and adjust administrative status (Moe 1989), it inherently necessitates a robust establishment and operation of administration (Long 1952; Miller 2000).

Meanwhile, achieving administrative responsibility requires a solid establishment and operation of administration, which eventually necessitates the exercise of optimized discretion (Long 1952; Miller 2000). It is that fully controlling administration through legal and constitutional means is virtually impossible, as abstract statutes and clauses will inevitably have gaps in specific and contextual applications in real-world situations (Rourke 1972; Plant 2011). Instead, the sound establishment and operation of administration, accompanied by the exercise of optimized discretion, can maximize effective organizational outcomes, ultimately benefiting citizens' interests the most: the administration becomes responsible (Plant 2011; Miller 2000). Still, considering that public officials are not exempt from interest-seeking behaviors as human beings, the establishment and maintenance of political control and institutional frameworks for the eventual achievement of administrative responsibility can be necessary (Miller 2000). At the same time, rent-seeking also applies to politicians and representatives, necessitating checks and

balances by other institutions such as the executive branch (Miller 2000; Miller and Whitford 2016).

Recent scholars have suggested extended approaches with recurring disputes. For instance, the theory of administrative reputation suggests that the mechanism of generation and sharing of reputation of administrative performance as acknowledged by citizens, meeting both sides' interests, can better secure administrative responsibility, reflecting active aspects of both democratic control and administrative discretion for better organizational performance (Carpenter and Krause 2012). Meanwhile, other scholars criticize this approach, arguing that administrative reputation based on connected cognitive associations between administrators and citizens, can delegitimize the mechanism of political control. This criticism suggests that the mechanism becomes less effective by inducing competition among core factors of political control, such as citizens and the representatives; the principles can be less active in their role of controlling the executive branch (Bertelli and Busuioc 2021). Instead, this approach can indicate that political-institutional control, which relies on citizens' perceptive support for governmental operations focused on agencies' higher-level missions rather than citizens' perception of agencies' performance and related reputation generation and sharing, can be better secured through citizens' political participation. Examples include elections, campaigns, and petitions for legislative actions to check and balance with the executive branch, ensuring constitutional and legal accountability of administration.

Reflecting on the modern theoretical advancements, one can question which mode of political control—either focusing on 'public support' for agencies' mission and work, in terms of political-institutional control, or 'public perception' about agencies' performance, in terms of administrative reputation—could be more effective in achieving a *true* alignment of democratic

will with optimal administrative 'outcomes.'[6] A more valid assessment can be achieved through a sophisticated reflection of the administrative mechanism—as recalibrated in this study—which interacts with the political control frameworks.

Revisiting the Scientific Principle of Organization

To seek further fundamental understanding of administrative functioning, it is prudent to revisit classic studies of organization and administration from the last century. These studies offer insights that remain relevant to modern public administration (Bullock, Huang, and Kim 2022). While the theorization of the current paper draws from seminal works by Max Weber, Chester Barnard, and Herbert Simon, among others, it primarily pays attention to the scientific principle of organization as Simon primarily supported Weber's theory of bureaucracy (Simon 1946; 1997). The scientific principle of organization emphasizes two fundamental components: job specialization and the hierarchical transfer of rational authority (Simon 1946; Weber 1978; Waters and Waters 2015; Bullock, Huang, and Kim 2022).

Meanwhile, managers hold a characteristic role. It is primarily grounded in a distinctively additional specialization of jobs compared with staff, involving coordination of both vertical (through hierarchical transferring) and horizontal (through spreading authority across different ranks) flows of rational authority, thereby mediating the actualization of the scientific principle of organization (Mintzberg 1978; Bullock, Huang, and Kim 2022; Huang et al. 2021). While this managerial feature is critical to comprehend, it may be considered a 'secondary' point compared

[6] To utilize the same standard to compare the effectiveness of both modes of political control, this study focuses on organizational employees' use of innovative technology tools to the extent of organizational performance. The eventual implications or dimensions of the 'outcomes' of administration and political control may surpass the domain of organizational performance. However, this matter is beyond the empirical scope of this paper.

to the fundamental principle of organization, which primarily encompasses the specialization of jobs and the hierarchical transferring of rational authority.

Specialization of Jobs to Realize Rational Authority: The Specification of Order

Following the principle of job specialization, individuals within organizations are assigned specialized roles based on their comparative advantages, matched with the tasks they are best suited to perform (Daft 2012). This process ideally aims to optimize organizational functioning by aligning individuals' capabilities with task specifications. Once jobs are analyzed and assigned based on job specializations, specific task requirements are described in job specifications for the execution of these specialized roles (Nigro and Kellough 2014).

In the systematized operation of organizations, which involves multiple individuals cooperating to achieve shared goals, job specification—as well as job specialization—is also essential for reducing transaction costs (Williamson 1999). This aligns with the idea that the application of standardized rules can be vital for increasing systematized organizational efficiency (Lee 1984; Williamson 1999).[7] Ultimately, in conjunction with the significance of codified orders for tasks/jobs that are grounded in the hierarchical extent of governmental organizational administration (Lynn 2009; Rosenbloom, Kravchuk, and Clerkin 2008), the combination of job specialization and specification can lead to the specification of order.

Specified orders determine the specialization and specification of a job, including details such as the composition of sub-tasks and supervisory relationships. This specification of order is accompanied by rules and laws, maintaining the basis for the rationality inherent in the concept of authority within modern bureaucracies, distinguishing it from charismatic authority, for

[7] The eventual effectiveness of such organizational structurization and functioning can depend on environmental complexity (including the chaotic) and uncertainty, requiring organizational operational adjustments (Lee 1984).

example. Weber's theoretical framework of bureaucracy emphasizes specialized task accomplishments—originally—combined with hierarchical control through legally institutionalized rules, reflecting the modern operational model of organizations driven by 'rationality' (Weber 1978; Waters and Waters 2015). However, Weber's focus was primarily on the structural and functional aspects of organizations rather than the cognitive-psychological aspects of individual work. He posited that work should be impersonal, although he acknowledged the impossibility of fully securing this 'ideal' for humans (Waters and Waters 2015; Bullock, Huang, and Kim 2022).

Transferring and Accepting Rational Authority: The Satisfaction of Interest

In the context of the scientific principle of organization, Simon's theoretical developments also diverged significantly from Weberian approaches to organizational structure and function. Instead, Simon focused on elucidating the role of individuals in accepting rational authority and performing tasks within administrative systems (Simon 1957; Simon 1997, 140-207). His attention shifted toward cognitive-psychological aspects of individuals, particularly in the context of bounded rational decision-making (March and Simon 1993; Simon 1997).[8] Organizational employees' different degrees of work fulfillment and retention are all considered to be rational decision-making (Simon 1997, 72-176). Critically, this cognitive-psychological mechanism was further intertwined with the concept of the zone of indifference in accepting

[8] Rational decision-making is a cognitive-psychological process as even the processing of factual information requires psychological triggers such as emotions and feelings (Simon 1997, 72-139). It is inherently bounded as it is virtually impossible to gather all necessary information components for making a perfectly rational decision especially in limited time (March and Simon 1993; Simon 1955; 1997). Consequently, individual decision-making is compromised often falling short of perfect rationality and settling at a satisficing level (Simon 1997, 55-91).

transferred authority through the hierarchical (and horizontal) channels of communication (Barnard 1974; Simon 1997, 208-249).

The zone of indifference (acceptance), as originally conceptualized by Barnard (1974), indicates that authority cannot be realized through one-way directives simply issued by the top entity; the concept was adopted by Simon and elaborated to a greater extent regarding organizational mechanisms and dynamics (Simon 1997). Acceptance of authority, coupled with specified orders—as reinterpreted in the present study—occurs when there is substantial alignment between the required organizational contributions of individuals and their perceived satisfaction of interests. This satisfaction of interests may encompass tangible and intangible compensations, including incentives, as well as positive cognitive-psychological relationships with higher-ranked entities, such as supervisors and senior managers (Simon 1997, 92-139; Rousseau 1995; Wilson 1991). Collectively, these factors can constitute the satisfaction of interest.

Recalibrating the Organizational Principle

In summary of the discussions thus far, Simon's concept of *rational* decision-making and administrative behavior, when associated with other organizational factors, can be compared to Weber's notion of realizing 'rational' authority and bureaucratic functioning. It is important to differentiate between institutional 'rationality', following Weber, and behavioral *rationality*, following Simon, as they have distinct focuses, while they can be joined for a deeper understanding of organizational agents' operations of administration. Rationality, in various

forms, indicated as 'nuts and bolts' of human social phenomena (Elster 1989),[9] holds essential meaning for human organizational agents in both structural and functional dimensions (Weber 1978; Simon 1996; 1997; Thompson 2003; Meyer and Rowan 1977; DiMaggio and Powell 1983; Weick 1995; Giddens 1986; Pentland and Rueter 1994; Feldman and Pentland 2003). There is a possibility that they can complement each other in modern organizational functioning, with the institutional rational approach to authority—grounded in using rules—being interpreted and processed through behavioral rational decision-making.[10]

Specifically, underlining the fundamental implications of rationality which retains ambivalence, the present study recalibrates the scientific principle of organization—generating "organizational principle." Highlighting the institutional rationality aspect, we can consider the specification of order as one component of the principle by integrating specialization of jobs with specification of jobs. This comes in a codified format for tasks that minimize opportunity costs and help increase organizational efficiency in systematized administration through multiple persons' cooperation to achieve shared goals.[11] Meanwhile, highlighting the behavioral

[9] Elster (1989) points out that irrationality can also critically affect human behavior and social systems. Although not explicitly elaborated upon in this study, such aspects could be reflected in the perspective of behavioral rationality.

[10] The institutional rationality can manifest public organizational employees' constitutional-legal-procedural abidance for tasks with political controls—differentiated from private employees with market systems—in terms of the mode of social control (Perry and Rainey 1988).

[11] In the pursuit of realizing institutional rational authority for bureaucratic functioning, the specification of order differs from addressing goal ambiguity and clarity (Chun and Rainey 2005), as goals have a broader scope compared to orders. Goals also reflect components of values, which rather contrast with factual information components for behavioral rational decision-making—as ideally pursued (Simon 1997, 55-91). That is, codified orders orient

rationality aspect, we can consider the satisfaction of interest as the other component of the principle by integrating direct compensation[12] as well as relationships with immediate and hyper supervisors (Simon 1997, 92-139, 278-304; Wilson 1991).[13] These principles encapsulate the criticality and subtlety of hierarchical mechanism of rational authority transfer-acceptance for tasks accompanied by human satisfaction for the effective operation of modern administrative organizations.

After all, we can correlate the ontology of 'institutional controlling' with 'structure' (as a comprehensive modality or grammar of settling) and the ontology of 'behavioral actions' with 'functioning.' These structural and functional dimensions can indicate the ostensive and performative dimensions of organizational routines (Pentland and Rueter 1994; Feldman and Pentland 2003). Hence, the organizational principle, recalibrating the scientific principle of organization, can predict, in principle, how organizations can maintain, change, or evolve,

---

themselves in legitimate, logical, and factual specifications in the prescription and preemption of administrative actions (Rosenbloom, Kravchuk, and Clerkin 2008). Meanwhile, organizational goals, comprising not only facts but also normative values, can be administratively achieved through the realization of specific orders 'reflecting' the democratic will of top entities through complex organizational dynamics (Simon 1997, 72-91). Realizing the specification of order and achieving goal clarity (or preventing goal ambiguity) present different dimensions of challenge for organizational operations.

[12] Direct compensation can include incentivizing agents for their work through benefits and rewards (Perry, Mesch, and Paarlberg 2006), holding more extensive implications for organizational behavior (Oldham and Hackman 1981; Hackman and Oldham 1976; Rainey, Fernandez, and Malatesta 2021).

[13] Among the higher-ranked officials, direct managers and hyper-supervisors can hold differentiated meanings to a subordinate because their scope of coordination varies further; hyper-supervisors are closer to the perspectives of controllers. These managerial/supervisory individuals play a significant role in upholding the hierarchical structure of operational relationships.

considering dynamic internal and external interactions (Weber 1978; Simon, 1946, 1997, 1996; Feldman and Pentland 2003).

Furthermore, these organizational dimensions can meet individuals' own characteristic decisional attributes, such as currently having different satisfactions or preferences to use innovative technology tools for tasks. That is, when the organizational-level administrative behavior—reflecting both institutional and behavioral rationality—meets the individual-level administrative behavior in terms of information processing to solve facing problems (Newell and Simon 1972),[14] it forms an employee's organizational-individual administrative behavior in the institutional environment.

Administrative Discretion Re-Approached

Essentially, we can consider discretion as stemming from the functional dislocation of institutional rationality and behavioral rationality as they are simultaneously applied to employees' organizational-level administrative behavior (**Theoretical Proposition 1**). In conjunction, employees' decisional characteristics as individual-level administrative behavior, such as having varying degrees of satisfaction in using innovation for tasks, can determine the texture of discretion in terms of organizational-individual administrative behavior (**Theoretical Proposition 2**).[15]

[14] Employees' problem solving includes decisions on the degree of working (not) hard for accomplishments of given tasks.

[15] The current paper considers the first proposition as a theoretically given condition for investigating the realization of discretion. Subsequently, hypotheses testing grounds in the second proposition regarding the two rationality dimensions separately.

Specifically, throughout the realization of the recalibrated organizational principle, the institutional rational authority reflected in codified orders cannot be entirely realized as expected by the top entity, allowing for behavioral rationality to be significantly reflected in subordinates' task performances. This is grounded in the inherent challenge of applying abstract rules and laws for subordinates tasked with performing managerial or frontline duties in complex and varying environments. The functional dislocation of institutional and behavioral rationality leads to subordinates' discretion in implementations, as textured by individuals' decisional characteristics—realized by professionalism (Rourke 1972). Professionalism can be an essential part in turning the realization of discretion into optimal organizational outcomes; otherwise, discretionary capabilities may be abused or not optimally aligned with their affiliations to generate organizational efficiency (Miller 2000), such that employees are far less inclined to tasks or excessively pursuing individual satisfaction in innovation use as improper administrative behavior.

Related to the matter of accountability and administrative responsibility, it is acknowledged that the existence of basic political and institutional frameworks of control over administration can be necessary for administrative responsibility as well due to the potential excessive interest-seeking behaviors by administrators (Miller 2000).[16] Nevertheless, the commitment of public employees to their roles is not only about adhering to established constitutional-legal-procedural controls, which are inherently limited, but also about navigating

[16] At the same time, the collective power of bureaucratic organizations can maintain mutual checks and balances with the legislatures, for instance, which can reveal rent-seeking behaviors (Miller 2000). This understanding can align with the eventual approach of "Economy and Society," which involves the theory of bureaucracy by Max Weber (Waters and Waters 2015).

the space with administrative discretion (Long 1952; Miller 2000; Plant 2011). This discretion can be crucial for effective job performance, enabling employees to tailor their responses to the unique demands of their direct work environments (Kaufman 2006). By doing so, discretion becomes a key driver of organizational efficiency and growth, facilitating dynamic adaptation to complex environmental challenges while maintaining the integrity of professional responsibilities (Miller 2000; Miller and Whitford 2016).[17]

As such, administrative discretion may hold further nuanced and contingent implications for external relationships with political controls on governmental agencies. While modern scholars of the political-institutional approach acknowledge the potential significance of discretion for administrative performance, they remain suspicious about its eventual implications for securing accountability in governance (Bertelli and Busuioc 2021). On the other hand, the performance-focused approach maintains that the realization of nuanced discretion for effective organizational operations may be critical for achieving administrative responsibility through reputational interactions with citizens (Carpenter and Krause 2015), as detailed in a later section.

Given that the present paper integrates both aspects of institutional rationality and behavioral rationality into the theoretical framework of individuals' organizational operation in the institutional environment, we could attempt to better evaluate the effectiveness of both modes of political control. Next, this paper incorporates the context of organizational innovation adoption and use into the theoretical discussion further. In particular, innovation can highlight

[17] After all, along with the existence of political and institutional frameworks of control over administration, the checks and balances of institutions may impact the sound functioning of bureaucratic professionalism, which can be a critical foundation for the realization of nuanced discretion and effective administrative outcomes (Miller and Whitford 2016).

the subtlety of discretion in administrative behavior by potentially not substantially aligning with the existing administrative system.

Organizational Innovation Adoption and Use: A Context of Administration

Organizations and employees can adopt and use innovation, which refers to the creation of novel products, tools, services, skills, knowledge, methods, and processes, to enhance organizational performance (Zaltman, Duncan, and Holbek 1973; Daft 1982; Damanpour and Evan 1984; Damanpour 1991; Walker 2007). Regarding organizational innovation in public agencies, the adoption of technological tools has been a critical medium of endeavors to increase organizational performance, whilst specific mechanisms and clarified implications are yet to be completely confirmed (Walker 2007). The remaining conundrum of organizational (technology) innovation adoption grounded in narrowed/diversified approaches implies that a more generalized framework approach may provide prospective advancements in a better understanding of the mechanism and effects of such innovation adoption (Walker 2007).

The present paper's alternative framework can specify that organizational agents tend to adopt innovation when they perceive it as beneficial, particularly when it is acknowledged by their supervisors to enhance individual and organizational performance (Baer 2012).[18] Meanwhile, employees will still concern themselves with following rules and laws even when

[18] In doing so, while focusing on the dimension of satisfaction for individuals' administrative behavior in this study, we can note that the adoption and use of innovation can be less critically discerned in the cognitive-psychological realm (Baer 2012). Accordingly, the current paper does not concern distinguishing the adoption and use hereafter, also admitting the limitation of the empirical scope.

adopting/using innovative technology or tools for tasks that can be particularly critical in public agencies (Rosenbloom, Kravchuk, and Clerkin 2008; Lynn 2009).

The use of innovation in the context of administrative behavior significantly falls into the area of discretion. As innovation is inherently novel, it is less likely to align with the current administrative system as codified by rules and laws. Even if an organization decides to employ innovative technology tools, their specific relationships with and implications for the status quo of administrative task accomplishments by employees are put into the realm of greater unstructuredness. An investigation of organizational innovation use can be significantly observed using the lens of organizational-individual administrative behavior, applying the organizational principle to an employee's decision-making for tasks in terms of information processing. Additionally, political controls can also play a role in shaping innovation use as actualized and contextual administrative behavior in the institutional environment.

Realizations of the Organizational Principle in Technology Innovation Use

Specification of Order and Satisfaction of Interest

Specification of Order

The specialization of jobs to consider the comparative advantages of individual agents for job performance as well as the specification of jobs to clearly direct tasks to be accomplished appear in codified rules as specified, reflecting institutional rational authority. Integrating these two aspects, job specialization and job specification, the specification of order is one of the core axes of the organizational principle as recalibrated. This organizational principle will consistently apply to the case of technology innovation use as contextualized administrative behavior. Hence, as the specification of order increases, the use of technology innovation,

evaluated as the satisfaction of having an opportunity to use it, will also increase (Hypothesis 1).[19]

H1: As the degree of specification of order increases, the degree of satisfaction in having an opportunity to use innovative technology/tools will increase.

Furthermore, in the context of technology innovation, which encompasses creative tools, additional nuance can be added to the realization of individual employees' use of such innovation in terms of administrative behavior. As mentioned earlier, innovation, by its nature, is creative and new. It may not initially align with the existing administrative system; it requires administrative adjustments. When a public employee has a high level of innovative status (individual-level administrative behavior), such as a predominant existing satisfaction with the opportunity to use innovative technological tools, their decision-making regarding the use of these tools for task accomplishment may not ideally align with organizational principles such as order specification (organizational-level administrative behavior).

That being said, with an intervention of order specification regarding the current administrative system, an employee's high degree of satisfaction in having the opportunity to use innovative technological tools (holding high innovative status, as against low innovative status) may not necessarily result in a high predicted probability of technological innovation use by the employee (organizational-individual administrative behavior); yet, for employees in high innovative status, as the degree of order specification increases, this organizational principle may

[19] The processing of information involved in specified orders for tasks is also a cognitive and psychological phenomenon. However, this study primarily assigns that aspect to the dimension of behavioral rationality in the hierarchical setting of order acceptance, while assigning the aspect of organizational and institutional control to the dimension of institutional rationality.

remain effective in increasing innovation use. Meanwhile, a predicted probability of technological innovation use by an employee of low innovative status may be buffered with an intervention of order specification due to its fundamental effectiveness. Yet, for employees with low innovative status, as the degree of order specification increases, this organizational principle may be restricted to remain effective in increasing innovation use. Hence, with an intervention of order specification, the relationship between an individual's degree of existing satisfaction with the opportunity to use innovative technological tools and the predicted probability of having satisfaction in using innovative technology/tools will become non-linear (textured discretion); this can be specified as follows:[20]

H1-a: At the base level of order specification, the relationship between an individual's innovative status and the predicted probability of technological innovation use will be polynomial.

H1-b: As the degree of order specification grows, the predicted probability of technological innovation use of individuals with higher innovative status will increase.

H1-c: As the degree of order specification grows, the predicted probability of technological innovation use of individuals with lower innovative status will decrease.

[20] Concerning the hypotheses presented here, as per H1-a, when order specification is at the base level, individuals with middle-level innovative status are expected to exhibit the highest usage of technological innovation. However, the individuals with *middle-level innovative status* may fall into the 'no superiority' group in terms of a binary classification, relating to H1-c (not H1-b): as the degree of order specification increases, the predicted probability of technological innovation use among individuals with *lower innovative status* will decrease.

Satisfaction of Interest

In dealing with the transfer and acceptance of authority, another core axis of the recalibrated organizational principle is the satisfaction of interest derived from having a contribution-interest match. Primarily, this satisfaction of interest can be directly related to tangible/intangible interests in terms of rewards and benefits (Oldham and Hackman 1981; Hackman and Oldham 1976; Perry, Mesch, and Paarlberg 2006). Additionally, for agents, contribution-interest matching can also be related to finding satisfaction in interacting with their direct supervisor and higher manager (Hassan and Hatmaker 2015; Wilson 1991). As pointed out, managers (supervisors) play a critical role in terms of holding an additional specialization of jobs in coordinating the vertical and horizontal flows of authority throughout organizational task accomplishments. For agents, as human beings who are susceptible to involving personal and subjective humane features in rational decision-making, dealing with rules and hierarchy for administrative behavior, having good relationships with them can be a critical part of interest satisfaction.

Taken together, I consider having direct benefits/rewards and good relationships with direct supervisors and higher managers as satisfaction of interest. Intrinsic and extrinsic benefits can motivate public employees to work (Wright 2007). The organizational principle will consistently apply to the case of technology innovation use as contextualized administrative behavior. Hence, as the satisfaction of interest increases, technology innovation use evaluated as the satisfaction of having an opportunity to use it will also increase (Hypothesis 2).

H2: As the degree of satisfaction of interest increases, the degree of satisfaction in having an opportunity to use innovative technology/tools will increase.

Furthermore, we can also apply the aforementioned logic of discretionary implications of creative and new innovation to organizational-individual administrative behavior, which requires administrative adjustments with regard to the status quo. Then, we can expect that when a public employee has a high level of innovative status, such as a predominant existing satisfaction with the opportunity to use innovative technological tools (individual-level administrative behavior), their decision-making regarding the use of these tools for task accomplishments may not ideally align with organizational principles such as interest satisfaction (organizational-level administrative behavior).

That being said, with an intervention of interest satisfaction regarding the current administrative system, an employee's high degree of satisfaction in having the opportunity to use innovative technological tools may not necessarily result in a high predicted probability of technological innovation use in the affiliated organization (organizational-individual administrative behavior); yet, for employees in high innovative status, as the degree of interest satisfaction increases, this organizational principle may remain effective in increasing innovation use. Meanwhile, a predicted probability of technological innovation use by an employee of low innovative status may be buffered with an intervention of interest satisfaction due to its fundamental effectiveness. Yet, for employees with low innovative status, as the degree of interest satisfaction increases, this organizational principle may be restricted in its effectiveness in increasing innovation use. Hence, with an intervention of interest satisfaction, the relationship between an individual's degree of existing satisfaction with the opportunity to use innovative technological tools and the predicted probability of having satisfaction in having an opportunity to use innovative technology/tools will become non-linear (textured discretion); similar to the case of order specification, this can be specified as follows:

H2-a: At the base level of interest satisfaction, the relationship between an individual's innovative status and the predicted probability of technological innovation use will be polynomial.

H2-b: As the degree of interest satisfaction grows, the predicted probability of technological innovation use of individuals with higher innovative status will increase.

H2-c: As the degree of interest satisfaction grows, the predicted probability of technological innovation use of individuals with lower innovative status will decrease.

Political Control and Democratic Realization of Administration

Political-Institutional Control

Regarding accountability, with a focus on the political sphere, it is critical to note that the accountability relationship is established as follows: agents (1) render account to the principle, (2) provide explanations and arguments regarding performance outcomes, and (3) undergo scrutiny by the principle, including the possibility of direct measures such as sanctions when appropriate (Bovens 2007). However, the political accountability relationship does not entail a direct link between public agencies/agents and citizens (Bovens 2007). Public agencies are accountable to representatives, who in turn are accountable to citizens. Institutionally, public agencies do not directly render account to citizens, nor do citizens have direct means to scrutinize and sanction public organizations. Therefore, when considering citizens' interaction with public organizations concerning the agencies' performance, the citizens' accountability relationship with the public organizations must pass through representatives. Consequently, citizens' primary focus on public agencies' performance, mediated by the legislative representation system, can be somewhat abstract, centered on perceptions of support for the mission and work of public agencies.

As a type of political control on administration and performance, political-institutional control—reflected in the 'public support' for the work and mission of the organization—is not grounded in optimizing administrative discretion; rather, the democratic political control mechanism intends to minimize discretion. That is, the political-institutional control orients toward accountability-based constitutional-legal control on administration, for instance, through the voting process and institutional checks and balances. Still, although political-institutional control does not necessitate optimizing discretion, it also requires the establishment of an administration system, which will embody the critical and nuanced matter of discretion. As pointed out, without an established administration system, securing effective and responsible administration cannot be realized.

After all, while political-institutional control can accompany a 'sound' administration system, the accountability-based control mechanism can significantly restrict the realization of nuanced discretion and optimal operation of administration. Meanwhile, scholars have suggested that aspects such as administrative judgment, accountability mechanisms, the balance between institutional abidance and discretion, and the realization of rationality can help enhance the responsibility of governmental administrative operations (Bertelli and Lynn 2003). Still, an enforced extension of the linkage of rationality-based control from the dimension of administration to political control may amplify the persistent and eventual limitation of laws in application to complex and varying task environments. Hence, the predicted probability of innovation use within the domain of satisfaction as contextualized administrative behavior can be mitigated (Hypothesis 3).

H3: As the degree of public support for organizational mission and work increases, the predicted probability of having satisfaction in having an opportunity to use innovative technology/tools will decrease.

Administrative Reputation

As another form of political control, administrative reputation—reflected in the 'public perception' of an organization's performance—indicates interactions between agents and citizens in forming and sharing the reputation of an agency. In contrast to the case of political accountability, citizens can have direct functional associations with public agencies. Citizens can access information on public organizations' performance directly or indirectly, for example, through mechanisms like open government and the media, and can form perceptions of public organizations' performance.

Public perception of agencies' organizational performance can influence agencies' internal mechanisms through the formation and dissemination of reputation and mutual benefits. This can motivate public organizations to perform optimally to enhance their reputation and accrue tangible or intangible benefits, thereby satisfying citizens' interests to a greater extent. In doing so, the mechanism of administrative reputation can significantly align with the functioning of the organizational principle, involving the optimization of administrative discretion. This optimization can be likened to the functioning of an 'invisible hand,' balancing the administrative outcomes of individual agents to align with the collective desires of external stakeholders—thus ensuring that public agencies are administratively responsible to their stakeholders.

Some scholars argue that these mutual beneficiary interactions between administrators and the public may mitigate the mechanism of institutional checks and balances, potentially

increasing unchecked bureaucratic power (Bertelli and Busuioc 2021). While the implication of such political control for the entire governance environment is uncertain and beyond the empirical scope of this study, the present paper focuses on the fact that citizen intervention in administration, based on their perception of governmental agencies' performance, does not always coherently align with internal operative goal setting and processes—it primarily becomes a controlling mechanism.

That is, while public organizations internally communicate and establish sub-goals and objectives for operations, these may not necessarily align with citizens' perspectives, norms, or expectations. Nevertheless, the direction of the controlling intervention can better align with the organizational operation itself compared with the case of political-institutional control. Reputation can be sustained through networking interactions with various stakeholders, influencing behavioral norms and the identity of employees within agencies (Selznick 1984), which can influence professionalism in administrative behavior (Carpenter and Krause 2012). Hence, the predicted probability of innovation use within the domain of satisfaction as organizational-individual administrative behavior can generally be maintained with moderate mitigation (Hypothesis 4).

> *H4: As the degree of public perception on organizational performance increases, the predicted probability of having satisfaction in having an opportunity to use innovative technology/tools will moderately decrease.*

Data and Variables

This study utilizes a dataset called the Merit Principles Survey (MPS) 2016, conducted by the US Merit Systems Protection Board (MSPB), comprising approximately 14,000

observations. The survey targeted federal administrators and the organizations involved are the 24 major departments and agencies of the United States federal government, including the Department of State, the General Services Administration (GSA), and the National Aeronautics and Space Administration (NASA).

For the dependent variable, I utilize 'innovation use' (within the satisfaction domain), which represents the perceived level of "satisfaction of administrators in having an opportunity to use innovation technology/tools," measured on a 5-point Likert scale. The values range from 'very dissatisfied' to 'very satisfied,' with 'very satisfied' scored as five.

Independent variables were chosen to reflect two core dimensions with significant implications for administrative behavior and responsibility in the context of technology innovation use: the organizational principle and political control. The study substantiates the organizational principle within political environments, focusing on the administration of public organizations and incorporating innovation as a contextualized aspect of administration. More direct innovation-related factors were employed as control factors, as specified in a later section.

Specifically, regarding the organizational principle dimension, the specification of order and satisfaction of interest were employed. The specification of order was measured as the averaged value of job specialization and job specification. Job specialization was measured on a 5-point Likert scale by asking, "My job makes good use of my skills and abilities." Job specification was measured similarly on a 5-point Likert scale by asking, "I know what is expected of me on the job." Meanwhile, satisfaction of interest was measured as the averaged value of satisfaction with compensation, satisfaction with hierarchical relationships with a direct supervisor, and satisfaction with hierarchical relationships with a higher manager. Each of these factors was measured on a 5-point Likert scale by asking, respectively, "I am satisfied with the

recognition and rewards I receive for my work," "Overall, I am satisfied with my supervisor," and "Overall, I am satisfied with managers above my immediate supervisor."

Related to independent variables reflecting the dimension of political control, public support and public perception variables were respectively employed in their original setting, and these were measured on a 5-point Likert scale. Public support was measured concerning an administrator's degree of satisfaction with "Public support for your organization's mission and work." Public perception was measured concerning an administrator's degree of satisfaction with "Public perception of your organization's performance."[21]

Additionally, I incorporate factors of innovation adoption as control variables to investigate the implications of organizational principle and political control for contextualized administration in technology innovation use. Accordingly, I include manager status, age, and education as determinative factors of innovation adoption, as maintained by Damanpour in an important meta-analysis (1991) and supported by subsequent studies (Damanpour and Schneider 2008; Huang et al. 2021). The manager variable is binary. The age factor is binary, with a respondent classified as "Older" if aged 40 or older, denoted as '1' if meeting this criterion. The education factor is binary, with a respondent classified as "College" if the respondent's education level is equal to or exceeds an AA/BA degree, denoted as '1' if meeting this criterion. Descriptive statistics of the variables used appear in **Appendix A**.

[21] These measures of public support and public perception are evaluated by administrators, not the citizens themselves. However, considering that the mechanisms of political-institutional control and administrative reputation involve both citizens and administrators and have mutual formative associations, these indicators can still represent genuine meanings.

Finally, I utilize the survey respondents' agency affiliation information as agency dummies to control for the endogenous influence of each organization arising from additive characteristic features such as organization size (the amount of human and financial resources) and the nature of the mission and primary tasks. The descriptive information regarding agency affiliation of survey respondents appears in **Appendix D**.

Empirical Strategy

The current paper investigates the impact of the organizational principle and political control on technology innovation use as contextualized administrative behavior, focusing on the domain of satisfaction. Firstly, concerning the organizational aspects, this study emphasizes the mechanism of transfer-acceptance of codified rules embodying rational authority, encompassing both cognitive and psychological aspects that embody behavioral rationality. These aspects are recalibrated as organizational principles, such as the specification of order and the satisfaction of interest. Secondly, in conjunction, concerning the political control aspects, this study considers public support—closely related to political-institutional control—and public perception—closely related to administrative reputation—as separate factors that can function simultaneously.

Relatedly, to manifest theoretical recalibration and parsimony of relevant factors in empirical considerations, I first conduct exploratory factor analysis. The findings are presented in **Appendix B**. Specifically, when considering all covariates, including the political control dimension (public support and public perception) and the organizational principle dimension (job specification and job specialization; satisfaction with direct tangible/intangible benefits and relationships with direct supervisor and higher manager), three groups emerge as valid: political control, 'job specification,' and other factors of the organizational principle. However, it is worth

noting that when considering only factors of the organizational principle, two distinct groups emerge. *Job specialization* stands out from the other organizational principle factors, as well as from 'job specification.' This suggests that *job specialization*—as originally underlined by Weber and supported by Simon—may have distinct functions within organizational operational mechanisms when we further narrow down the analytical focus. However, when considering the mechanism of accountability and administrative responsibility in terms of the political control factors, 'job specification,' as codified, can be particularly critical.

In either case, the satisfaction factors, collectively, remain distinct from both job specification and job specialization. Thus, this confirms that representing the organizational principle dimension with the specification of order—theoretically integrating job specialization and job specification, which essentially embody institutional rational authority to the extent of codified rules for task accomplishments—and the satisfaction of interest—highlighting the cognitive-psychological implications of behavioral rationality for tasks—allows these two integrated factors to be used for the main analyses.

For the main empirical testing, I primarily use ordered probit analysis. Supporting the notion that using ordered measures as a dependent variable for OLS regression analysis can be biased (Long 1997), the present study conducted exploratory analyses using the ordered logit model. The empirical model likely bears some distortive features, as the Brant test indicates that it violates the parallel assumption of ordered logit regression. Instead, it might be less critical for ordered probit regression requiring non-relationships among the measured values when calculating derivatives of the Hessian. Given the generally acceptable structure of values of the

dependent variable measured on a 5-point Likert scale, ranging from very dissatisfied to very satisfied, I alternatively use ordered probit analysis.[22]

Finally, marginal analysis was importantly performed, particularly targeting the investigation of how the high or low innovative status of individual employees (the value of the dependent variable), with an intervention of the organizational principles in varying degrees, can result in the predicted probability of satisfaction in using technology innovation (the dependent variable) as actualized. In other words, this study analyzes how individual-level administrative behavior, playing with the dimension of organization-level administrative behavior, can result in organizational-individual administrative behavior in the dimension of satisfaction. Furthermore, the marginal analysis was purposed to study how administrative reputation, specified as public perception, and political-institutional control, specified as public support, conditionally impact administrative behavior (institutionalized organizational-individual administrative behavior).

[22] To support this approach, the analysis outcome using ordered probit analysis was compared to that of multinomial logit analysis, which is provided in **Appendix C**. While the outcomes of the ordered probit and multinomial logit analyses are not substantially different, in particular, the statistical significance of factors of political control decreases when the value of the dependent variable is lower, suggesting weaker associations with public support than with public perception. Compared to the consistently significant functioning of factors of organizational principle in associations with the actualization of innovation use, this implies that the factors of political control are less congruently related to the nature of administrative behavior, which can include improper behaviors as well, whilst suggesting that there might be more significant incongruency implications of public support for administrative behavior. Further concrete matters, including when the value of the dependent variable is higher, will be discussed in a later section. While indicating that the use of multinomial logit analysis can be limited, these characteristic features of political control factors likely explain the violation of the parallel assumption in ordered logit model analysis.

The current paper explores the characteristic associations of institutional and behavioral rationality as realized in an individual's internal domain of information processing. This is for a detailed examination of the impacts of the organizational principle on the independent individual cognitive-psychological functioning dealing with innovation use in the institutional environment.

Analysis

Overview

As shown in **Table 1**, **Model 1**, when considering the organizational dimension only, both factors of the organizational principle—order specification ($\beta=0.315$, $p<0.001$) and interest satisfaction ($\beta=0.317$, $p<0.001$)—have statistically significant and positive impacts on satisfaction with having the opportunity to use innovative technology/tools, the dependent variable. Furthermore, when the political dimension is considered together, both order specification ($\beta=0.293$, $p<0.001$) and interest satisfaction ($\beta=0.266$, $p<0.001$) remain statistically significant and have positive impacts on satisfaction with having the opportunity to use innovative technology/tools. Hence, **H1** and **H2** are supported, indicating that the factors of the organizational principle can have a significant impact on administrators' use of innovative technology or tools in the dimension of satisfaction.

Additionally, as shown in **Table 1**, **Model 2**, the political control factors—public support ($\beta=0.074$, $p<0.001$) and public perception ($\beta=0.151$, $p<0.001$)—also have statistically significant and positive impacts on the dependent variable. It appears that public perception generally has a greater impact than public support, although further investigation may be necessary. In a nutshell, **H3** and **H4** do not seem to be supported; the intervention of political factors may instead increase contextualized administrative behavior.

Meanwhile, the intervention of political factors alters the beta coefficients of the two organizational factors. Specifically, when considering the political dimension alongside the organizational dimension, as reported, the beta coefficient of order specification (0.293) appears to be greater than that of interest satisfaction (0.266), whereas the magnitudes of the beta coefficients were nearly identical when only the organizational dimension was considered. This suggests that although both factors of the organizational principle are independently and equally important within the organizational dimension, their associations with the political dimension can differ in characteristic ways. In this context, the specification of order, which reflects institutional rationality, interacting with political factors, may have more significant implications (Finer 1936; 1941; Moe 1989; Bertelli and Busuioc 2021) for the use of technology innovation as contextualized administrative behavior, which warrants more detailed analyses.

Table 1. Ordered Probit Regression Results

Variables	Model 1	Model 2
Public Support		0.074***
		(0.015)
Public Perception		0.151***
		(0.020)
Order Specification	0.315***	0.293***
	(0.021)	(0.021)
Interest Satisfaction	0.317***	0.266***
	(0.020)	(0.020)
Older	0.263***	0.229***
	(0.030)	(0.035)
College	-0.184***	-0.170***
	(0.029)	(0.029)
Manager	-0.062	-0.072
	(0.041)	(0.046)
Agency Dummy	Yes	Yes
Cut Point 1	0.474***	0.994***
	(0.074)	(0.080)
Cut Point 2	1.202***	1.744***
	(0.071)	(0.075)
Cut Point 3	2.108***	2.661***
	(0.068)	(0.075)
Cut Point 4	3.224***	3.812***
	(0.068)	(0.078)
Observations	11,747	10,999

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Robust standard errors adjusted for clustering by agency (department) appear inside parentheses.

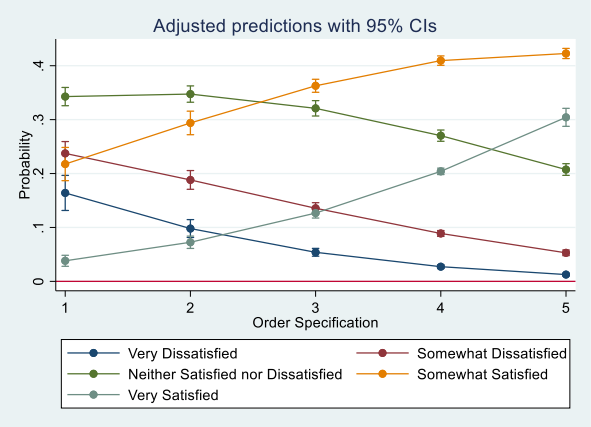


Figure 1. Effects of Order Specification

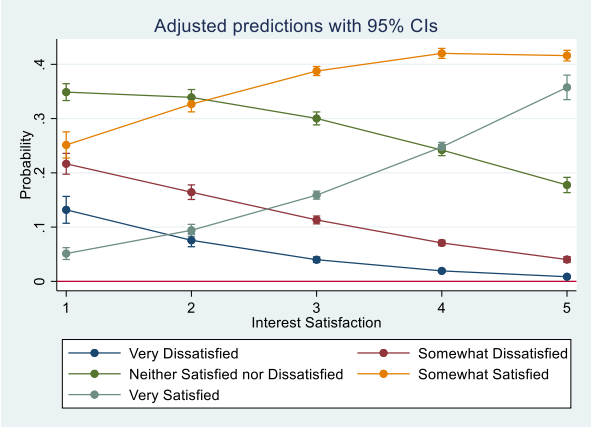


Figure 2. Effects of Interest Satisfaction

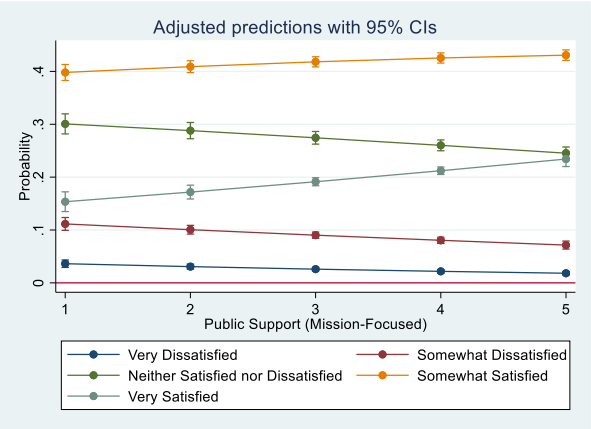


Figure 3. Effects of Public Support

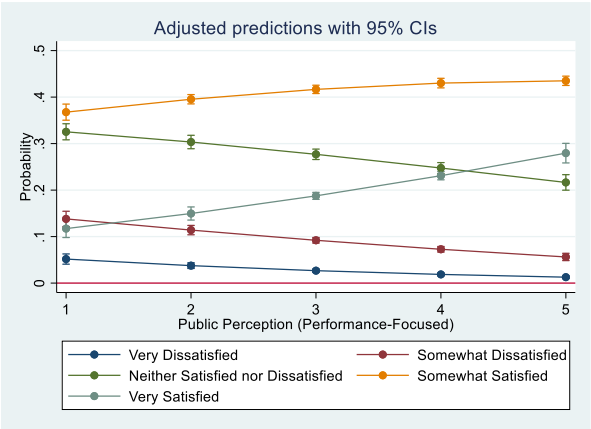


Figure 4. Effects of Public Perception

Nuanced Functioning of the Organizational Principle

Specification of Order

As shown in **Figure 1**, with the intervention of order specification increasing, the predicted probability of using innovative technology tools consistently rises only when the value of the dependent variable is higher, such as when individual perceptions of using innovation as an opportunity are high to very high (rated as 4 or 5). Conversely, as the degree of order specification increases, the predicted probability of using innovative technology tools consistently decreases when the value of the dependent variable is lower, such as when individual perceptions of using innovation as an opportunity range from very low to moderate (rated as 1, 2, or 3).

We can note that a higher value of the dependent variable indicates that an individual currently holds a higher innovative status for using related technological tools for tasks. From this perspective, when a person significantly views innovation use as an opportunity to enhance their capability in task accomplishments (individual-level administrative behavior), they may find the intervention of the specification of order challenging (organizational-level administrative behavior), leading to a drop in the initial point of the predicted probability of using innovative technology tools (base-level organizational-individual administrative behavior).

The specification of order can impose restrictions on innovation use since the extent and scope of utilizing this novel innovation may not align seamlessly with established administrative systems, while an individual may have a high innovative status to have an opportunity to use innovative technology tools. This point of gap between organizational and individual-level

administrative behavior concretely actualizes discretionary capabilities—textured discretion.[23] Eventually, as the degree of order specification increases, which may involve aspects of iterative reflections of new information and needs on established rule systems, the predicted probability of innovation use tends to increase—realizing nuanced discretion via professionalism (professionalized organizational-individual administrative behavior).[24]

In summary, when organizational employees have a higher innovative status, the specification of order to an increasing degree can help realize an increased use of innovative technology tools.

Furthermore, even in the two cases of higher rates of individual perception regarding the use of innovation as an opportunity, the intervention of order specification at an increasing rate holds different implications for the professionalism-based administrative behavior. The predicted probability of innovation use is consistently higher when the individual perception of using innovation as an opportunity is high (rated as 4) rather than very high (rated as 5) while maintaining similar slopes of increase at an approximately constant rate for the predicted probability of innovation use as the degree of order specification increases. This suggests that organizational factors can pose more challenges for agents who are most highly motivated for innovation use. That is, paradoxically, it seems that in terms of both the initiation effect of the

[23] This matter of a gap should not be confused with the matter of functional dislocation of actualizing institutional and behavioral rationality, both grounded in the organizational principle, which reveals the substance of discretion to be textured with individual-level decisional characteristics or statuses. The aspects of order specification and interest satisfaction, respectively highlighting institutional and behavioral rationality, are separately addressed for the empirical investigation of this study.

[24] This presumes that institutional checks and balances basically remain intact.

organizational principle intervention on innovation use and the escalation effect as the degree of the organizational principle increases, a high (not very high) level of order specification in the innovative status of a public employee can result in the highest predicted probability of satisfaction in innovation use, as measured in the satisfaction dimension.

Meanwhile, when the individual perception of innovation use is lower (rated as 1, 2, or 3 on the dependent variable), the intervention of order specification does not lead to a drop in the initial point of the predicted probability of using innovative technology tools; rather, the measures remain at moderate to fairly high statuses. While the existence of order specification itself can consistently pose a significant challenge for an employee with very high innovative status, as pointed out, on the other side of the coin, the same function can be significantly powerful in buffering employees with lower innovative statuses to use innovative technology tools for task accomplishments—the implications of order specification remain substantial. There is no paradox—no reversed orders of the impacts between the innovative status rates.

Nevertheless, order specification, as an organizational principle, does not maintain its significance without a coherent conjoint intervention of individual-level dynamics of administrative behavior. Eventually, for employees with lower innovative statuses, as the degree of order specification increases, potentially including aspects of iterative reflections of new information and needs on the established hierarchical system, the predicted probability tends to decrease. When organizational employees do not have a significant perception of technological innovation use, an increasing specification of order can be limited in optimizing organizational-individual administrative behavior: both aspects of organizational and individual dimensions of administrative behavior are critical for realizing synthetic administrative behavior.

After all, these findings suggest a critical aspect of technology innovation use as administrative behavior: as order specification intervenes (organizational-level administrative behavior), the relationship between an individual's innovative status (individual-level administrative behavior) and their use of technological innovation (organizational-individual administrative behavior) becomes non-linear. **H1-a**, **H1-b**, and **H1-c** are supported, indicating the significance and subtlety of textured discretion.

Satisfaction of Interest

Regarding the satisfaction of interest, as observed in **Figure 2**, there is no significant difference compared with the case of order specification. This implies that they are independent but equally crucial components of the organizational principle. However, the specific reasons may differ. In this context, satisfaction of interest emphasizes the cognitive-psychological aspects of transferring and accepting rational authority for tasks. In contrast, the case of specification of order highlights the fundamental criticality and also limitation of institutional rationality in applying the abstract mode of codified control to complex and varying immediate environments of tasks.

A notable difference compared to the case of specification of order is that the predicted probability of using innovative technology tools seems to be consistently higher when an individual holds the highest innovative status (rated as 5). This might imply that cognitive-psychological aspects, as highlighted by behavioral rationality, can be particularly critical for active organizational innovation adoption and use (Baer 2012).

We can continue to note that the intervention of interest satisfaction with an increasing degree holds similar ambivalent significance for organizational-individual administrative behavior, as observed in the case of specification of order. Interest satisfaction, as an

organizational principle, can restrict an employee with the highest innovative status (rated as 5 rather than 4) in realizing the highest-level administrative behavior. Yet, in the case of employees with high innovative statuses (rated as 4 and 5), as the degree of interest satisfaction increases, the predicted probability of innovative technology use also increases—though the relative detrimental effect on employees with the highest innovative status consistently remains. The paradox persists. Meanwhile, interest satisfaction can buffer employees with lower innovative statuses to have a fair motivational status to use innovative technology tools in terms of contextual administrative behavior. However, the organizational principle, while maintaining restrictions on individual-level innovative statuses, is not consistently solely effective.

After all, similar to the case of specification of order, these findings suggest a critical aspect of technology innovation use as administrative behavior: as interest satisfaction intervenes, the relationship between an individual's innovative status and their use of technological innovation becomes non-linear. **H2-a**, **H2-b**, and **H2-c** are supported.

Additional Functioning of Political Control for Administration

As discussed earlier, when considering organizational factors, both public support and perception significantly have positive impacts on public administrators' use of innovative technological tools. Furthermore, when political control factors are introduced, both public support, as illustrated in **Figure 3**, and public perception, as illustrated in **Figure 4**, generally uphold the earlier findings regarding the nuanced realization of the organizational principle—overall patterns maintain generally. Especially, when contrasting Figure 3 with Figure 1 and Figure 4 with Figure 2; even when comparing the highest predicted probabilities for each case with different innovative statuses (values of the dependent variable), the predicted values are not (considerably) smaller. In fact, depending on the degree of the political factors and innovative

statuses, the predicted probability of using innovative technology tools is greater than when the political factors are omitted. We can confirm that **H3** and **H4** are not supported.

These findings are likely because, first, citizens' perceptive support can be crucially related to the higher-level mission and work of an administrative organization, while the mission can critically align with the specification of order for organizational administration—in terms of institutional rationality—in 'reflecting' democratic will. When an organizational order is clearly specified and understandable (to achieve important and achievable goals), integrating both dimensions of institutional and behavioral rationality, it can motivate public employees to work, partly based on the goal theory (Wright 2007). The synthetic realization of rationality can motivate employees to work towards achieving the organizational mission. Dynamic communication, as a prerequisite through administrative adjustments, can facilitate cognitive task processes by helping employees better understand why they should work in that way (Wright 2007).

Relatedly, it is notable that the levels of predicted probability of using innovative technology tools are generally sound, holding relatively stable levels regardless of the measured degree of public support and the innovative statuses. This is probably because constitutional-legal control is a constant (less dynamic yet substantial) factor in terms of the key operational mechanism of the control mode, while the application of rules and laws is also a fundamental condition for public administrative operations (Lynn 2009).

Overall, political-institutional control results in a more "averaged" administrative functioning, diminishing its characteristic reliance on nuanced professional discretion. Cognitive and psychological work motivation dealing with orders and mission—as specified—as well as satisfactory intrinsic and extrinsic benefits (Wright 2007), reflecting the dimensions of

institutional and behavioral rationality as a joint, can be influenced by the political-institutional control mechanism. The political-institutional control mode can enforce the extent that the organizational principle can buffer organizational employees in a low innovative status to reveal more active administrative behavior of innovation use, although the eventual relationships are nonlinear. Relatedly, it remains noteworthy that public officials with the highest innovative status still do not achieve the highest predicted probability of using innovation; rather, employees with the second-best innovative status exhibit the highest predicted use of innovation. The political-institutional control mode manifests this adversarial implication of the organizational principle for organizational-individual administrative behavior.

Secondly, concerning public perception, the overall outcomes are similar to those observed with public support, albeit with less stability. This is likely because when considering public perception, which involves organizational performance and reputation generation and sharing, there remains a greater influence of organizational mechanisms.

It appears that administrative reputation imposes controlling suppressions on and somewhat alleviates characteristic administrative functioning, as the political mechanism may not always align with public organizations' internal goal-setting and processes. Nevertheless, public perception of agencies' organizational performance may also effectively influence internal mechanisms through reputation formation and dissemination, leading to mutual benefits (Carpenter and Krause 2015). The work motives of employees, which ultimately stem from their personal fitness for organizational operations, can be mediated by the congruence of their values with those of their organization (Wright and Pandey 2008), which may be related to the process of reputation formation and sharing (Carpenter and Krause 2012; 2015).

Meanwhile, it remains evident that public officials with the highest innovative status do not exhibit the highest predicted probability of using innovation; rather, employees with the second-best innovative status demonstrate the highest predicted use of innovation. However, when comparing employees with the highest innovative status (rated as 5 on the dependent variable) between the case of public perception and public support, it is worth noting that the predicted probability of innovation use is greater in the case of public perception. That is, the adversarial implication of this control mode for the most innovative employees is less significant than that of the political-institutional control mode.

In summary, in the context of using innovative technology, it appears that employees with top innovative standing can better fulfill their responsibilities when subjected to political controls through administrative reputation mechanisms, emphasizing the significance of behavioral rationality. This underscores the importance of exercising nuanced discretion and optimizing performance. Meanwhile, general employees seem to achieve optimal performance when subject to political control through political-institutional mechanisms, emphasizing the significance of institutional rationality. The contingent superiority of an accountability approach suggests that legal control can significantly moderate public officials who do not prioritize active and professional administrative behavior—either rated as not very high or below (except for the highest) in innovative standing—for task accomplishments.

These empirical findings reveal that institutional-political control can contextually *support* administrative behavior, particularly among employees who would be inclined to perform improper behaviors—either showing less inclination to work or excessively seeking personal satisfaction—whilst, indeed, diminishing its functional reliance on nuanced professional discretion (Bertelli and Busuioc 2021). On the other hand, although the administrative reputation

model may face criticism for delegitimizing its control mechanism and restricting citizens' control capability over the executive branch (Bertelli and Busuioc 2021), in fact, the model can generally *uphold* civic controllability. This is evidenced by the alleviated patterns of administrative operations while also holding significant implications for administrative mechanisms with discretion that can help secure administrative responsibility (Carpenter and Krause 2012; 2015; Busuioc 2016).

In both models, the most innovative employees tend to perform second-best, raising fundamental questions about managing public organizations and employees. As noted, this issue persists even without the intervention of political control factors. This is likely due to the fundamental power of hierarchy in control, creating a conundrum in organizational management and administration—dealing with desires, authority and responsibility (Arrow 1974).

Discussion and Conclusion

The present study delves into the perennial challenge of aligning optimal administrative outcomes with societal preferences in democratic governance. It revisits the historical debate between the accountability and responsibility approaches to administration, elucidating the divergent views on discretion. To understand this matter more effectively, a robust theoretical framework of organizational operation that incorporates political factors is necessary. In the context of organizational technology innovation use, this study investigates the theoretical framework's mechanisms and dynamics interacting with different political control modes, highlighted by modern scholars as the political-institutional control and administrative reputation. While the accountability and responsibility approaches are differently underlined

modes of democratic control on administration, the common essence may be the point that the best administrative outcomes should reconcile with what the populace collectively desires.[25]

To this extent, differentiated from canonical political or conventional administrative studies' approaches, the present study primarily underscores the independent and genuine significance of the organizational principle, as well as individuals' information processing aspects, for public agencies' accountable or responsible administration in a democratic society. As empirically revealed in this study, in a nutshell, political controls may seem to support or uphold administrative functioning (Bertelli and Busuioc 2021; Carpenter and Krause 2012; 2015). Nevertheless, the empirical findings encompassing the deeper aspects of the organizational principle indicate that different modes of political controls can variably target different subjects or contexts of administrative behavior. For instance, political-institutional control may help buffer individuals from potentially improper administrative behavior, while administrative reputation may encourage more active administrative behavior. Furthermore, the entire relationship between the organizational principle and individuals' administrative behavior can be nonlinear, indicating the contextual realization of discretion can be key to understanding the real and eventual scene of reconciling the best administrative outcomes with the will of the populace. Eventually, the exercise of discretion accompanies professionalism, which may be maintained through institutional checks and balances (Miller and Whitford 2016).

This study's theoretical approach can help overcome the everlasting discussion on the politics-administration dichotomy, inherently dealing with the fact and value distinctions

[25] The ultimate scope of this point may involve comprehensively maintaining checks and balances in governance, concerning any (groups of) entities or individuals 'incongruently seeking interest' in governance, as Woodrow Wilson also partially pointed out (1889).

(Goodnow 1886; White 1926; Frederickson et al. 2011). The present paper's theorization is grounded in reconciling the neo-positivist way of studying administration (Simon 1997) with another classical approach that emphasizes the institutional realization of social values (Weber 1978; Waters and Waters 2015), alongside crucial modern studies on administration. That said, this research intends to advance theories of democratic control on administration with reflections of civic values for responsible administration (Mosher 1982) by assembling deeper fundamentals of organizational operations.

This study may imply a pathway for a more scientific study of public administration, which is substantially grounded in the significant functioning of the executive branch (Wilson 1887), actively maintaining checks and balances in the entire governance (Long 1952; Miller 2000; Miller and Whitford 2016). People's interest-seeking and internal/external influences do affect bureaucratic structures and functions (Moe 1989). However, bureaucratization, while inevitably being political and dealing with social value distribution in various aspects (Weber 1978; Lipsky 1980), interacting with environments, may be grounded in the more substantial scientific principle of organization as genuine social phenomena (Blau 1963; Giddens 1986), with technology as a significant factor for the manifestation/transformation of organizational routines (Perrow 1967). Institutional environments will characterize how public organizations, compared to private firms, can relatively differ in structurization and functioning, with substantial influences of political controls vis-à-vis the market system (Perry and Rainey 1988; Williamson 1975; 1999). This refined and synthetic theoretical approach to administrative organizations could also contribute to advancing organizational innovation research, which has struggled with contingent and fragmented findings (Walker 2007; Borins 1998).

Meanwhile, this study has several limitations. First, using ordered probit analysis, the empirical testing addresses an individual's internal aspects of information processing; this empirical strategy may introduce endogeneity bias when predicting actual behavioral outcomes. Furthermore, through the functional (in)congruence of institutional and behavioral rationality in various scenes, routines can realize performance and visualize organizational maintenance, change, and evolution; this aspect is limited in the empirical investigation in this study. That being said, it is also limited to reflecting the actual 'anatomy' of administrative behavior (Simon 1997, 305-355) by not elucidating other organizational aspects. As such, budgeting, although omitted in this paper, can be critical for achieving organizational efficiency (Simon 1997, 250-277), extending beyond individual information processing. Budgeting can have significant implications for the institutional and rational operations of administration (Willoughby 2014). Relatedly, Simon (1996) emphasized the significance of economic rationality, considering both structural mechanisms and cognitive-psychological phenomena.[26]

Second, focusing on the ontology of public administration studies, this paper's empirical scope of assessing the effectiveness of accountability and responsibility-based approaches is limited to the direct functional implications of governmental administrative agencies. In doing so, this study does not consider the direct influences of other political institutions, such as the legislative branch (Clinton, Lewis, and Selin 2014), or the influences of other institutional branches, such as the judiciary (Bertelli and Lynn 2003). Third, even within the administrative scope, the structural and functional dynamics of hierarchy in governmental agencies, such as the executive branch, can be much more heterogeneous, ambiguous, and even adversarial (Heclo

[26] Still, the endogenous aspect may remain substantial in originating organizational routines in maintenance, change, or evolution (Feldman and Pentland 2003).

1978; Yackee 2006; Hollibaugh 2015; DeHart-Davis, Davis, and Mohr 2015; Miller and Whitford 2006). Additionally, while hierarchy is a pivotal component of the organizational principle, diagonal and network relationships among subsystems should also be considered (O'Toole 2015), as hierarchy is a phenomenon of complexity (Simon 1996; Downs 1967). Moreover, as hierarchy is conditioned by the complexity of inner and external environments, interactions and diverse perspectives of citizens regarding administrative representation and burden should be reflected (Meier 1975; Moynihan, Herd, and Harvey 2015).[27]

Nevertheless, this study offers an integrated theoretical framework to comparatively assess accountability and responsibility approaches through empirical investigation. In doing so, this research advances a deeper understanding of administrative operations within organizations, enabling detailed empirical investigation of the realization of discretion, including its interactions with political control factors. Additionally, this work can contribute to a more generalized and nuanced understanding of government organizations' adoption and use of technological innovation.

Finally, we also need to note that an increasing use of artificial intelligence (AI)/machine learning (ML) technology systems can impact the understanding, forming, and sharing of administrative reputation of public agencies (Anastasopoulos and Whitford 2019). Also, the use of AI/ML systems can bear institutional control problems as AI holds discretionary capabilities in organizational functioning (Bullock, Huang, and Kim 2022). Robust studies of technology, innovation, and administration, as integrated, will ever be more critical for human society.

[27] One may question how mechanisms of bureaucratic representation will function concerning organizational control and coordination, and how administrative burden can be addressed in the inevitable nature of organizational institutionalization.

CHAPTER 3

COGNITIVE IMPACTS OF AI ON ADMINISTRATION[28]

[28] Kyoung-cheol (Casey) Kim. To be submitted to the *Journal of Public Administration Research and Theory*.

Abstract

There is a lack of empirical research systematically investigating how and why employees adopt artificial intelligence (AI) in specific organizational contexts, including different types of organizations and positions. This study focuses on AI as a decision-making agent operating within organizational administration, with a specific emphasis on the case of 'basic AI' as a form of supervised machine learning that involves greater characteristics of control. I review existing literature on organizational innovation adoption, drawing insights from classic works in administration, information processing, and organizational sensemaking to develop an integrated theoretical and analytical lens. For empirical testing, I utilize survey experiment data collected from National Taiwan University (N=1,200), consisting of responses from employees working in both public and private organizations. The experiment includes a decision exercise in which all participants were involved, allowing for pre- and post-perception measurements. The treatment group experienced AI intervention during the decision exercise, while the control group did not. To analyze the data, I employ difference-in-differences (D-i-D) analyses. The results indicate that employees of public organizations who experienced AI intervention during the decision exercise are more likely than others to agree with the utilization of AI for conducting organizational operations.

Introduction

Artificial Intelligence (AI) has the potential to significantly influence human cognitive decision-making processes and outcomes, which are recognized as integral to organizational administration (Simon 1997). Management scholars increasingly view AI as a machine's ability to perform cognitive functions that humans typically associate with "perceiving, reasoning, learning, interacting with the environment, problem solving, decision-making, and even demonstrating creativity" (Rai, Constantinides, and Sarker 2019, 3). When AI is introduced into organizational operations, it has the capacity to profoundly impact the cognitive functioning of human agents involved in administering the organization.

The current paper specifies such cognitive impacts of AI on administration. In doing so, while taking the same line with management and behavioral scholars who increasingly consider AI as an agent, underlining its autonomous capabilities in decision-making and execution for designated tasks and procedural processing (Rahwan et al. 2019; Rai, Constantinides, and Sarker 2019; Berente et al. 2021), the present study focuses on the perceptive dimension of human organizational employees when adopting and using AI (eventually, considering its autonomous decisional capabilities, "interacting with") from the perspective of organizational innovation adoption and contextualized administrative behavior.[29] Human employees will evaluate benefits of adopting and using AI, based on its operationality and their organizational natures and positional roles.

[29] While the current paper does not directly address AI as an autonomous decision intervention within an organization, it ultimately aims to lay a sustainable theoretical foundation for future research that integrates humans and AIs as decisional actors within administrative environments (Bullock, Huang, and Kim 2022).

To the extent of operational autonomy, AI systems, which are primarily based on supervised machine learning (ML) technologies, can be distinguished from AI systems that are mainly based on the other ML techniques such as unsupervised, deep, and reinforcement learning (Shalev-Shwartz and Ben-David 2014). The supervised ML-based AI can significantly feature higher controllability, allowing it a certain level of discretionary capability from the perspective of the controller (Hao 2020; Roberts 2021). These features could generally be reversed for other ML-based AI systems—lesser controllability and a higher level of discretionary capability (Hao 2020; Roberts 2021). Accordingly, human organizational employees could value the operational characteristics of AI systems for their work and performance in adopting and utilizing AI contingent on environmental conditions (Russell 2019; Marcus and Davis 2019), as reflected in the pivotal nature of their organization and job—specified as the type of an organization (i.e., mechanistic vis-à-vis organic) as institutionally configured and a position (i.e., manager or staff) they genuinely hold for organizational operation.

Meanwhile, public administration scholars have explored understanding the adoption and utilization of AI, focused on its technological features, within broader organizational and environmental contexts (Meijer, Lorenz, and Wessels 2021; Neumann, Guirguis, and Steiner 2022; Madan and Ashok 2022; Young et al. 2021; Alon-Barkat and Busuioc 2022).[30] Additionally, some researchers have investigated the significance of individual administrators' perceptions related to adopting and using AI such that public officials can trust and follow AI's decisional recommendations for their task accomplishments when there is coherence with their

[30] A well-developed example of this approach is the TOE (Technology-Organization-Environment) framework (Neumann, Guirguis, and Steiner 2022).

professional judgment (Selten, Robeer, and Grimmelikhuijsen 2023). There also exist arguments that automation may decrease the perceived discretion of human street-level bureaucrats; this implies the significance of such phenomena to furthered organizational operations, adopting and using certain types of AI (Wang, Xie, and Li 2022; de Boer and Raaphorst 2021).

However, it is important to note that current studies have placed less emphasis on specified organizational mechanisms when discussing the *organizational* use of AI (Bullock, Huang, and Kim 2022), representing a significant missing link that has received less attention but can be a vital part of such research. Further, the implications of discretion, in terms of latent loss of control, from the controller's perspective, over autonomous agents' decision-making, which applies to AI in terms of artificial discretion (Young, Bullock, and Lecy 2019), associating with the discretion-as-perceived of humans, can be genuinely understood from a deeper organizational perspective.

I intend to add a contribution to the current scholastic endeavor. Why and how will administrators—throughout more specific organizational and operational mechanisms—adopt and use AI of different types, while organizations are inherently grounded in broader institutional environments? Moreover, how can the significance of the discretionary aspect of AI in organizational administration, as perceived by human employees, be better captured? This study attempts to better understand the mechanism of individual human agents' adoption and use of AI in specified organizational administrative contexts, including different types of organizations and positions that represent a substantial part of the organizational mechanism of structure and functioning in institutional environments.

The paper begins with an overview of conventional theories of organizational innovation adoption. Next, it incorporates classics of administration, along with information processing and

Weick (1995)'s organizational sensemaking. In conjunction, it considers different types of AI's operational features in organizational contexts. Then, for empirical testing of hypotheses, I utilize data from a research team that employed a survey experiment (Huang et al. 2021). And I employ difference-in-differences (D-i-D) analyses to evaluate AI's cognitive impacts on human agents, considering the time effect within administrative contexts—as specifically reflected in the organizational sensemaking. The paper concludes with a discussion of contribution of this research to the scholarship of public administration in general as well as AI research concerning organizational implications.

Theories of Organizational Innovation Adoption

Organizational innovation is defined as the development of creative products, devices, services, skills, knowledge, and processes aimed at achieving improved organizational outcomes (Zaltman, Duncan, and Holbek 1973; Damanpour and Evan 1984; Daft 1982; Damanpour 1991; Walker 2007). The concept of 'innovation' encompasses extensive social and institutional phenomena, ranging from the generation of novelty arising from problem identification or opportunity seeking to its implementation and diffusion. For organizational innovation adoption, in particular, the organizational context plays a significant role in addressing individual limitations and facilitating the achievement of shared goals with greater efficiency and scalability.

Fundamental Factors of Organizational Innovation Adoption

Whitford and associates (2020) point out that Borins' seminal research on innovation, published in 1998, underlined the criticality of nuance and conditionality, and that Clausen, Demiricioglu, and Alsos (2020) systematized such approach by highlighting the significance of

push and pull factors around internal and external environments of organizations for their operation and innovation adoption. Whitford et al. (2020) further elucidated organizational professionalism as the push and the agencies' task environment as the pull, among others, focused on the case of governmental agencies' robotics innovation adoption at the organizational level.

Relatedly, public agencies and private firms may face different organizational conditions for innovation adoption in that rule, protocol, and accountability can be significant factors for governmental agencies' innovation adoption, while private firms may more concern the extent of market advantages—for both of public and private organizations, considering benefit aspects by fulfilling these criteria with innovation adoption (Whitford et al. 2020, 977-978). These sectoral aspects may help substantiate/differentiate organizational adoption of innovation, playing with other internal/external environmental factors of organizations—maintaining their operative mechanisms, which imply the organizational substance for the environmental conditionality of organizational innovation adoption (Kim 2024a).

To the extent of organizational innovation adoption by employees, Damanpour (1991)'s meta-analysis specified fundamental factors for the actualization, reflecting the significance of institutional environment of organizations, internally and externally. In doing so, he argued that the sector variable can serve as a substantive moderator that governs the validity and influence of previously expected attributors in relation to organizational innovation adoption. In other words, determinants of organizational innovation adoption play their role on the ground, embedding the sectoral influence (Damanpour 1991).

Although the sector may hold significant implications for actualizing organizational operative mechanisms playing with environmental conditions, for organizational innovation

adoption, specifically, and organizational administration, generally, the identification of the sector has not been fulfilled. Relatedly, theories still need to be fully integrated regarding whether the public and private sectors are different. Public administration scholars have maintained two 'ironic' points. One is that the public sector may be genuinely different from the private sector, against general (business) administration scholars who have argued that public and private organizations are all the same except for minor issues (Rainey, Fernandez, and Malatesta 2021; Sayre 1958). The other is that we have observed that organizational types blur, lessening the sectoral distinction due to, i.e., an increasing hybridization of organizational formulations and operations; the matter of, e.g., publicness has been accordingly discussed (Rainey, Fernandez, and Malatesta 2021; Bozeman 2004).

Revisiting Perry and Rainey's (1988) consideration of the mode of social control, in conjunction with classics of administration theories, may provide a clearer answer to the question of sectoral difference and to seeking in-depth meaning of the sector to organizations' operations.[31] As substantial factors of institutional environments in modern institutional societies, political control significantly influences the structure and functioning of public organizations, while the market mechanism substantially affects those of private organizations, relatively speaking. Embedding influences of the mode of social control, when it comes to the organization itself, achieving goals efficiently and addressing individual limitations of physical and intellectual capabilities—facing, e.g., environmental complexity—requires the structural and functional organization of agents and resources, which entails hierarchy, deployment

[31] While being critical along with the mode of social control, the ownership and source of funding are not the primary focus of this paper.

(allocation), and coordination to optimal degrees (Weber 1978; Waters and Waters 2015; Simon 1996; 1997; Galbraith 1973; 1977; Lee 1984; Mintzberg 1978): Organizational systematization.

For the organizational systematization, the key operative *principles* of bureaucracy (organization), highlighting specialization of jobs and hierarchical transfer of authority, can apply to both public and private bureaucracies without discrimination (Simon 1946), which will be detailed in a later section. In conjunction, the mode of social control can be the very *ground* of organizations for their actualization of the operative principles. For instance, in the case of public organizations, while holding the operative principles of an organization in effect, the political control mode—which realizes throughout the significant application of the constitution and subsequential legal and procedural abidance—will substantiate how public organizations operate (e.g., more rigidly) and what it works for (i.e., to be accountable to the public, by substantively following constitutional rules and procedures) (Lee 1984). Additionally, other organizational factors, such as primary tasks and objects, will be significant in organizational operations, leading to organizational performance and innovation adoption, and vice versa (Walker 2007).

In sum, the principles of organization—as the main function of organizations to achieve goals—will always be held, which will be structurally and functionally configurated by the mode of social control and, as moderated, by other organizational factors. After all, the resulting organizational configurations of structure and functioning and other characteristics can appear blurred. Organizational innovation adoption may be deemed as all about ‘it depends,’ highlighting nuance and contingency (Borins 1998; Whitford et al. 2020). The current paper’s approach aligns with that the sectoral distinctiveness ultimately exists along a continuum of

dichotomous sectoral features (Dahl and Lindblom 2017; Wamsley and Zald 1973; Perry and Rainey 1988; Rainey and Bozeman 2000; Bozeman 2004).[32]

Differential Sectoral Features in Organizational Innovation Adoption

The spectrum of sectoral features of organizations can also be represented by the concepts of mechanistic and organic organizations. Building upon the work of Burns and Stalker appeared in 1961, who conceptualized these two organizational types as distinctively characterizing organizational features, we can cautiously reinterpret their framework in conjunction with reflecting the critical implications of mode of social control. Mechanistic organizations are typically associated with public agencies, while organic organizations are more commonly found in private firms (Damanpour 1991; Burns and Stalker 1994).

Public organizations, characterized as mechanistic, are primarily rule-oriented and operate within the framework of laws and administrative decisions. They are subject to procedural and accountability restrictions, which are prevalent in most modern constitutional and democratic nations (Plant 2011; Cook 1992). As a result, public agents heavily rely on adherence to laws in order to accomplish their tasks. Rule-breaking by public agents can have significant consequences, including punishment and negative impacts on their benefits. Although rule-

[32] Corroboratively, once the sector variable is reflected, it has been discovered that manager can serve as a significant determinant of organizational innovation adoption (Damanpour 1991; Damanpour and Schneider 2008); I will further elaborate on the managerial functioning from the perspective of organizational systematization in a later section. More recently, Huang et al. (2021) found that the manager variable could be a causal factor influencing organizational innovation adoption, particularly in the realm of AI innovation, with a specific focus on the public sector case.

breaking can occur within public organizations, public agents are highly sensitive to the legal implications associated with such actions.

Private organizations also operate within a framework of rules, standards, and routines. They are bound by common rules and laws and maintain institutional relationships with society while pursuing entrepreneurship (Williamson 1975). However, compared to public organizations, the rules and laws have less substantial restrictions on private organizations. It is common to observe private firms disregarding or strategically breaking rules if it leads to higher profits. In some cases, they may not face punishment but instead be incentivized by the lucrative outcomes, sometimes even exploiting the rule-based institutional regulations (Piazza, Bergemann, and Helms 2022). Their organizational behaviors are primarily influenced by the market system, reflecting governmental regulations as well as the recognition of consumers and stakeholders, which ultimately impact their profitability.

The critical difference that sets apart public and private organizations, characterized as mechanistic and organic, may lie in the substantive adherence to the rule of law, which is reinforced by constitutional-democratic control. While eventual organizational configurations and characteristics may seem all different and blurred to our view, challenging our discrete observations, the effects of mode of social control (via political control vis-à-vis market system) will remain predominant in the cognitive dimension, impacting organizational employees' decision-making for tasks and operations of administration.[33]

[33] The current paper focuses on the fundamental implications of institutional environments, in conjunction with organizational operative mechanisms, that have imprinted in the cognitive dimension of organizational employees for their administrative functioning. As such, this study does not concern other critical environmental conditions for

Meeting Organizational Innovation Adoption through Administrative Behavior

This study aims to investigate the adoption of organizational innovation in the light of contextualized *administrative behavior*. Administrative behavior refers to the decision-making and actions of organizational individuals as cognitive phenomena, which contribute to maintaining the overall equilibrium of organizational structure and functioning (Simon 1997). This process is rooted in the scientific principles of organization, accompanied by the organizational systematization in that organizations tend to bureaucratize to some degree (not necessarily meaning an increase of, e.g., organizational size), without discrimination to sectors, which encompass the hierarchical transfer of authority through codified rules and laws, along with job specialization (Simon 1946; 1997; Weber 1978; Bullock, Huang, and Kim 2022).

The hierarchical transfer of authority is eventually realized by the acceptance of organizational employees, who consider whether their contributions through task accomplishments align with the compensation, including psychological satisfaction, they expect to receive from the organization, matching their contributions (Simon 1997). This concept is grounded in the zone of indifference, as conceptualized by Chester Barnard (1974), where employees fully accept authority within certain boundaries. This authority transferring-acceptance, in terms of a hierarchical agreement that ties different subjects' willingness to engage towards the same direction, can play with the realization of specialization of jobs, which results in task accomplishments for organizational goal achievement and, ultimately, performance (Kim 2024a).

---

organizational operation and innovation adoption, such as the resource (i.e., budgetary) status of organizations, nor different phases, such as earlier or later adoption (Whitford et al. 2020).

To a significant extent, the perception of 'agreement' among individual agents—tying their varying willingness to engage towards the same direction for achieving goals—becomes crucial when considering the actualization of innovation adoption within the framework of organizational structure and functioning. Organizational individuals perceive innovation adoption as an organizational behavior that should align with and adhere to organizational rules in the administration of operations (Kim 2024a). In the context of administrative organizational behavior, similar to the agents' consideration of fulfilling task accomplishments that align with their contribution and matching compensation, organizational employees will adopt innovation to perform their tasks in the administration of operations if they perceive the innovation as beneficial for both themselves and their organization, as recognized by supervisors, leading to improved individual and organizational performance (Baer 2012).[34]

Regarding AI adoption, the management literature has reported that complementarity can be an essential aspect to consider when it comes to humans' engagement with machines (Dietvorst, Simmons, and Massey 2018; Fügener et al. 2021; Tan et al. 2018). That is, human entities will acknowledge and use AI in a way that can eventually be beneficial for achieving their own interests.

By integrating theories of administrative behavior, organizational innovation adoption, and human engagement with AI, it becomes apparent that the concepts of compensation-contribution matching (authority transferring-acceptance), perceived benefit, and complementarity are coherently interconnected. In essence, it implies that human organizational

[34] In line with Baer's (2012) argument, this study does not concern itself with a strict distinction between organizational individuals' innovation adoption and (actual) use, underlining the significance of benefit perception, focused on the cognitive dimension of administration.

employees will *agree* to adopt and use (interact with) AI (of autonomous decision-making) for tasks, aligned with the flows of hierarchy for job performances, when they perceive that the adoption and use may increase benefits throughout their own organizational task accomplishments.[35]

Impact of AI as Innovation on Administration

Basic AI System as Conventional Innovation

AI systems have been actively developed with various types and characteristics, powered by different forms and combinations of machine learning techniques in their applications. In this context, we can initially consider 'basic AI' as a form of supervised machine learning that involves greater human programmer intervention in developing and modifying its learning and decision-making processes and outcomes. An expert system can represent this type of AI. In contrast, 'advanced AI' is characterized by the high-level application of unsupervised, deep, and reinforcement learning, either separately or in combination. Generative AI can represent this type of AI. As more recently developed within a last decade, advanced AI systems are capable of high-level real-time learning and often require minimal or no substantial human involvement once the initial learning protocol is established (Russell 2019).[36] These systems are increasingly autonomous and highly effective in performing a wide range of tasks. At the same time, they also

[35] While focusing on human employees' baseline cognitive dimension in administrative contexts, the current paper does not concern specific behavioral aspects of human agents in interacting with AI in various decisions and actions, albeit these are significant points (Bullock, Huang, and Kim 2022).

[36] While deep learning can also be applied to supervised learning, its power may be particularly evident in the context of advanced AI systems (Russell 2019); the exact clarification is less imperative to the purpose of this paper.

raise significant concerns such as biased outcomes and value alignment problems (Russell 2019), which sets them further apart from conventional technological tools and systems.[37]

AI's Organizational Operational Features: The Mechanistic and Discretionary

AI systems possess computational capabilities for predicting and generating decision outcomes in problem-solving processes. Utilizing machine learning processes, AI systems analyze data points and their associations with outcome variables, making autonomous and momentary statistical/computational decisions.

Any AI's operational process is inherently mechanistic, as it involves the processing of factual information without any procedural jumps, ultimately leading to computational decisions (Newell and Simon 1972; Heyck 2008b). The information processing capabilities of computers are inherently bound by procedures and lack the flexibility for procedural deviations. The concept of 'programming,' as envisioned by Allen Newell and Herbert Simon, two pioneers of artificial intelligence, encompassed the principles and methodologies of computer operations, policies, and administration, particularly in the context of Simon's work (Heyck 2008b).

Meanwhile, when it comes to using AI in organizational contexts, AI can hold discretionary capabilities (Young, Bullock, and Lecy 2019). While there have been various conceptual and theoretical understandings of discretion across different disciplines, discretion ultimately relates to the inherent loss of control over agents' behaviors within the realm of information processing (Bullock and Kim 2020). Achieving perfect control without allowing any leeway for agents or subordinates would require principals or supervisors as controllers to possess the ability to simultaneously secure and process all the necessary information (Bullock and Kim 2020). However, in reality, there will always be a certain degree of discretion allowed

[37] The focus of distinguishing basic AI from advanced AI is different from that of weak AI and strong AI.

for agents, measured as the gap between the expected behavioral outcomes by controllers and the actual behavioral outcomes realized by agents of decision-making (Bullock and Kim 2020). Once any decisional entity or system, including AI, which represents the culmination of non-human technological systems with autonomy, is placed within an *organizational* context for decision-making and executions, discretion becomes a universal factor. In comparison to other digital tools and devices with certain automated decision-making capabilities, which are substantively programmed and controlled by human programmers and users and distinguished from AI, some scholars have identified the concept of artificial discretion (Young, Bullock, and Lecy 2019; Bullock 2019).

From the human agents' perception of interacting with AI in organizational contexts, AI is characterized not only by its mechanistic features but also by its inherent discretion. These perceptions can vary depending on the technological advancements of AI systems, exemplified by the categorization of basic AI and advanced AI in this study. Specifically, in the case of basic AI, as closer to the conventional conceptualizations and typologies of innovation, the perceived mechanistic feature tends to be *high*, while the perceived discretionary feature is *mid-low*.

Specifically, humans may increasingly perceive advanced AI systems as "something distinct from conventional computers, making their own decisions to some extent." This perception is particularly applicable to unsupervised, deep, and reinforcement ML systems due to their perceived lesser mechanistic functionality. Decisional systems, including expert systems and earlier versions of AI systems from preceding decades, often exhibit more mechanistic and rigidly controlled operations that are limited in performance in real and open environments (Russell 2019; Marcus and Davis 2019). Individuals may perceive advanced AI systems, which effectively solve complex and uncertain problems mirroring our natural standards and

expectations, as truly intelligent, sentient, and more human-like (Gordon 2022). However, despite these advancements, the recognition of AI as mechanistic fundamentally remains unchanged. Even when facing further technological progress, humanoid and intelligent robots, even if they possess more human-like aspects such as emotion and feelings supported by affective computing, and increased anthropomorphic features, are still regarded as non-human machines.[38] Compared to advanced AI, humans would perceive basic AI's mechanistic feature tends to be *high*.

Meanwhile, humans may increasingly perceive advanced AI systems as discretionary—in that such AI is accompanied by, in particular, enhanced variability in task accomplishments, requiring less human controls over and interventions for the machines' operations. However, as humans perceive, even advanced AI systems would still have limitations in securing and processing information within continuously changing and complex open environments. This necessitates cooperation with other decisional systems and potentially requires systematic control if available (Bullock, Huang, and Kim 2022). Despite technological advancements, AI's discretion would not be maximized to an extreme extent, as it operates within an administration system. Compared to advanced AI, humans would perceive basic AI's discretionary feature tends to be *mid-low*.

[38] I acknowledge that there are technological developments, such as the potential implantation of AI-powered digital chips into the human brain (Neate 2022). These advancements raise philosophical questions about the distinctions between humans and machines, as well as between biology and digital technology. However, this paper primarily focuses on the core functional features of AI, which are separately and inherently rooted in computer systems.

Cognitive Impacts of AI as Intervention on Human Agents in Administration

Given the institutional context of sectoral differences and the configurations of organizational structure and functioning, it is essential to examine the impacts of AI intervention (highlighting its autonomous decisional capabilities) on the cognitive dimension of organizational employees in their contextualized administrative behavior. Furthermore, organizational sensemaking can play a critical role in the cognitive dimensions of organizational agents, as individuals' rational decision-making is significantly influenced by their past work experiences and current informational inputs from the environment, guiding their future-oriented behaviors (Weick 1995).

When it comes to using AI, the cognitive dimensions of individuals in the organization deal with the integration of 'past' (experienced) and 'future' (expected) information points, shaping individual and organizational behavior in tasks 'currently' (experiencing). Highlighting the organizational context, the decision-making process regarding the adoption of AI can be seen as a form of sensemaking in administration through information processing, where the present experiences of interacting with AI become essential informational pieces.

Organizational operations are sustained by the establishment and preservation of a 'corporate mind'—from a business administration standpoint. The achievement of organizational purpose relies on the continuous and shared agreement among members who form the ontological foundations of organizational structure and functioning (Morrison and Mota 2021; 2022; Martela 2022), grounded in the perceived benefits of engagement. Bureaucratic phenomena can commonly be observed in systematized organizations that face cognitive/physical capacity limitations and encounter environmental challenges in individual, collective, or even polycentric approaches, potentially being reconciled with the nature of

democratic citizenship (Davis 1996). This pervasiveness can be observed to varying degrees not only in public agencies but also in private firms that interact with both natural and artificial entities within society (Simon 1996; 1997; Heyck 2008a; 2008b; Koski, Xie, and Olson 2015). Encompassing both types of organizations within the realm of governance, we can translate the concept of the 'corporate mind' as the 'administrative mind.' This serves as the fundamental basis for individual agents' sensemaking within the organization, guiding their decision-making processes and facilitating the accomplishment of tasks through administrative operations.

In the case of basic AI (hereafter AI), the characteristics of its decision-making process and outcomes can be perceived as a combination of high-level controllability and mid-low-level variability, reflecting both mechanistic and discretionary features in the administrative context. Considering that public organizations are predominantly rule-based, public agents may perceive that AI is well-suited for task accomplishments within their organization, which leans towards a more mechanistic approach. The mechanistic feature of AI can hold greater significance for public agents compared to private employees who operate within relatively organic organizations.

In addition to the mechanistic aspect of AI, its discretionary feature in decision-making can also be perceived as useful for public agents who navigate intricate business environments. Still, compared to the mechanistic aspect, the discretionary feature of AI is less differentially perceived by public and private employees. In other words, discretion is rather related to the perspective of within-organizational control, which can be sensitively perceived by varyingly ranked positions, as specified in a later section. Employees in both public agencies and private firms—without reflecting the positional distinctions—encounter their own intricate environments, and the discretionary feature of AI can be equally critical for these employees,

without significant discrimination. After all, I expect that public agents, compared to private employees, will experience a more positive impact of AI intervention on the perception of agreement regarding the adoption and use of AI for task accomplishments in their organizational environment (***Hypothesis 1***).[39]

> *H1: For public agents rather than private agents, AI Intervention will have a greater positive impact on the perception of agreement regarding the adoption and use of AI for organizational task accomplishments*

Organizational Specifications: Managerial Role

Recent research, focusing on the public sector case, conducted a differential analysis and found that the manager variable can have a determinative impact on agents' adoption of AI for organizational task accomplishments (Huang et al. 2021). However, our understanding of how managers, in their distinct role, specifically function in adopting innovation has been limited (Huang et al. 2021). Moreover, there has been a scarcity of specified conceptual and empirical understanding regarding the functioning of middle-level managers in general, despite the perpetual emphasis on their criticality in scholarship (Tyskbo and Styhre 2022).

In the context of public policy implementation and from a systems perspective, Moldogaizev and Resh (2016) proposed an approach that distinguishes chief executives—the administrative core—from managers and staff as part of the same group—the technical core—while also considering their respective positions within organizations and their grounding in institutional environments. This view can effectively clarify the functions of managers and staff in comparison to those of chief executives. The administrative core, represented by chief

[39] As noted earlier, highlighting the autonomous decisional capability of AI and its behavioral potential interacting with humans, eventually, I use the term AI 'intervention' as interchangeable with adoption and use.

executives, is more concerned with the systemic control of an organization, addressing the substantial influences of external factors. For example, chief executives in public organizations often prioritize securing political support and financial funding. On the other hand, managers and staff are more focused on achieving specific task accomplishments in efficient and effective ways. Through interactions and communication, they are fundamentally guided by the organizational principles established by the top authority, the chief executives, who reflect the democratic will and handle political controls.[40]

This framework can also be applied to the context of private firms, although the concrete functional and structural specifications within organizations may vary (Williamson 1999). Despite their more organic structure and functioning, elements of bureaucratization, such as hierarchy and job specialization, persist to varying degrees. In the case of private firms, chief executives tend to prioritize securing customer support and financial resources, including investments. Conversely, managers and staff are more focused on achieving task accomplishments in efficient and effective ways. Still, it is important to note that specific behavioral mechanisms related to control, incentives, and termination may differ in private firms compared to public organizations (Williamson 1999), eventually, grounded in differential applications of the mode of social control.

While the integrated approach of considering the administrative core and the technical core is significant in effectively limiting internal and external influences on the organizational perspective, it is necessary to differentiate between managers and non-managers to gain a more

[40] Networks and networking also need to be considered seriously; however, they can be formulated by agents' choices upon environmental and contingent appropriateness, while hierarchy and designated job specialization can persist as core aspects of organizational structure and functioning (O'Toole 2015).

specific understanding of organizational innovation adoption. While staff members are primarily focused on performing specialized jobs, managers have the additional responsibility of coordinating both vertical and horizontal flows of rational authority, which adds another layer of specialization to their role and expands the range of their decision-making responsibilities (Bullock, Huang, and Kim 2022).

In further specifying the scope within organizations, the degree of discretion that organizational employees face differs based on their organizational positions. In general, higher-ranked officials have greater discretion due to the larger area of their task-related decision-making responsibilities. The problem space for individual problem-solving can be immensely complex and dynamic even for small tasks (Newell and Simon 1972), and this intricacy applies equally to individuals at all ranks. However, while lower-level officials face the same environmental intricacy (Kaufman 2006), their job responsibilities, such as those of front-line forest rangers, do not encompass the entire scope of forest management, recreational activities, or environmental policies, which are solely the purview of top authorities in relevant agencies. Considering the vertical discrepancy and horizontal equality of environmental intricacy for rational decision-making, managers generally have greater discretion than staff members.

After all, employees in different sectors (public versus private) and with different positions focused on the technical core (managers versus staff) maintain characteristic perceptual operational features, as illustrated in **Figure 5**. When considering the association with basic AI, which is characterized by high mechanistic and mid-low discretionary features, employees will correspondingly perceive the benefits of adopting and using AI for their task accomplishments in their respective organizational contexts. And this aspect can be more specified as follows.

Firstly, when comparing public managers and staff, they will not have significantly disparate perceptions of the basic AI's high mechanistic feature, as it is considered important for both groups. However, the mid-low discretionary feature of AI may not fully meet the expectations of public managers, who deal with higher levels of discretion in their managerial positions. On the other hand, public staff may perceive the mid-low discretionary feature of AI more significantly in their task accomplishments and interactions. Based on this, I expect that public staff, compared to public managers, will experience a more positive impact of AI intervention on the perception of agreement regarding the adoption and use of AI for task accomplishments (***Hypothesis 2-a***).

H2-a: For public staff rather than public managers, AI Intervention will have a greater positive impact on the perception of agreement regarding the adoption and use of AI for organizational task accomplishments

Secondly, when comparing private managers to private staff, they will not significantly differ in their perception of the basic AI's high mechanistic feature. However, the mid-low discretionary feature of AI may not fully meet the expectations of private managers in their managerial positions, as they deal with higher levels of discretion in their task accomplishments. On the other hand, private staff may perceive the mid-low discretionary feature of AI more significantly in their task accomplishments and interactions. Based on this, I expect that private staff, compared to private managers, will experience a more positive impact of AI intervention on the perception of agreement regarding the adoption and use of AI for task accomplishments (***Hypothesis 2-b***).

H2-b: For private staff rather than private managers, AI Intervention will have a greater positive impact on the perception of agreement regarding the adoption and use of AI for organizational task accomplishments

Thirdly, when comparing public and private managers, the mid-low discretionary feature of basic AI may not fully meet the expectations of both groups in their managerial positions, as they deal with higher levels of discretion in their task accomplishments. However, public managers may still perceive that AI's mechanistic feature significantly aligns with their organizational nature. Based on this, I expect that public managers, compared to private managers, will experience a more positive impact of AI intervention on the perception of agreement regarding the adoption and use of AI for task accomplishments (***Hypothesis 2-c***).

H2-c: For public managers rather than private managers, AI Intervention will have a greater positive impact on the perception of agreement regarding the adoption and use of AI for organizational task accomplishments

Finally, when comparing public staff to private staff, both groups will significantly perceive the mid-low discretionary feature of basic AI, considering their positional roles in task accomplishments that involve lower levels of discretion. Public staff may even be more sensitive to perceiving that AI's mechanistic feature significantly aligns with their organizational nature. Based on this, I expect that public staff, compared to private staff, will experience a more positive impact of AI intervention on the perception of agreement regarding the adoption and use of AI for task accomplishments (***Hypothesis 2-d***).

H2-d: For public staff rather than private staff, AI Intervention will have a greater positive impact on the perception of agreement regarding the adoption and use of AI for organizational task accomplishments

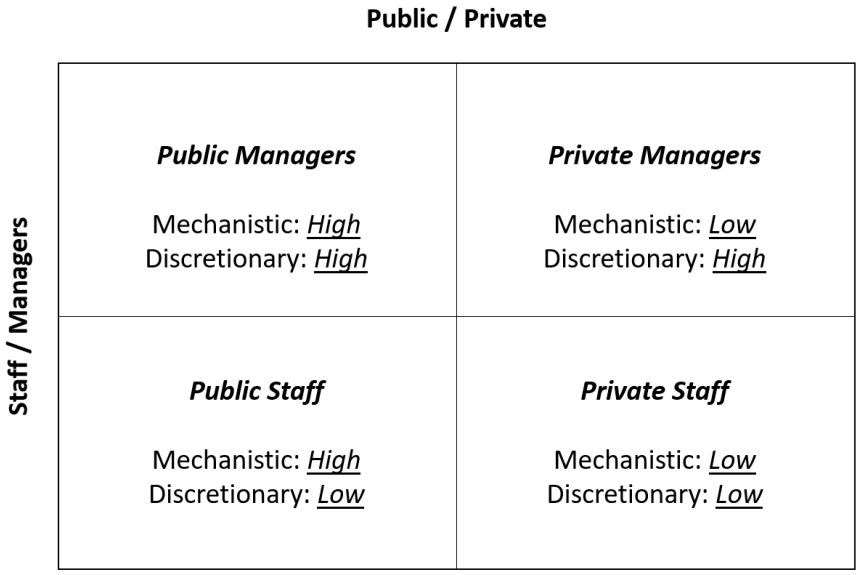


Figure 5. Mechanistic and Discretionary Features in Sectoral and Managerial Comparisons

Data and Experiment

The data were collected from an online survey experiment conducted in Taiwan in 2019 by National Taiwan University in collaboration with a data company called EZChoice.[41] The data collection took place from September 19 to October 19, spanning a period of one month. The sample consisted of working-age adults (18-65 years old) who were employed full-time in either the public or private sector (N=1,200), as specified by Huang et al. (2021).

[41] It provided an economic incentive to participants, allowing them to exchange it for actual products. I assume that the economic incentive itself would not substantially differentiate the cognitive mechanism of public and private employees in performing the experimental task. Primarily, the presence of an economic incentive can also be a crucial motivation for public employees in general.

Regarding the experimental task, participants engaged in facial recognition tasks through an online platform in a written communication setting in Mandarin for 12 rounds. They compared footages to suspects and were asked the question, "Is the person from the recorded image below the same as the one from the suspect photo above?" Participants were required to provide yes or no answers and, if they were sure, they could change their answer to confirm it for each round. In this process, only the treatment group received the intervention of AI at the confirmation stage. The confirmation question for the control group was, "To the answer you just chose, are you sure you want to change the answer?" while for the treatment group it was, "After looking at the prediction of similarity from AI, would you like to change your original answer?" Participants' performance information, such as whether their answers were correct or not, was not revealed during or after the completion of the experimental task.[42] Before and after performing the experimental task for the 12 consecutive rounds, all participants were surveyed regarding their perception of agreement on a 5-point Likert scale regarding the use of AI to accomplish eight types of organizational tasks, including the operation of machines, personnel management, and strategic management, among others. Other survey items were also included.[43]

In doing so, at the beginning, before performing the experimental task, all participants were provided with basic information through passages about two aspects. Firstly, they received

[42] This approach may prevent the bias effect (Moynihan and Lavertu 2012) or performance feedback effect on perceptions that can impact the complementarity, performance, and complementarity-performance relationships in working with AI (Dietvorst, Simmons, and Massey, 2018). Still, it is acknowledged that the specific dynamics of performance in working with AI can be a further complicated issue (Fügener et al. 2021; Tan et al. 2018).

[43] The online platform allowed participants to use ICT devices with a screen that displayed a human figure in communication throughout their task performance. This setup reflected a limited level of anthropomorphism effect, which concerns humans' perception of interacting with AI systems (Castelo, Bos, and Lehmann, 2019).

information about the performance implications of AI in performing organizational tasks, which could be categorized as positive, negative, or neutral (meaning no provision of such information). Secondly, they were informed about the allocation of responsibility for performing tasks, whether it was assigned to oneself or a supervisor, reflecting an organizational setting. While the latter information regarding responsibility allocation is critical for establishing organizational contexts and can influence the participants' perception during the experiment, the former information regarding the performance implications of AI is also crucial in terms of providing fundamental guidance for one's administrative decision-making concerning the use of AI, considering its various benefits and risks.

The provision of passages regarding the AI's organizational performance implications and responsibility allocation settings, in this consecutive order, was randomized using a randomized controlled trial (RCT) approach. By controlling for factors of organizational sensemaking, this setting is critical in allowing the experiment participants to be reminded of certain organizational contexts in their affiliations through performing the experimental task and having perceptions of adopting and using AI for organizational tasks, in terms of base information processing. In so doing, the treatment group will have an additional layer of information processing directly interacting with AI for task accomplishments.[44]

[44] Meanwhile, in fact, this experiment employed a 'quasi-AI system' that closely resembled a conventional platform program, although it was designed to appear as a genuine AI system. The system was programmed to generate a specific set of answers for human participants to perceive it as having either a high or low precision rate. In other words, it could be perceived as either a highly accurate or poor-performing system, as programmed, reflecting the variations in AI's performance. Technically speaking, the system used in this experiment effectively imitated the functioning of AI. This approach provides an efficient way to examine how humans would interact with AI in a setting with varying precision rates and patterns. This method is frequently employed in the field of management

Research Design and Empirical Strategy

To estimate the impacts of critical factors—the sector, manager, and AI intervention—on human agents' perception of agreement regarding the adoption and use of AI for administrative task accomplishments, I employ difference-in-differences (D-i-D) analyses. For the analyses, I stacked observations based on the time difference, specifically before or after performing the experimental task. This results in a short two-term panel dataset (N=2,400). This empirical setting enables the examination of differences in estimation based on both time and treatment group settings.

Of particular note is the consideration of the time effect, which encompasses the fundamental of organizational sensemaking—covering from the experienced to the experiencing to the expected as related to working—which this study significantly takes into account (Hernes and Obstfeld 2022; Weick 1995). The current paper goes beyond solely examining the treatment effect for individuals dealing with a facial recognition AI system. This study incorporates the element of time effect, which helps make sense of administrative contexts, along with the treatment effect. Relatedly, as noted, providing information with respect to the AI's organizational performance implications and responsibility allocation settings, using the RCT approach, could help realize the organizational sensemaking more concrete and relevant, from the administrative perspective. Also, although the experimental task focuses on facial recognition for identifying suspects, it is important to acknowledge that participants may reinterpret the cognitive processing involved in the task based on their own organizational environments.

(information systems) (Dietvorst, Simmons, and Massey 2015; 2018). The primary focus of this research is to investigate the impacts of AI on humans' cognitive functioning based on AI's core functional features in autonomous decision-making, as perceived by human agents.

Thereby, estimating the net differential cognitive impact of AI on human agents through their interactions, this study aims to provide generalized implications from an administrative perspective.[45]

Throughout the analyses, the sector and manager are considered as case-sorting moderators, using if-clauses for regression analysis, with a focus on the AI intervention as a potential causal factor. While if-clauses for both sector and manager can be simultaneously utilized, theoretically, the sector is treated as a hyper-level moderator, and the managerial role is treated as a sub-level moderator (Damanpour 1991), considering that the moderating effects will be systematically realized. To evaluate systematic sectoral differences, overall statistical figures of the public and private cases are noted in comparisons. Moreover, the D-i-D analyses with regression specifications aim to estimate the Average Treatment Effect (ATE), which indicates the causal impact of AI intervention on the perception of agreement regarding the adoption and use of AI for organizational tasks.

In sum, the treatment effect itself reveals the surface-level meaning of AI intervention, while the time effect reflects the base information processing and organizational sensemaking at the surface level. By combining these two factors (AI intervention and time), the net effects of AI intervention in organizational contexts can be specified, offering a concrete and generalizable understanding of AI's cognitive impact on organizational employees in terms of contextualized

[45] The baseline recognition of AI's organizational performance implications and of responsibility allocations serves as a grounded informational basis for every participant's cognitive information processing. At the same time, this setting enables both treatment and control group members to formulate perceptions as to adopt and use AI for tasks; the treatment group members have an additional line of information for processing as to adopt and use AI, having direct interactions with the decisional system.

organizational sensemaking. These effects are primarily estimated in sectoral comparisons. Additionally, the impacts of the sub-level moderator, managerial role, are investigated in detail as part of the analysis. Overall, the study examines the effects of AI intervention on agreement perception while considering sectoral differences and the role of managers in the context of organizational task accomplishments. The functional form of the empirical model is as follows:

$$\text{Agreement Perception (Y)} = \beta_0 + \beta_1 \text{ AI Intervention binary } (X_1) + \beta_2 \text{ Post-Agreement dummy } (X_2) + \beta_3 \text{ (AI Intervention binary x Post-Agreement dummy) } (X_3) + \varepsilon$$

Variables

Agreement Perception

As a dependent variable, I utilize a measure of participants' perception of agreement regarding the adoption and use of AI for accomplishing organizational tasks. Eight different agreement perceptions on various tasks are evaluated, including Operating Machines, Administrative Office Work, Communication with Customers, Coordination with Colleagues, Hiring Processes, Employee Performance Evaluation, Strategy or Policy Planning, and Goal and Object Setting. For the evaluation of agreement perception, participants were asked questions in the following format: "According to your working experience, do you agree with applying AIs to the task of X" (one of the eight tasks). These questions were measured using a 5-point Likert Scale, where the scale represents the following: "Strongly Agree (5), Agree (4), All Right (3), Disagree (2), and Strongly Disagree (1)." While the dependent variable is the perception of agreement regarding the adoption and use of AI for task accomplishments, the original eight agreement perceptions measured did not yield meaningful eigenvalues when subjected to

exploratory factor analysis. The detailed outcome of this analysis is included in **Appendix E**. Therefore, I adopted an averaged measure as the dependent variable to facilitate the intuitive interpretation of analysis outcomes. The utilization of factor scores generally yielded identical results in terms of statistical significance and sign, although they are not explicitly reported.

Post-Agreement

To conduct the D-i-D analysis that captures the effects of time and treatment, as noted, I stack observations and establish a short two-term panel dataset. For this analysis, I include a binary variable as a time indicator to differentiate between pre- and post-estimation of agreement perception dealing with the experimental task. This binary variable is referred to as the "Post-Agreement" dummy, with a value of 1 assigned if the agreement perception is measured during the post-experimental task session, and a value of 0 assigned if it is measured during the pre-experimental task session.

Independent Variables

To conduct the D-i-D analysis, I utilize three covariates. The first covariate, "AI Intervention," is a binary variable that indicates whether an individual had the opportunity to directly interact with AI during the experiment. This variable applies only to the treatment group. If the AI intervention applies to an observation, it is measured as 1; otherwise, it is measured as 0. The second covariate, "Sector," is a binary variable that indicates the sector in which an individual's current affiliation is located, serving as a hyper-level case-sorting moderator. If an observation's affiliation is in the public sector, it is measured as 1; if it is in the private sector, it is measured as 0. The third covariate, "Manager," is a binary variable that indicates whether an individual holds a managerial role in their affiliation, serving as a sub-level case-sorting moderator. If an observation holds a managerial position, it is measured as 1; if the individual is

not a manager, it is measured as 0.[46] Descriptive statistics of variables are revealed in **Appendix F**.

Findings

Firstly, the sector can have a substantial moderating impact on the relationship between AI intervention and human agents' perception of agreement regarding the adoption and use of AI for organizational task accomplishments. In the case of the public sector, as shown in **Table 2**, both the Post-Agreement (representing the time effect) and AI Intervention (representing the treatment effect) variables exhibit statistical significance with positive beta coefficients in **Models 1**, **2**, and **3**, without considering the Manager variable as a case-sorting moderator yet. Particularly, these results are observed without including the interaction term of the two covariates that indicate the net differential (causal) impact, reflecting more generalizable administrative contexts. However, in sharp contrast, the private sector case, as displayed in **Table 3**, shows no statistical significance in any regression model specification, not only in **Models 1**, **2**, and **3**. This implies that there is a systematic difference between public and private organizational employees in terms of their agreement perception for the adoption and use of AI in their organizational task accomplishments.

Specifically, in the case of the public sector, as shown in **Table 2**, **Models 1** and **3** exhibit strong statistical significance at a significance level of .01, and positive beta coefficients are observed for the Post-Agreement variable (for both, identically, $\beta = 0.173$, $p = 0.000$). These

[46] Although the dataset does not include specific indicators to differentiate chief executives from managers or non-managers, I am less concerned about this issue. Chief executives are generally a demographically minor group, and the dataset I am using has a relatively large sample size, which helps mitigate this limitation.

results indicate that public agents critically perceive the implications of AI's task accomplishments as benefiting their administrative behavior at an abstract level—without reflecting the ATE, which indicates AI's cognitive impacts at the concrete level. These findings suggest that the experimental task effectively enables participants to make sense of and agree with the use of AI in administrative contexts. Public agents, even without directly experiencing AI intervention, exhibit a high level of coherence in perceiving the use of AI for task accomplishments in line with their organizations' core nature. However, as shown in **Table 3** for the private sector, including **Models 1** and **3**, these findings do not hold true. It appears that the mechanistic nature of AI, with the exception of the mid-low discretionary features, may hold less appeal for private employees in terms of their abstract perception.

Also, in the case of the public sector, the statistical significance at a significance level of .10 and positive beta coefficients observed for the AI Intervention variable indicate that the basic AI system itself functions in a meaningful way. This can be seen in **Table 2**, specifically in **Models 2** and **3** ($\beta = 0.103$, $p = 0.095$; $\beta = 0.103$, $p = 0.093$). However, as shown in **Table 3** for the private sector, which includes **Models 2** and **3**, these findings do not hold true. The high mechanistic nature of AI, with the exception of the mid-low discretionary features, may have a more distinct appeal to public agents than to private employees—directly interacting with it—in terms of their abstract perception.[47]

[47] Still, I also acknowledge that the AI system used in this study is restricted to facial recognition, and the experimental task is to identify suspects. Relatedly, the type of jobs (affiliations), in particular, may impact the formulation of agreement perception, despite the research design setting. To address these concerns, for ancillary judgements, information on this additional factor is provided in **Appendix G**.

When public agents directly interact with AI and also engage in the base information processing of AI's administrative implications through performing the experimental task (when considering the interaction between the AI Intervention and Post-Agreement factors), their perception becomes more concrete rather than abstract. However, when including the interaction term between Post-Agreement (reflecting the time effect) and AI Intervention (reflecting the treatment effect) to estimate the net differential effect at the concrete level, none of the covariates in **Model 4** of **Table 2** and **Table 3**, for both the public and private sectors, show statistical significance.[48] This indicates that there is no valid causal impact of AI Intervention as estimated by the ATE in the administrative context. The lack of significance of the ATE is likely due to various factors or reasons, which will be discussed in detail in a later chapter. Still, the systematic sectoral difference largely remains, as observed in the public sector models where beta coefficients are generally greater and standard errors are generally smaller compared to the corresponding estimates in the private sector models. These findings support ***Hypothesis 1*** (For public agents rather than private agents, AI Intervention will have a greater positive impact on the perception of agreement regarding the adoption and use of AI for organizational task accomplishments). Nevertheless, it should be noted that this does not imply a causal effect of AI intervention; the effect is rather correlational.

[48] In the analyses, the Variance Inflation Factor (VIF) values for the interaction term in Model 4, 7, and 8 of Table 2 are 7.52, 7.67, and 7.51, respectively. These values are relatively high but still below the non-conservative threshold of 10. Meanwhile, the VIF values for AI Intervention remain at 2.00. The VIF values for the Post-Agreement are slightly higher at 6.52, 6.67, and 6.51, but they also fall within the non-conservative threshold. These outcomes alleviate concerns regarding the basic functional effectiveness of facial recognition AI system used in the experiment, and the generalized meaningfulness of the experimental task for identifying suspects. This allows us to consider more theoretical reasons to account for the lack of valid causal impact.

Table 2. OLS Regression Analysis of Stacked Model (Public Sector)

VARIABLES	Manager as Case Moderator not Considered				Manager as Case Moderator Considered			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Post-Agreement	0.173***		0.173***	0.150	0.286***	0.124**	0.277	0.106
	(0.044)		(0.044)	(0.113)	(0.061)	(0.055)	(0.170)	(0.138)
AI Intervention		0.103*	0.103*	0.090	0.071	0.089	0.065	0.078
		(0.062)	(0.061)	(0.087)	(0.091)	(0.075)	(0.128)	(0.106)
Post-Agreement x AI Intervention				0.027			0.010	0.022
				(0.123)			(0.182)	(0.150)
Constant	3.536***	3.534***	3.448***	3.459***	3.691***	3.368***	3.696***	3.377***
	(0.031)	(0.057)	(0.061)	(0.080)	(0.090)	(0.074)	(0.120)	(0.097)
Manager Case Moderator	No	No	No	No	Yes (Manager)	Yes (Staff)	Yes (Manager)	Yes (Staff)
Observations	1,200	1,200	1,200	1,200	360	840	360	840
R-squared	0.013	0.002	0.015	0.015	0.060	0.008	0.060	0.008

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3. OLS Regression Analysis of Stacked Model (Private Sector)

VARIABLES	Manager as Case Moderator not Considered				Manager as Case Moderator Considered			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Post-Agreement	0.021		0.021	0.019	0.050	0.018	0.069	0.014
	(0.042)		(0.042)	(0.109)	(0.140)	(0.044)	(0.362)	(0.113)
AI Intervention		0.033	0.033	0.031	-0.052	0.041	-0.041	0.038
		(0.059)	(0.059)	(0.083)	(0.195)	(0.061)	(0.278)	(0.087)
Post-Agreement x AI Intervention				0.002			-0.023	0.005
				(0.118)			(0.392)	(0.123)
Constant	3.440***	3.423***	3.412***	3.413***	3.732***	3.377***	3.722***	3.380***
	(0.030)	(0.054)	(0.058)	(0.077)	(0.193)	(0.061)	(0.256)	(0.080)
Manager Case Moderator	No	No	No	No	Yes (Manager)	Yes (Staff)	Yes (Manager)	Yes (Staff)
Observations	1,200	1,200	1,200	1,200	120	1,080	120	1,080
R-squared	0.000	0.000	0.000	0.000	0.002	0.001	0.002	0.001

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Secondly, in addition to the sectoral distinction, analyses pertaining to the managerial role distinction can help determine further specific impacts of AI on employees' agreement perceptions of adopting and using it for task accomplishments. In the public sector case, as shown in **Table 2**, in **Model 5** and **6**, Post-Agreement demonstrates high statistical significance regarding both staff and manager cases (respectively, $\beta = 0.124$, $p = 0.023$; $\beta = 0.286$, $p = 0.000$), while AI Intervention does not show statistical significance.

Contrasted with implications of the ***Hypothesis 1***, here, the beta coefficients of managers are greater (not smaller) than those of staff in both public and private sector cases. This pattern maintains throughout models. Dealing with not AI Intervention but Post-Agreement which indicates the time difference, reflecting the base information processing of AI *performance* implication and *responsibility* allocation, these findings support the theorization of this paper to the extent of organizational administration. That is, managers than staff, in more mechanistic organizations, cognitively embedding the nature of their organizations and positions, can better perceive the significance of hierarchical and coordinated administration of operations.

Albeit not significant, the beta coefficient for AI Intervention in the public staff case is greater than that for the public manager ($\beta = 0.089$, $p = 0.235$; $\beta = 0.071$, $p = 0.437$). At this point, an interaction of the two factors is not yet considered, meaning individuals' perceptual formulation is at the abstract level.

There is an overall loss of statistical significance for the covariates (Post-Agreement and AI Intervention) once they interact with each other. As shown in **Table 2**, in **Model 7** and **8**, the interaction term of Post-Agreement and AI Intervention does not have statistical significance for both public staff and managers. However, the pattern remains evident pertaining to the effect of AI Intervention. By including the interaction term for regression analysis, albeit not significant,

the beta coefficient for AI Intervention in the public staff case is greater than that for the public managers ($\beta = 0.022$, $p = 0.885$; $\beta = 0.010$, $p = 0.955$).

However, due to the lack of statistical significance, these findings are limited to supporting ***Hypothesis 2-a*** (For public staff rather than public managers, AI Intervention will have a greater positive impact on the perception of agreement regarding the adoption and use of AI for organizational task accomplishments). Still, theoretically, while public sector employees can value the high mechanistic functionality of AI, its mid-low discretionary feature can be more appreciated by public staff than public managers, in that the latter generally hold higher discretion for their own task accomplishments and accordingly evaluate the benefits of using AI for tasks.

On the other hand, in the case of private managers and staff, while managers overall (regardless of sector) have a better recognition of the criticality of hierarchical context in coordinating compared to staff, private managers may not further appreciate the mechanistic features of AI in their organizational functioning. Conversely, while the perception of its mechanistic aspect is not discriminative to private staff, they can relatively favorably perceive the mid-low discretionary feature of AI, resulting in a more positive perception of adopting and using AI, as seen in **Table 3**, **Model 5** and **6**. While not statistically significant, it is notable that the beta coefficient of AI Intervention for private staff is positive, while that for private managers shows a negative sign ($\beta = 0.041$, $p = 0.505$ vs. $\beta = -0.052$, $p = 0.789$). In other words, the beta coefficient for private staff is greater than that of private managers.

When observing the joint impact of Post-Agreement and AI Intervention, as shown in **Table 3**, **Model 7** and **8**, it does not appear that the AI Intervention has a significant ATE. Nevertheless, including the interaction term for regression analysis, the pattern remains in that

the beta coefficient of AI Intervention for private staff is greater than that of private managers (β = 0.005, p = 0.967 vs. β = -0.023, p= 0.954). However, due to the lack of statistical significance, these findings are limited in supporting ***Hypothesis 2-b*** (For private staff rather than private managers, AI Intervention will have a greater positive impact on the perception of agreement regarding the adoption and use of AI for organizational task accomplishments).

The sectoral and managerial differences can be further investigated jointly. As mentioned earlier, the differentiation between sectors regarding the impact of AI plays a substantial role before discussing the managerial distinction. When including the managerial distinction in the discussion and focusing on the ATE, the beta coefficient of the interaction term for public managers is greater than that of private managers (β = 0.010, p = 0.955 vs. β = -0.023, p = 0.954), maintaining similar features when comparing treatment (AI Intervention) effects. While both public and private managers show less appreciation for the mid-low discretionary operational characteristic of AI, public managers may perceive its high mechanistic feature as more valuable, consistent with their organizational nature. However, due to the lack of statistical significance, these findings are limited in supporting ***Hypothesis 2-c*** (For public managers rather than private managers, AI Intervention will have a greater positive impact on the perception of agreement regarding the adoption and use of AI for organizational task accomplishments).

Similarly, focusing on the ATE, the beta coefficient of the interaction term for public staff is greater than that of private staff (β = 0.022, p = 0.885 vs. β = 0.005, p = 0.967), maintaining similar features when comparing treatment effects. While both public and private staff appreciate the mid-low discretionary operational characteristic of AI, public staff may perceive its high mechanistic feature as more valuable, aligning with their organizational nature. Nevertheless, due to the lack of statistical significance, these findings are limited in supporting

Hypothesis 2-d (For public staff rather than private staff, AI Intervention will have a greater positive impact on the perception of agreement regarding the adoption and use of AI for organizational task accomplishments).

Discussion

Clarification of Findings

In summary, the H1 is supported by the notable difference in statistical significance of the effects of time (Post-Agreement) and treatment (AI Intervention) between the public and private sector models in terms of having correlational effects; there is no significant ATE. It is worth to note that these two basic factors meaningfully worked, basically, helping the experiment participants to form the agreement perception of using AI for organizational tasks and, for the treatment group members, to discern the functionality of AI. Moreover, when considering the managerial distinction in conjunction with the sectoral distinction (H2-a to H2-d), no statistically significant treatment effects or ATEs are found in either sector's models. As a result, all the hypotheses related to the managerial distinction are limited in their ability to provide support.

The primary reason for the lack of statistical significance in the ATE regarding the sectoral distinction could be attributed to the absence of more concrete factors that shape the perception of organizational individuals when interacting with AI. As management and behavioral scholars highlight, factors such as perceived transparency, trust, explainability, and fairness can play a critical role in cognitively and psychologically shaping the human-AI interaction (Binns 2018; Fu et al. 2022; Glikson and Woolley 2020; Gilpin et al. 2018; Salge and Berente 2017). These factors can significantly influence how humans perceive the

complementarity of interacting with AI and the benefits it brings to their administrative task accomplishments.[49] While this paper mainly focused on reflecting substantial institutional-organizational factors that indicate the sector and managerial position, taking these more micro-level factors into account together would result in more convincing empirical estimates.[50]

Meanwhile, the lack of statistical significance in the regression models when including the Manager variable implies that the experimental task was not effective enough for managers and staff to discern the functionality of AI in relation to their genuine task accomplishments. For instance, managers, in contrast to staff, are crucially involved in coordinating functions and have broader scope responsibilities for achieving organizational goals. Particularly, the experimental task might not be ideally suited to capture these genuine role functions of organizational employees, as related to discerning AI's functionality. Nonetheless, while not statistically significant when reflecting the managerial distinction, the theorized patterns of AI's cognitive impacts on different entities notably persist. Future research conducted in a better experimental setting may help provide more convincing evidence for the theoretical propositions.

[49] For instance, public officials can trust and follow AI's decisional recommendations for task accomplishments when there is coherence with their professional judgment (Selten, Robeer, and Grimmelikhuijsen 2023).

[50] Still, such fundamental approaches hold significance. Researchers have argued that automation—akin to the basic AI—decreases street-level bureaucrats' discretion-as-perceived (Wang, Xie, and Li 2022), and can enhance their mechanistic behavior while such phenomenon is not mediated by discretion-as-perceived itself (de Boer and Raaphorst 2021). Alternatively speaking, public staff, for instance, may substantially have grounded in mechanistic and less discretionary operative conditions, more likely appreciating such operational characteristics of automation in organizational contexts and adopting such AI for tasks and operations of administration. When it comes to dealing with the impacts of AI intervention on human administrators' adoption and use of AI, it may be significant to reflect the institutional environment and organizational mechanisms.

At the same time, it should be clarified that the sector distinction can serve as a proxy to explain the institutional configurations of organizational structure and functioning, realizing organizational employees' contextualized administrative behavior, at an abstract level. That is, the sector can be a *secondary* factor implying organizations' structural and functional configurations. However, a combination of specific primary tasks and cultural traits, for instance, can provide a better indication of organizational types that may have characteristic associations with various AIs used in administrative contexts, which interact with human agents. Therefore, the findings and implications of this research should be reinterpreted and approached based on these specific organizational features rather than solely relying on the sector in which organizations are located. For example, private security firms that have highly specialized tasks and enforced coordination procedures dealing with the use of armories, and have stronger applications of relevant laws, may be more mechanistically structured and functioning than public welfare organizations providing childcare. Due to these reasons that the employed data involve various types or sorts of organizations in each sector, after all, the D-i-D analyses outcomes in the current paper seem to represent the accumulated outcomes of all the different cases.[51] As appeared in **Appendix H**, for more elaboration, I perform ancillary analyses.[52]

[51] Regarding the data generation process, I presumably understand that the research team at the National Taiwan University included a variety of jobs in each sector, involving some that may seem odd (like representatives in the public sector and agriculture in the private sector), to be as inclusive as possible and address most cases of jobs in a nation.

[52] Additionally, it is important to consider national and cultural contexts, as well as critical events, as they can significantly influence perceptions of engaging (or not) with AI (Meijer, Lorenz, and Wessels 2021; Alon-Barkat and Busuioc 2022). In the Taiwan context, based on a strong record of bureaucratic leadership throughout their history, yet holding the significant influences of political leadership since democratization that compromised the

Expanding Implications

This research, in theory, can further suggest that a private agent who works in more organic-type organizations—holding managerial positions—will be more likely to agree to the administrative adoption and use of more advanced AI, such as generative AI, which is primarily based on unsupervised, deep, and reinforcement learning methodologies. This can be inversely inferred from the hypotheses and findings of this study, which focused on the case of basic AI and implied that a public agent who works in more mechanistic-type organizations—holding non-managerial positions—will be more likely to agree to the administrative adoption and use of more basic AI. Although the empirical testing of the present paper focused on the case of using basic AI as contrasted with advanced AI, the theorization was designed to encompass more comprehensive applications.

Additionally, in terms of the practical implications of focusing on the case of the basic AI system for theorization, even when advanced AI becomes pervasive, basic AI will still be required to address the limitations of unsupervised, deep, and reinforcement learning methods. The deep learning approach, in particular, has opened new frontiers in AI technologies by overcoming the substantial restrictions of classical expert system approaches that rely on human interventions and, thereby, has significantly impacted the functional boundaries and autonomous capabilities of AI. However, it is likely that a high volume of contemporary AI/ML systems, representing advanced AI, will continue to face inevitable limitations as they operate in open

---

bureaucratic leadership, there has been a popular sentiment that their public managers should do more and better role in solving social problems with the help of innovation (Berman et al. 2013). At the same time, there were no significant negative events or scandals related to AI in the nation. Hence, throughout the experiment, I consider that the baseline cognitive impacts of AI on Taiwanese administrators were, at least, not adversarial.

environments and encounter information problems (Marcus and Davis 2019). Accordingly, there will continue to be benefits from expert system-like approaches, representing basic AI, that may effectively guide the majority of contemporary advanced AI/ML systems (Hao 2020).

Furthermore, similar to the approach taken in distinguishing organizational types via sectors, the eventual types and operational characteristics of AI can be further contextualized and nuanced. There will be a variety of AI/ML systems, each facing different contextual locations for decisional actions and processing corresponding data, both independently and collectively. Meanwhile, the theoretical and practical implications of this research remain crucial.

Finally, the focus of this study was primarily on the human perceptual dimension in the human-AI interaction, assuming a one-way direction of cognitive impacts from AI to humans. However, as AI possesses autonomy in learning and decision-making processes, the cognitive impacts shared with humans become increasingly simultaneous and mutual (Rahwan et al. 2019). In turn, it is also essential to consider human intervention in AI, including tasks such as managing data, ML processes, control, and incorporation of other related technological developments (Rahwan et al. 2019). It becomes evident that two-way feedback effects between humans and AIs emerge. Furthermore, investigating these phenomena poses a significant additional challenge as they occur at various levels of the ecosystem, ranging from the individual to the collective and social spheres (Rahwan et al. 2019). Eventually, this ecosystem transformation may substantially alter the dynamics of institutional-organizational-individual administration that this study is grounded in. Moreover, considering that AI, as an agent, operates autonomously for decision-making and execution of tasks, conventional theories of administration and organizational innovation adoption—assuming humans as the sole autonomous decisional agent fully controlling technology operations—may need to transform.

Conclusion

AI has the potential to significantly influence human cognitive decision-making processes and outcomes, which are recognized as integral to organizational administration (Simon 1997). AI can be viewed as a machine's ability to perform cognitive functions that humans typically associate with, e.g., decision-making (Rai, Constantinides, and Sarker 2019, 3). The cognitive effects of AI can be experienced by humans through their interaction with machine systems, such as devices or apps, equipped with AI capabilities. Interacting with various AI systems reflecting their functionality, humans can perceive and understand the operational characteristics of AI systems. Based on this foundation, this paper investigated how and why individual human agents agree to adopt and use different types of AI in specified organizational administrative contexts, including different types of organizations and positions that represent substantial part of organizational mechanism of structure and functioning, which are grounded in institutional environments. In other words, the paper elaborated on the cognitive impacts that AI can have on humans institutionally engaged in organizations for the administration of operations.

By doing so, this study makes three significant contributions to the field of administration studies. Firstly, it establishes a theoretic integration connecting between organizational innovation adoption, the deeper mechanisms of organizational administration, and human engagement with AI systems/agents, with a specific focus on the sector and, furthermore, the role of managers and staff. Secondly, in doing so, it further specifies how managers and staff will be differentiated to the extent of organizational innovation adoption and administration of operations on the institutional ground, advancing a priory theory (Molodogaziev and Resh 2016), extending the scope to human-AI engagements. Lastly, it highlights the concept of 'sectoral

distinction' across social-institutional, within-organizational, and individual-cognitive dimensions. It is important to note that this study does not aim to stereotype these distinctions but rather considers the sector as a proxy that can be further nuanced and elaborated upon by organizations with primary tasks and managerial mechanisms that interact with society and individuals.

This study also has two important contributions to the researchers who investigate human-AI interactions in organizational contexts. Firstly, while different individual-level perceptive/behavioral factors have been significantly studied by scholars, as underlined earlier, it has been less highlighted to reflect organizational mechanisms to understand *organizational* adoption and use of AI as this study especially focuses on. Combination of these approaches could help us better understand how and why humans will cognitively interact with AI for task accomplishments in administrative contexts, holding significant implications for AI and governance. Secondly, considering AI as agent—highlighting its autonomous capabilities for decisions and executions of designated tasks—can be valuable to better capture its operational implications within organizational mechanisms, as underlined by the discretionary feature. Treating AI as a decision-making agent for tasks and integrating it with conventional administration and innovation theories will be necessary for a better practical and theoretical understanding of the significant impacts of AI on society and humanity in this new era.

CHAPTER 4

ORGANIZATIONAL WILLINGNESS TO USE AI: EVALUATING THE ROLES OF AI PERFORMANCE INFORMATION AND RESPONSIBILITY-TAKING [53]

[53] Kyoung-cheol (Casey) Kim. To be submitted to *Public Administration Review*.

Abstract

Artificial intelligence (AI) systems have become integral to how administrators function within an organizational setting, impacting organizational performance and responsibility. In particular, it is notable that AI's decisional autonomy and operational uncertainty can pose risks for organizational employees to use AI for tasks, since they cannot completely control AI and predict the operational outcomes. It is also critical that the responsibility stemming from its operational outcomes goes to human users only, even when AI *itself* makes significant decisions for tasks. Paying attention to these matters, this study focuses on better understanding how organizational employees, in the public and private sector (representing types of organizations) and (non) managerial positions, will differently be willing to use AI in their institution. In so doing, this study underlines more specified organizational contexts for organizational employees to use AI, such as the 'AI performance information' (positive, negative, and neutral) indicating AI's organizational performance implications, and the 'AI-use responsibility-taking' in terms of an organizational setting (non-attributive or attributive, meaning allocating it to oneself or supervisor). Grounded in theories of economic and political organizational efficiency—critically differentiating sectoral job security—and administrative responsibility, public and private organizational employees can have differentiated willingness to use AI in their institution, particularly, having AI negative information and non-attributive responsibility-taking. Probit model analysis on survey experimental data from National Taiwan University (N=1,200) shows that public organizational employees are *more* willing to use AI when having *even* AI negative performance information and non-attributive responsibility-taking.

Introduction

Artificial intelligence (AI) systems are increasingly utilized in modern society, significantly impacting how humans work. AI is characterized by its autonomy in learning and decision-making, employing various machine learning (ML) methods. In exploring the administrative adoption of AI, public administration scholars have primarily focused on human-AI interactions within social, organizational, and technological dimensions. These studies often approach governance at the meso- or macro-level (Anastasopoulos and Whitford 2019; Meijer, Lorenz, and Wessels 2021; Madan and Ashok 2022; Neumann, Guirguis, and Steiner 2022; Alon-Barkat and Busuioc 2022; Young et al. 2021; Bullock, Huang, and Kim 2022). However, there is still a considerable gap in understanding how human organizational employees will collaborate or interact with AI in more specific operational contexts. This includes dealing with aspects such as AI performance information and the allocation of AI-use responsibility (whether to oneself or other entities like supervisors). These aspects hold significant administrative implications worthy of discussion.

First, the evaluation of AI performance information is vital for human agents collaborating with AI on tasks. It is especially important to pay attention to the 'negative' aspects of AI performance. AI systems not only yield beneficial outcomes but also present numerous drawbacks, which have prompted regulatory efforts worldwide (Rep. Malinowski 2020). Furthermore, organizational employees may be apprehensive about the potential negative impacts of AI performance, affecting the extent of their interaction with AI for task execution.

This apprehension could lead to varying degrees of willingness to use or interact with AI systems.[54]

Second, the allocation of responsibility for AI use, which impacts organizational performance outcomes, presents complex administrative implications of AI intervention. Within an organizational context, this responsibility can be assigned either to the users themselves (non-attributive allocation) or to their supervisors (attributive allocation). From the perspective of agents in administrative behavior, assigning AI-use responsibility ultimately equates to accepting it. It is crucial to recognize that AI's autonomous decision-making can create challenges in determining who should be responsible among organizational human employees who utilize AI for tasks. Consequently, the concept of an 'attributive' framework for AI-use responsibility deserves attention. In response to these challenges, the US government is increasingly designating Chief AI Officers to responsibly manage the organizational use of AI (Henderson 2022). This approach to responsibility allocation can influence employees' varying degrees of willingness to engage with AI.

Next, I begin by examining organizational efficiency from the perspective of organizational economics. This approach systematically investigates the implications of AI use in organizations, notably in terms of discharging (laying-off) employees due to problematic

[54] With regard to the conventional approach to humans' *use* and *adoption* of AI, this research reflects aspects of the mutual cognitive impacts between the two different decisional systems (humans and AIs). In light of reflecting AI's cognitive impacts on the human side, vice versa, I alternatively utilize terms such as human's *interaction*, *engagement*, or *co-working* with AI. This aspect is culminated by identifying human agents' administrative use of AI as 'AI intervention on administration' (Kim 2024b). I utilize such terms interchangeably; this study does not concern AI's manipulative impacts on humans for empirical testing.

performance. I then delve into the specific implications of AI for carrying out organizational tasks and, more broadly, for administration. Additionally, I consider political economy perspectives on organizational efficiency, emphasizing the importance of administrative responsibility and professional discretion. Subsequently, I describe the data, survey experiment, and empirical strategy, as well as the variables used. Interpreting empirical findings, I critically discuss administrative responsibility within the context of organizational characteristics. I conclude by discussing the significant implications of AI use in organizations for public administration research and practice.

Organizational Efficiency: Emphasizing the Discharge of Agents with Problematic Task Performance

This study aims to investigate the impacts of AI on human agents' willingness to use AI, in terms of administrative behavior, focusing on the perceptual dimension. In doing so, for more nuanced understanding, I emphasize the negative extent of AI-use outcomes, which are increasingly diagnosed and acknowledged. These outcomes can hold notable implications for organizational performance and lead to corresponding challenges in assigning responsibility for tasks completed by AI to legitimate human users.

Critically, the negative extent of AI use outcomes belonging to organizational users can eventually lead to the discharge (laying-off) of employees, with the aim of achieving and maintaining organizational economic efficiency more generally (Williamson 1999). In this process, considering that AI performance information can potentially be evaluated, which implies an *ex ante* uncertainty regarding performance, the specific differentiation in meaning

between ‘laying off’ and ‘discharging,’ particularly in the context of the immediate rationale for these actions against employees who utilize AI systems, can be mitigated.[55]

Differential Discharging Behaviors by Sectors and Managers

Public and private organizations can exhibit differences in their organizational operations and outcomes, falling on a continuum of opposite characteristics rather than as stark distinctions (Dahl and Lindblom 2017; Wamsley and Zald 1973; Perry and Rainey 1988). Private organizations primarily influenced by market systems typically prioritize profit maximization, often accompanied by lower job security. In contrast, public organizations primarily influenced by political control typically aim to achieve their missions in accordance with constitutional-legal procedures, accompanied by higher job security. Notably, the termination of employees in the public sector is subject to significant restrictions imposed by constitutional laws and due process in most modern democratic and constitutional states (Nigro and Kellough 2014). This implies that employees in the private sector, in comparison to their public sector counterparts, may exhibit greater concerns regarding the generation of problematic task performances, including the case of using AI for tasks. If the outcomes of using AI for tasks are problematic and negatively impact organizational performance and efficiency, private firms tend to terminate employment relationships more readily due to the absence of significant constitutional-legal procedural restrictions. This institutional and organizational nature can be reflected in the cognitive perceptions and behaviors of organizational employees (Kim 2024b).

[55] This argument is intended to support the point that the present study does not address the technical aspects of laying off and discharging in the discussion. The further substantive differences between these terms, in the context of organizational economics and management, are not reflected in the empirical scope of this study.

The sectoral difference can be further elaborated in conjunction with the managerial difference. When compared with staff, it is noteworthy that the performance outcomes of lower-ranked employees can also fall under the responsibility of managers who supervise and coordinate them. In the private sector, managers can readily lay off employees at their discretion, particularly when they face an increased burden of managing subordinates with performance issues (Williamson 1999). In contrast, public sector managers are generally constrained by constitutional laws and due process in most modern democratic and constitutional states when it comes to employee termination (Williamson 1999; Nigro and Kellough 2014). This suggests that public managers, in comparison to their private sector counterparts, may be more concerned with the organizational contexts surrounding the management of employees, including the case of using AI for tasks, while facing greater restrictions on their ability to discharge the problematic subordinates.

The Matter of Administrative Use of AI

Implications of AI for Tasks: Use-Context Uncertainty

AI systems embed different machine learning models, often presenting complex challenges to human users who interact with the systems, especially in gauging their potential outcomes that hold situational variations (e.g., precision rates when they operate in open environments, accompanied by their decisional autonomy) (Russell and Norvig 2009). This highlights that we cannot effectively evaluate the eventual benefits and risks of AI use, especially in the *ex ante* mode. Also, it will be increasingly difficult to secure controllability over advanced AI systems maintaining decisional autonomy (Russell 2019). As technology continues to advance and scale, these issues in the organizational use of AI will become increasingly

challenging for natural human beings to anticipate and address (Baird and Maruping 2021). We can define these AI usability problems as 'use-context uncertainty,' with a specific focus on its organizational implications at the task level.

Implications of AI for Administration: Task-Accomplishment and Responsibility Disentanglement

Continuing with the concept of AI use-context uncertainty for tasks at the immediate task-level, AI systems share a critical institutional challenge. AI autonomously accomplishes designated tasks; however, it currently does not legitimately hold responsibility for these actions. Hence, modern organizational employees find themselves in a novel situation where they collaborate with AI systems for autonomous decision-making in task accomplishments, with the primary institutional responsibility resting on the humans who 'use' them (Farber et al. 2023).

Specifically, rights, tasks, and responsibilities converge when it comes to administrative behavior; both humans and autonomous decision-making AI delegate their rights, tasks, and responsibilities to each other in a mixed manner (Baird and Maruping 2021). From conventional human perspectives, this leads to the disentanglement of task accomplishments and responsibility-taking within organizations involving AI.[56] AI's autonomous decision-making for task accomplishments and responsibility-taking, which falls on human 'users,' shed light on AI's institutional implications in administration. This institutional challenge concerning AI's responsibility for tasks may extend beyond the scope of task-level interactions between humans and AI.

Meanwhile, the responsibility of organizational employees in their work can serve as a crucial foundation for the successful operation and development of an organization. In well-

[56] As mentioned earlier, this paper solely focuses on the human perspective regarding cognitive interactions with AI.

established states with systems of checks and balances, employees' commitment to professionalism can substantially be rooted in a sense of responsibility, ultimately leading to enhanced performance and, subsequently, increased organizational efficiency (Miller 2000). Particularly in the public sector, professional responsibility can be significantly upheld through adherence to procedural (constitutional and legal) guidelines, often in a 'paradoxical' conjunction with administrative discretion (Miller 2000; Miller and Whitford 2016). When comparing public agencies to private firms, the realization of professional responsibility can be seen as a reflection of systematized administrative characteristics within public organizations, in contrast to the task-centric profit maximization and more adaptable procedural approaches often seen in the private sector: being responsible to stakeholders (for mission) vis-à-vis shareholders (for profit), respectively (Williamson 1999; Miller 2000).

Testable Implications of AI Performance Information and Use Responsibility-Taking

The AI intervention can be associated with how organizational employees perceive the use—in a conventional sense—of AI for tasks, having willingness to use it.[57] Relatedly, we can note two critical moderators: 1) performance information related to AI's outcomes in organizational task operations, which can potentially be evaluated, and 2) the responsibility-taking of human organizational employees when using AI systems, in conjunction with other contextual factors—for a more nuanced understanding of such phenomena. Additionally, the

[57] While it is crucial to recognize mutual cognitive interactions between humans and AI as agentic information systems artifacts (Baird and Maruping 2021), the current paper focuses solely on the human side. For the sake of ease of understanding, in a conventional sense, and also of theorization, ultimately, I use both terms—AI use and AI intervention—interchangeably.

sector and managerial position can jointly further moderate the organizational willingness to use AI.

AI Performance Information

Firstly, as a contextual factor in the use of AI for tasks, we can consider AI's organizational performance outcomes, which can potentially be evaluated, indicating AI performance information. AI performance information encompasses the evaluation of AI use as having either positive or negative impacts on organizational performance. It is crucial to emphasize the importance of paying attention to 'negative' AI performance information. AI systems not only generate useful outcomes but also come with a myriad of drawbacks that have led to regulatory efforts worldwide (Rep. Malinowski 2020).[58] Organizational employees, as AI users, may express concerns regarding the negative potentialities associated with AI performance.

The negative outcomes associated with AI use are institutionally expected to be attributed to the users. This situation can eventually lead to the termination of (potentially or presumably) problematic and responsible organizational employees. Consequently, when confronted with the problem of AI use-context uncertainty, which involves concerns about the use outcomes in situational variations and the controllability over AI, private employees with lower job security,

[58] In a law enforcement case, for instance, there have been instances of wrongful arrests of minority individuals in the United States in recent years (Hill 2020). An AI system was tasked with predicting risk scores for suspects (citizens), and human police officers were expected to *consider* this information for their tasks, such as making arrests. The police officers relied on the information provided by AI, and their organizational performance in this task ultimately had catastrophic outcomes (explaining the specific reasons is not within the primary focus of this paper).

as opposed to public employees with higher job security, are likely to exhibit lower willingness to use AI. Therefore, when AI intervenes with organizational employees for tasks, the presence of negative AI performance information will result in private sector employees with lower job security being less inclined to use AI compared to their counterparts in the public sector with higher job security (**Hypothesis 1**).

> ***H1 (AI Performance Information & Non-managerial distinction)****: AI negative performance information will result in private employees being less willing to use AI compared to public sector employees.*

An additional aspect to note involves managers who oversee and coordinate the organizational operations of their subordinates. Coordination is a crucial function or specialized jobs of managers (Bullock, Huang, and Kim 2022). Consequently, the performance of subordinates can significantly impact the performance of their managers. Ultimately, managers will consider higher-level supervisors or chief executives in relation to their own employment, as these individuals have the authority to lay off or discharge the managers. The managers' effectiveness in supervising and coordinating subordinates will also influence their employment relationship.

Meanwhile, public managers, in comparison to their private sector counterparts, are more constrained in their ability to discharge problematic subordinates using AI for tasks. This constraint can lead to an increased managerial burden and lower willingness to use AI in organizational contexts. Therefore, when AI intervenes with organizational employees for tasks, the presence of negative AI performance information will result in public managers being less inclined to use AI compared to private managers (**Hypothesis 2**).

H2 (AI Performance Information & Managerial distinction)*: AI negative performance information will result in public managers being less willing to use AI compared to private managers.*

AI Use Responsibility-Taking

It is worth emphasizing 'attributive' AI-use responsibility-taking to the extent of achieving organizational goals through hierarchical control over subordinates. This concept involves the allocation of responsibility to higher-ranked supervisors, such as Chief AI Officers, as organizationally designed, to systematically address AI-related matters and promote the effective use of AI (Henderson 2022). The implication is that if employees express concerns regarding the use of AI for tasks, attributive responsibility allocation to (higher) supervisors can potentially moderate and alleviate reluctance toward AI use.

This moderation occurs by buffering the negative effects while maintaining the positive use benefits. While the negative effects can have differential implications for sectors, in conjunction with differences in job security, the positive effects may not systematically discriminate among sectors. Through effective management of human employees and AI systems in coordination, organizations—regardless of their sector—may anticipate positive usability of AI when utilized by employees.

Setting aside the positive effect as a non-differential point, private sector employees, in comparison to their public sector counterparts, can significantly encounter the negative aspects of using AI, particularly concerning lower job security. However, these negative effects can be mitigated by the attributive responsibility-taking in terms of organizational setting and design. Hence, when AI intervenes with organizational employees for tasks, AI-use responsibility-taking in an attributive manner will result in private employees with lower job security being more

inclined to use AI compared to their public sector counterparts with higher job security (**Hypothesis 3**).

> ***H3 (Responsibility-taking & Non-managerial distinction)****: AI-use responsibility-taking in an attributive way will result in private employees being more willing to use AI compared to public sector employees.*

Meanwhile, AI-use responsibility-taking in an attributive manner can influence public managers, in comparison to their private sector counterparts, to exhibit a higher willingness to use AI. This impact occurs by buffering the negative effects while maintaining the positive use benefits, particularly with regard to the managerial burden of overseeing subordinates who have higher job security and use AI for tasks. As mentioned earlier, while the negative effects can have varying implications for sectors due to differences in job security, the positive effects may not systematically discriminate among sectors. Therefore, when AI intervenes with organizational employees for tasks, AI-use responsibility-taking in an attributive manner will result in public managers being more inclined to use AI compared to private managers (**Hypothesis 4**).

> ***H4 (Responsibility-taking & Managerial distinction)****: AI-use responsibility-taking in an attributive way will result in public managers being more willing to use AI compared to private managers.*

Data and Experiment

This paper aims to investigate how having direct AI intervention (AI-use) experience can contextually impact the willingness of organizational individuals to use AI, as a perceptual measure. While exploring the contextual implications of AI-use for administration, this study

emphasizes the moderation of the effects of AI intervention through sectoral and/or managerial differentiations. Additionally, it delves further into the moderation effects through AI negative performance information and AI-use responsibility-taking in an attributive manner.

For empirical testing, this study utilizes survey experiment data from National Taiwan University (N=1,200), collected in collaboration with a data company named EZChoice, during a one-month period from September 19 to October 19, 2019. Participants were screened and included if they were currently full-time working-age adults (18-65 years old), employed in either the public or private sector, as specified by Huang et al. (2021).

Organizational willingness to use AI perception was evaluated after completing a set of experimental tasks. In terms of the experiment tasks, which were conducted over 12 rounds for individual participants, they were administered through an online platform in Mandarin, involving written communication. Participants were tasked with facial recognition activities that required comparing images to suspects. In each round, they were presented with two questions: 1) "*Is the person from the below recorded image the same as the one from the suspect photo above?*" and they marked their answers as either 'yes' or 'no.' Subsequently, 2) inquiring whether they were certain of their answer, with the option to change their response or not, in terms of confirmation. In this experiment, only the treatment group received AI intervention at the confirmation stage throughout the decision exercise, while the control group did not, despite performing the same decision exercise.[59]

[59] Meanwhile, this experiment utilizes a quasi-AI system. Although it actually operates as a conventional computational program, it gives the appearance of functioning like a pure AI system. It was designed to appear as if it could perform either perfectly or poorly, as programmed, reflecting AI's critical functionality in terms of the

In doing so, at the beginning of the experiment process (before the first round), participants were provided with information through passages. These passages covered 1) the organizational performance implications of AI for tasks, either resulting in positive or negative outcomes, or without any provision of such information (neutral), and 2) responsibility allocation concerning the performance of the experimental task, potentially affecting organizational performance outcomes, either to themselves or their supervisors—in this order. These passages were randomized in their provision, in terms of Randomized Control Trials (RCTs).

Research Design and Empirical Strategy

While this study primarily focuses on investigating willingness-to-use-AI perception, which is largely moderated by sector and manager indicators and further influenced by AI performance information and AI-use responsibility-taking, it is crucial to reflect self-performance efficacy and AI use contexts in terms of control variables. Self-performance efficacy and AI use contexts are inherently linked to employees' own performance dimension and the characteristic features of AI used in the workplace, respectively. Each of these constructs comprises multiple sub-factors, which are elaborated on in the following chapter explaining the variables used. Additionally, exploratory factor analysis (EFA) was performed for each construct, and the eigenvalues were found to be less than 1 in each case. For the sake of ease in interpreting the analysis outcomes, the averaged values for these factors were utilized, with no noticeable difference compared to using factor scores alongside ancillary analysis. The EFA

situational variance in performance and the matter of controllability. This method is frequently employed in the management (information systems) field (Dietvorst, Simmons, and Massey 2018; 2015).

outcomes are presented in **Appendix I**, and the ancillary analysis outcomes can be found in **Appendix L**.

This study aims to investigate the more nuanced impacts of AI-use-related factors, such as AI performance information and AI-use responsibility-taking, in conjunction with significant moderators such as sector and manager, on organizational employees' institutional willingness to use AI. Therefore, instead of focusing solely on the Average Treatment Effect on the Treated (ATET) of AI intervention, the present study employs probit model analysis, which takes into account the effects of other associated factors such as self-performance efficacy and AI use contexts.[60]

Variables

Dependent and Explanatory Variables

The dependent variable is Organizational Willingness to Use AI, operationalized as "When AI is introduced to your institution, would you use it?" (binary, yes = 1; no = 0). I employ four covariates that can also be used as moderators. The first one is Sector (binary, public = 1; private = 0). Particularly, Sector is employed as a preemptive case-sorting moderator, considering the significant effects of institutional factors that reflect sectoral distinctions on organizational mechanisms of organizational innovation adoption (Damanpour 1991). That is, while this variable is not placed in the same position as the other covariates, I compare estimates

[60] I attempt to empirically test the hypotheses using probit analysis, for nuanced understanding, and I perform Seemingly Unrelated Estimation to evaluate whether and how the statistical significance of factors differs significantly between the sectors. While I present excerpted analysis outcomes with the final model in reporting the empirical findings, the analysis outcomes of the entire models are provided in **Appendix K**.

in public vis-à-vis private sector cases. The second one is Manager (binary, manager = 1; staff = 0). The third one is AI Performance Information (+1: Positive; 0 = Neutral; -1: Negative) as randomized. The last one is Responsibility-Taking (binary, oneself = 1; supervisor = 0) as randomized. The AI Performance Information and Responsibility-Taking variables are introduced through Randomized Control Trials (RCTs) in this experiment.[61]

Control Variables

I also employ multiple control variables. A primary one is AI Intervention, which indicates if an observation is in the treatment group, as a binary variable. AI Intervention can be a critical causal factor in organizational adoption and use of AI (Kim 2024b); however, the present study focuses on contextual organizational factors as key covariates. Other than this, the first group of control variables represents factors that affect performance and responsibility in using AI for tasks: Self-Performance Efficacy and AI-Use Contexts.

First, AI-Use Contexts reflects the workplace implications of AI use, related to its outcomes in situational variations and controllability problems. It comprises eight sub-factors, all measured on 5-rank Likert Scales (1 strongly oppose, 5 strongly support), and they are assessed in relation to a pre-conditioning question: "If AI is applied to your job in the future, do you agree with the following statement?" The sub-factors include: (1) "[Applying AI can enhance my performance]"; (2) "[Applying AI can enhance my efficiency of working]"; (3) "[Applying AI

[61] One might be concerned that the AI Performance Information and Responsibility-Taking variables are introduced through RCTs in this experiment, which moderate the effects of AI intervention on organizational employees' willingness to use AI perception, potentially introducing biased effects on the causality of AI intervention. However, recent methodological research argues that such an approach (reflecting moderating effects with RCTs) does not necessarily affect the causal relationships of major factors (Sheagley and Clifford 2023).

can increase my productivity]"; (4) "[Applying AI is useful for many of my job tasks]"; (5) "[It is clear and easy to understand AI]"; (6) "[It is easy to interact with AI]"; (7) "[It is easy to use AI]"; (8) "[It is easy to direct AI to do the tasks according to my thoughts]."

Second, Self-Performance Efficacy reflects the natural operational base of organizational employees' task performance. This can be a significant control factor (base factor) for the AI-Use Contexts which highlights the performance of and controllability over AI (Baird and Maruping 2021). This variable includes the interactional aspects of AI in co-working with humans, which critically supplement or replace human jobs and tasks that are of increasing concern globally (Raisch and Krakowski 2020; Autor 2015).[62] It is comprised of three sub-factors. While these are all 10-level measurement scales (1 is the lowest and 10 is the highest), they are measured as follows: (1) "Please self-rank your performance of current job" (without having AI intervention); (2) "Please rank your performance when AI [Assists You] doing your job"; (3) "Please rank your performance when AI [Executes] your job."

The other group of control variables comprises demographic factors aimed at capturing individual characteristics of behavioral perceptions. First is Age, which is categorized into sub-groups. Specifically, individuals aged 18-24 are assigned a value of 1; those aged 25-29, a value of 2; those aged 30-34, a value of 3; those aged 35-39, a value of 4; those aged 40-44, a value of 5; and those aged 45-49, a value of 6. Additionally, age sub-groups ranging from 50-54, 55-59, 60-64, and above 65 years old (omitted) are consolidated into the same group with a value of 7, due to a smaller sample size in the original ranges. The second control variable is Gender, which is represented as a binary variable with a value of 1 for males and 0 for females. The third

[62] Still, the current paper does not concern real-time manipulative effects of AI on human agents (Rahwan et al. 2019) for empirical testing.

variable is Education (Level), where value 1 includes samples from Senior high school, Senior vocational high school, and Non-commissioned school; value 2 encompasses individuals with education from Five-year junior college, Two-year junior college, Three-year junior college, Military/Police specialized class, Military/Police College, Remoted University, and Industrial College; value 3 represents those with a Bachelor's degree; and value 4 combines individuals with graduate degrees, including Master's and Ph.D., integrating the two cases that were originally measured separately due to a smaller sample size. Descriptive statistics for the employed variables can be found in **Appendix J**.

Empirical Findings

Contextual Effects of AI Performance Information and Responsibility-Taking

Summary

In terms of estimates, in summary, as shown in **Table 4**, all covariates demonstrate statistical significance (at the significance level of 0.01 or at least 0.05), except for the Manager and AI Performance Information variables in both the public and private sectors. In order to compare statistically significant covariates in each sector, I conducted Seemingly Unrelated Estimation by subtracting the probit regression beta coefficient and standard error estimates of private sector factors from those of the public sector. Only the AI Use Contexts variable shows a statistically significant sectoral difference at the significance level of 0.10 (in **Model 3**, $\beta = -0.371$, $p = 0.095$). Notably, there is no statistical significance for the AI Performance Information and Manager variables, which challenges the direct hypothesis testing for AI's performance implications (**H1**) and the managerial role (**H3**). The Responsibility-Taking variable is statistically significant in both sectors; however, there is no statistically significant sectoral

difference to directly evaluate the allocation and taking of responsibility (**H2**) and, in conjunction with the Manager variable, the joint hypotheses (**H4**). Lastly, AI Intervention loses its statistical significance in the private sector. This suggests that its significance may be contextual, as there is no statistically significant difference in effect compared to the public sector, where it remains statistically significant (in **Model 3**).

After all, with additional analyses, the empirical findings only support **H1** (AI negative performance information will result in private employees being less willing to use AI compared to public sector employees). This support primarily arises from the seemingly counterintuitive outcome of marginal effects of AI Performance Information. Specifically, public employees exhibit a greater willingness to use AI when exposed to negative performance information than to positive information, in contrast to the case of private employees (see **Figure 6**). I aim to gain a deeper understanding of this finding by examining its connection to administrative responsibility, which will be more elaborated later.

The Responsibility-Taking variable is statistically significant in both sectors (public sector: β=0.662, p=0.001; private sector: β=0.350, p=0.041), with no statistically significant sectoral difference evident (see **Model 1**, **2**, and **3** in **Table 4**). This suggests that responsibility holds similar importance for organizational employees in both the public and private sectors. Additionally, it is worth noting that employees in public organizations often exhibit characteristics such as constitutional-legal procedural abidance, professionalism, and nuanced discretion (Miller 2000). Private sector employees, on the other hand, tend to be more task-focused and less procedurally-restricted (Piazza, Bergemann, and Helms 2022).

The AI Use Contexts variable is statistically significant in both sectors (public sector: β= 0.621, p=0.000; private sector: β= 0.883, p=0.000). Furthermore, its sectoral difference is

statistically significant (β=-0.371, p=0.095), indicating that AI Use Contexts, reflecting implications at the task-level, have a more critical impact on employees' organizational willingness to use AI perception in private organizations compared to the public sector (as shown in **Model 1**, **2**, and **3** in **Table 4**). This observation aligns with the task-centric and more flexible procedural administration of corporate firms, characterized by their organic organizational nature, in contrast to the mechanistic nature of public organizations (Burns and Stalker 1994), relatively speaking.

Detailed Implications of Institutional Environments and Administrative Responsibility

Undoubtedly, the task itself, concerning job specialization, stands as one of the key components of any type or form of organizational (bureaucratic) structuring and functioning (Bullock, Huang, and Kim 2022). In the meantime, the differential organizational nature, rooted in institutional environments (Kim 2024b), compels organizational employees to earnestly pursue the fulfillment of their organizational goals while maintaining organizational efficiency—responsible to stakeholders (for mission) vis-à-vis shareholders (for profit) (Williamson 1999; Miller 2000). Due to the task-centric nature of private firms compared to procedural ones, their employees can be significantly influenced by AI Use Contexts in terms of their willingness to use AI. AI Use Contexts, emphasizing task-related aspects, remain important for public employees; however, to a significantly 'lesser' extent than for private employees. Public organizations are more inclined towards legal-procedural compliance in achieving their organizational mission, which reflects stakeholder-based constitutional and democratic control.

Building upon these sectoral understandings regarding the extent of administrative responsibility, it is confirmed that **H1** is supported. Private sector employees, when compared to their public sector counterparts, tend to be more concerned with generating problematic task

performances, including cases involving the use of AI for tasks. This is challenging due to the difficulty in gauging AI's potential operational outcomes and securing control over its operation. In contrast, employees affiliated with public organizations, primarily influenced by political control, generally prioritize the achievement of their mission in compliance with constitutional-legal procedures, often benefiting from higher job security. This increased job security can promptly alleviate concerns among public employees when it comes to generating potentially problematic performance using AI, provided they adhere to procedural specifications.

Furthermore, procedural abidance among public employees can have broader implications for AI use and administration. As a new component of the procedure, organizationally set and designed for the use of AI in task performance, public officials should and would ideally utilize AI accordingly. In doing so, they can be motivated to exhibit responsibility and contribute to the public they serve in a professional manner, while paradoxically exercising discretion that extends beyond legal and procedural *ex ante* regulation (Miller 2000; Miller and Whitford 2016).

Importantly, when it comes to facing the negative potentialities of using AI, it becomes a critical issue for the public. In this context, public officials are compelled to actively address these potential negative consequences. In other words, by adhering to the organizational administrative framework for using AI in tasks rather than obviating it, public officials may be more willing to employ AI even when it carries negative potential risks for the public they serve. This willingness arises from their sense of responsibility and is coupled with a paradoxical use of discretion and creativity. At this juncture, their higher job security can play a significant role. Despite grappling with the uncertainty of AI use-context (at the task level) where they cannot reliably predict its performance outcomes and secure complete operational control, they may

exhibit less concern. Their responsibility can be channeled towards maximizing organizational efficiency and achieving administrative mission objectives for the stakeholders.

Meanwhile, private employees tend to be more oriented towards enhancing the performance of the task itself to generate more profitable production outcomes, with less concern for assuming responsibility from a procedural and legal control perspective. Responsibility remains important for private employees, but it carries different institutional connotations. In the private sector, responsibility may come with greater autonomy, allowing for the avoidance of procedural and legal controls in strategic ways (Piazza, Bergemann, and Helms 2022). This is ultimately aligned with the organizational nature of private firms, which emphasize task-centric operations rather than strict procedural compliance, in pursuit of higher profits as more organic types of organizations that are primarily responsible to shareholders (Burns and Stalker 1994). This orientation also corresponds with their lower job security, making them more attentive to the potential risks associated with using AI. Ultimately, when faced with the challenge of assessing AI's potential operational outcomes and securing control over its operation, especially when presented with negatively evaluated AI performance information, private employees may 'responsibly' exhibit a reduced willingness to use AI.[63]

Next, we shift our focus to the allocation of responsibility as determined within the organization—whether it is designated to oneself or a supervisor. This is exemplified by cases like organizational designs appointing Chief AI Officers to primarily assume this responsibility.

[63] One may argue that private firms are risk-takers, but they tend to take risks only when they perceive greater profit opportunities. If they anticipate greater losses, as determined through benefit-risk analyses, it becomes evident that they will not undertake the enterprise or will cease to sustain it. This aligns with the spirit and principles of the free-market system.

As mentioned, ‘allocating’ responsibility corresponds to individual employees’ willingness to ‘take’ on responsibility in terms of their administrative behavior.

As implied earlier, in both sectors, the variable is statistically significant and exhibits a positive correlation (see **Table 4**). When responsibility-taking is non-attributive (having a value of 1, compared to the value of 0 for attributive), there is a greater likelihood of willingness to use AI. It is evident that attributive responsibility-taking, as established within the organization, is not effective in fostering greater willingness among organizational employees to use AI. Furthermore, there is no statistically significant sectoral difference between public and private employees. As emphasized, organizational employees in both the public and private sectors place importance on their ‘own’ responsibility, albeit with different institutional connotations.

This observation is noteworthy as it suggests that the issue of task accomplishment and responsibility disentanglement may not be a significant concern for both public and private sector employees. They are willing to assume responsibility. However, this willingness may be more prevalent in the short term, without a deep and extensive realization of the entanglement problem. The cognitive relationships between humans and AI systems can evolve over time, reflecting cumulative effects (Baird and Maruping 2021). Assuming the manageable scenario, employees may continue to maintain conventional responsibility dynamics. After all, **Hypothesis 3** (AI-use responsibility-taking in an attributive way will result in private employees being more willing to use AI compared to public sector employees) cannot be supported.

Table 4. Probit Analysis (Sectoral Comparison)

Variables	(Model 1) Public Sector	(Model 2) Private Sector	(Model 3) Public-Private Difference
AI Intervention	0.519**	0.292	0.227
	(0.224)	(0.212)	(0.299)
Manager	-0.227	-0.140	-0.087
	(0.221)	(0.325)	(0.365)
AI Performance Information	-0.011	0.067	-0.078
	(0.114)	(0.103)	(0.155)
Responsibility-Taking	0.662***	0.350**	0.312
	(0.191)	(0.169)	(0.260)
Self-Performance Efficacy	0.157***	0.214***	-0.057
	(0.051)	(0.047)	(0.073)
AI Use Contexts	0.877***	1.248***	-0.371*
	(0.149)	(0.173)	(0.223)
Constant	-3.979***	-4.226***	0.247
	(0.671)	(0.716)	(0.945)
Age and Education FEs	Yes	Yes	Yes
Male	Yes	Yes	Yes
Observations	600	600	600

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

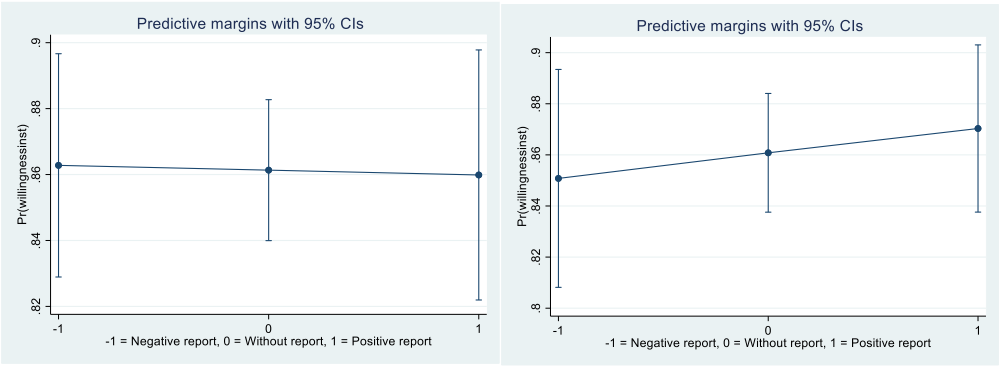


Figure 6. Marginal Effects of AI Performance Information (Public v. Private Comparison)

Limited And Meaningful Functioning of Managers

We can observe compromised managerial functioning since the variable does not exhibit statistical significance in the models presented in **Table 4**. However, interpretations of the effects of managerial roles can be more contextual. In the overall regression specifications, as shown in **Appendix K**, the manager variable is statistically significant in some basic models. This finding aligns with theoretical arguments in the conventional innovation setting, suggesting that the manager variable can be a significant determinant of organizational innovation adoption and use (Damanpour 1991). However, it loses statistical significance when substantive AI-related factors, particularly AI Use Contexts, are included.

Hence, it is plausible that managers can generally hold positive perceptions of AI's potential in more conventional innovation contexts. However, they may perceive its actual usage aspects, such as situational outcome variations and controllability issues (AI use contexts uncertainty), as problematic, especially concerning administrative responsibility implications when supervising and coordinating subordinates who use AI for tasks. With this mixed effect, which can be indicative of increased managerial burden when dealing with subordinates facing challenges related to AI use, the statistical significance of the Manager variable, overall, can become insignificant (neutralized).

Finally, **Hypothesis 2** (AI negative performance information will result in public managers being less willing to use AI compared to private managers) and **Hypothesis 4** (AI-use responsibility-taking in an attributive way will result in public managers being more willing to use AI compared to private managers) are not supported. However, the theoretical implications may still hold value and relevance. In future studies, more focused experimental and/or research

settings may assist managers participating in the studies in discerning specific managerial issues related to AI usage.

Discussion

Thus far, we have discussed the importance of constitutional-legal compliance as a pivotal factor distinguishing political-democratic control from market-system-oriented administration in public and private organizations, each being responsible to stakeholders and shareholders, respectively, while pursuing organizational efficiency. This approach has the potential to complement and enrich classic theories on institutional-organizational dynamics, taking into account sectoral similarities and differences, grounded in the mode of social control (Perry and Rainey 1988). I emphasize the critical role of legal compliance as a substantiating condition (Kim 2024b) that extends to the realm of administrative responsibility in the pursuit of organizational efficiency (Williamson 1999; Miller 2000).

This understanding can also provide valuable insights for assessing the risk-averse behaviors of public and private employees, thereby adding contextual nuances to the discourse in behavioral economics and administration (Nicholson-Crotty, Nicholson-Crotty, and Webeck 2019). In many cases, public servants may appear risk-averse, refraining from taking actions beyond their area of responsibility, as they tend to adhere to fulfilling their legitimately conferred duties. However, in situations involving risks where the required actions fall within the scope of their legitimate responsibilities, they, such as forest rangers, may exhibit courage, creativity, and dedication in fulfilling their responsibilities to the stakeholders, utilizing discretion to a significant extent (Kaufman 2006). Administrators' actions should be viewed within the organizational and institutional contexts, moving beyond a sole focus on individual-level

behavioral characteristics; there may be conjoint effects that warrant further consideration. This knowledge will maintain furthering importance in better comprehending humans' organizational interactions with AI, which hold situational outcome variations and controllability issues.

Meanwhile, when considering AI intervention in administration, the traditional dynamics of administrative responsibility may rather apply in the short term. As AI intervention continues, the perceived dynamics of administrative responsibility, which also reflect mutual cognitive effects between humans and AI agents, may undergo changes (Baird and Maruping 2021). As AI's decisional impacts on organizational administration and outcomes become more intense and extensive, corresponding shifts may occur in the benefit-risk assessments related to AI use, as conceived by human employees in their administrative behavior.

Regarding the cognitive and rational interactions between human employees and AI in its organizational use, performance information (with evaluation) holds significance. The novel challenge of AI use-context uncertainty can introduce complexities to the conventional theory of performance information utilization, emphasizing the criticality and limitations of capturing the *ex ante* dimension in performance evaluation (Nowlin 2018)—as the implication becomes evident. Further utilization of AI systems may aid in addressing such cognitive challenges for humans (Bullock, Huang, and Kim 2022); however, it may also further complicate the organizational dynamics associated with AI use (Baird and Maruping 2021).

Conclusion

This study focused on determining when (contexts) and how (mechanisms) organizational employees are inclined to use AI. To systematically investigate the organizational implications of AI usage, I grounded the study in the mechanism of maintaining organizational

efficiency, commencing with a discussion from the perspective of organizational economics. In doing so, I particularly delved into the discharging (laying-off) mechanism, which varies by sectors and is associated with differences in job security levels. In relation to managers, I highlighted their managerial burdens in dealing with subordinates, which can potentially lead to the dismissal of problematic subordinates as a means to maintain organizational efficiency.

In the realm of organizational AI use, there are distinct challenges and varying attitudes across sectors. Organizations face increasing difficulties in controlling AI operations and predicting outcomes, especially as AI systems grow more advanced, heightening concerns about negative impacts. This technological advancement also complicates the allocation of responsibility among employees, leading organizations to consider assigning AI responsibilities to senior roles like Chief AI Officers.[64] Public officials, often with greater job security and operating within AI-favorable frameworks, show a propensity to use AI actively, even in the face of potential public risks, balancing efficiency and stakeholder responsibilities. In contrast, private sector employees, facing less job security, tend to be more cautious with AI, especially when negative impacts are anticipated, focusing instead on efficiency and profit maximization. Across both sectors, employees generally assume direct responsibility for AI task implementation, moving away from supervisor dependency. Managers, while generally positive about AI in innovation, may face increasing challenges as AI evolves and its interactions with humans become more complex, particularly in managing and guiding employees who utilize AI.

[64] To the extent of responsibility and accountability, where AI can autonomously make decisions at the eventual moment, society may also consider including AI in the definition of legal subjects in certain aspects, such as inventing (Taylor 2021). This would be highly controversial and would raise philosophical questions. However, this 'substantive institutional matter' is beyond the scope of consideration in this study.

This study has two noteworthy limitations. First, as mentioned earlier, the experimental and/or research setting is limited in its ability to capture the discernible willingness-to-use-AI perception of managers. Managers play a crucial role in understanding the more holistic dynamics of organizational operation and administration (Miller 2000). Second, in its pursuit of theoretical foundations, by relying on organizational economics to emphasize organizational efficiency, this study primarily focused on discharging (laying-off) mechanisms (Williamson 1999). However, in the pursuit of organizational efficiency, other managerial tools that capture and promote positive (constructive) aspects can also be crucial. It is worth noting that, from a political economy standpoint, "organizational economists tend to discount this language as cheap talk," while those points can be significant (Miller 2000, 305).

In future research, expanding the scope, accountability-oriented approach in AI use (Busuioc 2021), along with long-standing debates on responsibility vis-à-vis accountability by Fredrich and Finer (Plant 2011), can further be synthetically considered. It can also be meaningful to reflect constructive associations between administration and democracy (Bertelli 2021), public-private partnership (Teisman and Klijn 2002), government reform (Kettl 1997), and dynamics in administrative performance and citizen evaluation (Carpenter and Krause 2012), among many others. These can be importantly drawn upon together for harnessing a deeper and more comprehensive understanding on human-AI interaction in public administration. Further, collaborations between the scholarship of public affairs and AI researchers could be critical to better understand both comprehensive and specific issues of using AI in governance.

CHAPTER 5

CONCLUSION

This dissertation aims to better understand how governmental organizations operate in modern democratic environments, considering the significant implications of technology and innovation. First, I revisited classic studies of organization and administration to achieve a more robust and scientific understanding of organizational principles in structurization and functioning. This understanding was then applied to the context of technological innovation, with a focus on highlighting the nuanced operational dynamics of organizational administration within the institutional environment of political controls. Second, with a focus on AI as a critical modern technological innovation, I further specified the organizational operational mechanisms of managerial functioning as well as the implications of discretion that AI can hold—maintaining cognitive impacts on human agents' administrative behavior. In conjunction, I highlighted the institutional environment's significant configurational implications for administrative organizations in terms of the mode of social control (Perry and Rainey 1988). Third, I further integrated the theoretical foundations with the perspectives of organizational and political economics. This approach highlights the significance of organizational efficiency and responsibility for the operations of organizational administration that affect organizational employees' willingness to use innovation in the context of AI intervention.

Specifically, the first essay delved into the perennial challenge of aligning optimal administrative outcomes with societal preferences in democratic governance. It revisits the historical debate between the accountability and responsibility approaches to administration,

elucidating the divergent views on discretion. The accountability approach advocates for limited administrative discretion, whereas the responsibility approach emphasizes nuanced discretion for optimal organizational effectiveness. To better understand the relative significance of these approaches, it is necessary to establish an integrative theoretical framework that embraces both aspects, addressing the matter of discretion more comprehensively. This first requires a deeper understanding of the operational mechanisms of administrative organization.

By revisiting classic theories of organization and administration studies, the essay proposes a recalibrated organizational principle, comprising key components. These principles reflect aspects of institutional and behavioral rationality, operating independently and simultaneously within the organizational and institutional environments. Furthermore, the synthetic applications of institutional rationality and behavioral rationality can reveal functional dislocation, essentially indicating the exercise of discretion. While the functional dislocation of institutional and behavioral rationality necessitates a realization of discretion, it is concretely textured with individual employees' decisional attributes in terms of behavioral information processing. The eventual exercise of discretion accompanies professionalism, which may be maintained through institutional checks and balances (Miller and Whitford 2016).

Regarding political controls, the theory of administrative reputation reflects the criticality of discretion and administrative dynamics (Carpenter and Krause 2015) that can lead to responsible outcomes through generating and sharing performance-focused reputation, interacting with citizens (Carpenter and Krause 2012). On the other hand, the theory of political-institutional control criticizes the mechanism of administrative reputation, arguing that it may lead to illegitimate outcomes of control, such as an unchecked increase in bureaucratic power (Bertelli and Busuioc 2021). Instead, citizens' political behaviors can help achieve institutional

checks and balances by exerting control over public bureaucracies (Bertelli and Busuioc 2021). Grounded in the mutual significance of institutional checks and balances as well as administrative establishment and maintenance, these modes of political control can be characteristically important for modern democratic administration.

Then, the essay empirically investigated these points in the context of US federal agencies' use of innovative technology tools which can assist in increasing individuals' task performances. By nature, the use of novel innovation for tasks may not align with the current codified administrative system, necessitating adjustments. Hence, organizational innovation use inherently bears the potential for the functional dislocation of institutional rationality and behavioral rationality in applications, with varying innovative status of individuals for problem solving in terms of information processing—thus realizing textured discretion. As related, the political control approaches can have characteristic implications.

The second essay highlights institutional implications for administrative use of AI. AI has the potential to significantly influence human cognitive decision-making processes and outcomes, which is recognized as integral to organizational administration (Simon 1997). AI can be viewed as a machine's ability to perform cognitive functions that humans typically associate with, e.g., decision-making (Rai, Constantinides, and Sarker 2019, 3). The cognitive effects of AI can be experienced by humans through their interaction with machine systems, such as devices or apps, equipped with AI capabilities. Interacting with various AI systems reflecting their functionality, humans can perceive the operational characteristics of AI systems. Based on this foundation, this essay investigates how and why individual human agents agree to adopt and use different types of AI in specified organizational administrative contexts, including different types of organizations and positions that represent substantial part of organizational mechanism

of structure and functioning which are grounded in institutional environments. In other words, the essay elaborates on the cognitive impacts that AI can have on humans institutionally engaged in organizations for the administration of operations.

By doing so, this study makes three significant contributions to the field of administration studies. First, it establishes a theoretic integration connecting between organizational innovation adoption, the deeper mechanisms of organizational administration, and human engagement with AI systems with a specific focus on the sector and the role of managers and staff. Second, the study further specifies how managers and staff will be differentiated to the extent of organizational innovation adoption and administration of operations on the institutional ground, advancing a priory theory (Moldogaziev and Resh 2016) extending the scope to human-AI engagements. Last, it highlights the concept of sectoral distinction across institutional, organizational, and individual dimensions. It is important to note that this study does not aim to stereotype these distinctions but rather considers the sector as a proxy that can be further nuanced and elaborated upon by organizations with primary tasks and managerial mechanisms that interact with society and individuals.

This study also has two important contributions to the researchers who investigate human-AI interactions in organizational contexts. First, while different individual-level perceptive/behavioral factors have been significantly studied by scholars, it has been less highlighted to reflect specific organizational mechanisms to understand organizational adoption and use of AI as this study especially focuses on. The combination of these approaches could help us better understand how and why humans will cognitively interact with AI for task accomplishments in administrative contexts, holding significant implications for AI and governance. Second, considering AI as agent—highlighting its autonomous capabilities for

decisions and executions of designated tasks—can be valuable to better capture its operational implications within organizational mechanisms as underlined by the discretionary feature. Treating AI as a decision-making agent for tasks and integrating it with conventional administration and innovation theories will be necessary for a better practical and theoretical understanding of the significant impacts of AI on society and humanity in this new era.

The third essay focused on determining when (contexts) and how (mechanisms) organizational employees are inclined to use AI. To systematically investigate the organizational implications of AI usage, I grounded the study in the mechanism of maintaining organizational efficiency, commencing with a discussion from the perspective of organizational and political economics. In doing so, I particularly delved into the discharging (laying-off) mechanism which varies by sectors and is associated with differences in job security levels.

It is notable that AI's decisional autonomy and operational uncertainty can pose risks for organizational employees to use AI for tasks because they cannot completely control AI and predict the operational outcomes. It is also critical that the responsibility stemming from its operational outcomes goes to human users only, even when AI *itself* makes significant decisions for tasks. In relation to managers, I highlighted their managerial burdens in dealing with subordinates, which can potentially lead to the dismissal of problematic subordinates as a means to maintain organizational efficiency. Paying attention to these matters, this study focuses on better understanding how organizational employees, in the public and private sector (representing types of organizations) and (non) managerial positions, will differently be willing to use AI in their institution.

In the realm of organizational AI use, there are distinct challenges and varying attitudes across sectors. Organizations face increasing difficulties in controlling AI operations and

predicting outcomes as AI systems grow more advanced, heightening concerns about negative impacts. This technological advancement also complicates the allocation of responsibility among employees, leading organizations to consider assigning AI responsibilities to senior roles like Chief AI Officers. Public officials with greater job security show a propensity to use AI actively in the face of potential public risks, balancing efficiency and responsibility for stakeholders. In contrast, private sector employees facing less job security tend to be more cautious with AI when negative impacts are anticipated, focusing instead on efficiency with profit maximization, being responsible to shareholders. Across both sectors, employees generally assume direct responsibility for AI task implementation. That is, while supervisory interventions can be considered critical, employees may assume individual-level responsibility crucially. Managers, especially in the public sector, may face increasing challenges as AI evolves and its interactions with humans become more complex, particularly in managing and guiding employees who utilize AI, holding higher job security.

Limitations

These studies have several limitations; this chapter focuses on more critical ones. Regarding the first essay, the empirical testing addresses an individual's internal aspects of information processing; the empirical strategy can have endogeneity bias to predict actual behavioral outcomes. That being said, this empirical approach is also restricted in addressing the actual 'anatomy' of administrative behavior (Simon 1997, 305-355) by elucidating other organizational aspects. As such, budgeting, albeit omitted in this paper, can be critical to achieving organizational efficiency (Simon 1997, 250-277) beyond the matter of individuals' information processing, while it can have significant implications for the rational and

institutional operation of administration (Willoughby 2014). Future studies need to examine how the organizational principle can be realized as 'real' administrative behavior in the institutional environment.

With regard to the second essay, the primary reason for the lack of statistical significance in estimating the causal effects of AI intervention, concerning the sectoral distinction, could be attributed to the absence of more concrete factors that shape the perception of organizational individuals when interacting with AI. As management and behavioral scholars highlight, factors such as perceived transparency, trust, explainability, and fairness can play a critical role in cognitively and psychologically shaping the human-AI interaction (Binns 2018; Fu et al. 2022; Glikson and Woolley 2020; Gilpin et al. 2018; Salge and Berente 2017). These factors can significantly influence how humans perceive the complementarity of interacting with AI and the benefits it brings to their administrative task accomplishments. While this essay mainly focused on reflecting substantial institutional-organizational factors that indicate the sector and managerial position, taking these more micro-level factors into account together would result in more convincing empirical estimates.

The third essay has two noteworthy limitations. First, the experimental and/or research setting is limited in its ability to capture the discernible willingness-to-use-AI perception of managers. Managers play a crucial role in understanding the more holistic dynamics of organizational operation and administration (Miller 2000). Second, in its pursuit of theoretical foundations, by relying on organizational and political economics to emphasize organizational efficiency, this study primarily focused on discharging (laying-off) mechanisms (Williamson 1999). However, in the pursuit of organizational efficiency, other managerial tools that capture and promote positive (constructive) aspects of employees can also be crucial. It is worth noting

that, from a political economy standpoint, “organizational economists tend to discount this language as cheap talk,” while those points can be significant (Miller 2000, 305).

In future research, expanding the scope, accountability-oriented approach in AI use (Busuioc 2021), along with long-standing debates on responsibility vis-à-vis accountability by Fredrich and Finer (Plant 2011), can further be synthetically considered. It can also be meaningful to reflect constructive associations between administration and democracy (Bertelli 2021), public-private partnership (Teisman and Klijn 2002), government reform (Kettl 1997), and dynamics in administrative performance and citizen evaluation (Carpenter and Krause 2012), among many others. These can be importantly drawn upon together for harnessing a deeper and more comprehensive understanding on human-AI interaction in public administration. Furthermore, collaborations between the scholarship of public affairs and AI researchers could be critical to better understand both expansive and specific issues of using AI in governance.

This point can relate to the first essay’s critical lesson that we also need to note that an increasing use of artificial intelligence (AI)/machine learning (ML) technology systems can impact the understanding, forming, and sharing of administrative reputation of public agencies (Anastasopoulos and Whitford 2019). Also, the use of AI/ML systems can bear institutional control problems as AI holds discretionary capabilities in organizational functioning (Bullock, Huang, and Kim 2022). As such, robust studies of technology, innovation, and government, as integrated, will ever be more critical for human society.

Contributions

This dissertation addressed the more sophisticated structural and functional mechanisms of administrative organizations, reflecting the configurational influence of the institutional

environment in a democratic society. Given the significance of technology and innovation for human agents' task accomplishments and administrative operations, this study further integrated the substantial implications of AI for decision-making and administration. In future studies, building upon the structural and functional blueprint of organizational operations, the implications of AI as an agent (Rahwan et al. 2019; Rai, Constantinides, and Sarker 2019; Berente et al. 2021) should be more concretely and comprehensively identified.

It has been reported that humans and AI can form a conjoint agency for decisional rule setting and action selection, generating characteristic decisional patterns, outcomes, and organizational routines (Murray, Rhymer, and Sirmon 2021). For instance, it is critical to note that once an AI autonomously recommends strategies or predicts actional directions, humans' follow-up actions in decisional specifications can ground in or be 'arrested' by the AI's decision, forming various decisional dynamics between humans and AI. Also, humans and AI can undertake different tasks that leverage comparative advantages in terms of task-assemblage (Berente et al. 2021). This collaboration impacts rights, tasks, processes, and responsibility assignments among human and AI agents (Baird and Maruping 2021). This phenomenon holds nuanced implications for system-level dynamics and organizational control (Bullock, Huang, and Kim 2022) as well as democratic and ethical values (Young et al. 2021), potentially transforming the entire institutional ecosystem as comprised of human and AI agents (Rahwan et al. 2019). Addressing these matters will also require significant industrial, regulatory, and policy considerations to better prepare for maintaining optimal governance. This dissertation, as an initiative endeavor, aims to contribute to more robust and sophisticated studies of governance in the new era through the networks of humans and technologies within organizational and institutional environments.

REFERENCES

Alon-Barkat, Saar, and Madalina Busuioc. 2022. "Human–AI Interactions in Public Sector Decision Making: 'Automation Bias' and 'Selective Adherence' to Algorithmic Advice." *Journal of Public Administration Research and Theory*, February, muac007. https://doi.org/10.1093/jopart/muac007.

Anastasopoulos, L. Jason., and Andrew B. Whitford. 2019. "Machine Learning for Public Administration Research, With Application to Organizational Reputation." *Journal of Public Administration Research and Theory* 29 (3): 491–510. https://doi.org/10.1093/jopart/muy060.

Autor, David H. 2015. "Why Are There Still So Many Jobs? The History and Future of Workplace Automation." *Journal of Economic Perspectives* 29 (3): 3–30. https://doi.org/10.1257/jep.29.3.3.

Baer, Markus. 2012. "Putting Creativity to Work: The Implementation of Creative Ideas in Organizations." *Academy of Management Journal* 55 (5): 1102–19. https://doi.org/10.5465/amj.2009.0470.

Baird, Aaron, and Likoebe M. Maruping. 2021. "The Next Generation of Research on IS Use: A Theoretical Framework of Delegation to and from Agentic IS Artifacts." *Management Information Systems Quarterly* 45 (1): 315–41. https://doi.org/10.25300/MISQ/2021/15882.

Barley, Stephen R., and Wanda J. Orlikowski. 2023. "Technologies Change, the Charge Remains the Same." *Administrative Science Quarterly & Management Information Systems*

Quarterly Research Curation. https://journals.sagepub.com/topic/collections-asq/asq-technology_and_institutions/asq.

Barnard, Chester I. 1974. *The Functions of the Executive*. Harvard University Press.

Berente, Nicholas, Bin Gu, Jan Recker, and Radhika Santhanam. 2021. "Managing Artificial Intelligence." *Management Information Systems Quarterly* 45 (3): 1433–50.

Berman, Evan, Don-Yun Chen, Chung-Yuang Jan, and Tong-Yi Huang. 2013. "Public Agency Leadership: The Impact of Informal Understandings with Political Appointees on Perceived Agency Innovation in Taiwan." *Public Administration* 91 (2): 303–24. https://doi.org/10.1111/j.1467-9299.2011.01979.x.

Bertelli, Anthony M., and Madalina Busuioc. 2021. "Reputation-Sourced Authority and the Prospect of Unchecked Bureaucratic Power." *Public Administration Review* 81 (1): 38–48. https://doi.org/10.1111/puar.13281.

Bertelli, Anthony M., and Laurence E. Lynn. 2003. "Managerial Responsibility." *Public Administration Review* 63 (3): 259–68. https://doi.org/10.1111/1540-6210.00288.

———. 2006. *Madison's Managers: Public Administration and the Constitution*. Baltimore: The Johns Hopkins University Press.

Bertelli, Anthony M. 2021. *Democracy Administered*. Cambridge, United Kingdom ; New York, NY: Cambridge University Press.

Binns, Reuben. 2018. "Fairness in Machine Learning: Lessons from Political Philosophy." In *Proceedings of Machine Learning Research*, 81:1~11.

Blau, Peter Michael. 1963. *The Dynamics of Bureaucracy: A Study of Interpersonal Relations in Two Government Agencies.* 2nd Revised edition. Chicago: University of Chicago Press.

Boer, Noortje de, and Nadine Raaphorst. 2021. “Automation and Discretion: Explaining the Effect of Automation on How Street-Level Bureaucrats Enforce.” *Public Management Review* 0 (0): 1–21. https://doi.org/10.1080/14719037.2021.1937684.

Borins, Sandford F. 1998. *Innovating With Integrity: How Local Heroes Are Transforming American Government*. Washington, D.C: Georgetown Univ Pr.

Bovens, Mark. 2007. “Analysing and Assessing Accountability: A Conceptual Framework [1].” *European Law Journal* 13 (4): 447–68. https://doi.org/10.1111/j.1468-0386.2007.00378.x.

Bozeman, Barry. 2004. *All Organizations Are Public: Comparing Public and Private Organizations*. Beard Books.

Bullock, Justin B. 2019. “Artificial Intelligence, Discretion, and Bureaucracy.” *The American Review of Public Administration* 49 (7): 751–61. https://doi.org/10.1177/0275074019856123.

Bullock, Justin B, Hsini Huang, and Kyoung-cheol (Casey) Kim. 2022. “Machine Intelligence, Bureaucracy, and Human Control.” *Perspectives on Public Management and Governance* 5 (2): 187–96. https://doi.org/10.1093/ppmgov/gvac006.

Bullock, Justin B., and Kyoung-cheol (Casey) Kim. 2020. “Creation of Artificial Bureaucrats.” *Proceedings of European Conference on the Impact of Artificial Intelligence and Robotics*.

Burns, Tom, and G. M. Stalker. 1994. *The Management of Innovation*. New York: Oxford University Press.

Busuioc, Madalina. 2016. “Friend or Foe? Inter-Agency Cooperation, Organizational Reputation, and Turf.” *Public Administration* 94 (1): 40–56. https://doi.org/10.1111/padm.12160.

———. 2021. “Accountable Artificial Intelligence: Holding Algorithms to Account.” *Public Administration Review* 81 (5): 825–36. https://doi.org/10.1111/puar.13293.

Carpenter, Daniel, and George A. Krause. 2015. “Transactional Authority and Bureaucratic Politics.” *Journal of Public Administration Research and Theory* 25 (1): 5–25. https://doi.org/10.1093/jopart/muu012.

Carpenter, Daniel, and George A. Krause. 2012. “Reputation and Public Administration.” *Public Administration Review* 72 (1): 26–32. https://doi.org/10.1111/j.1540-6210.2011.02506.x.

Chun, Y. H., and Hal G. Rainey. 2005. “Goal Ambiguity in U.S. Federal Agencies.” *Journal of Public Administration Research and Theory* 15 (1): 1–30. https://doi.org/10.1093/jopart/mui001.

Clausen, Tommy Høyvarde, Mehmet Akif Demircioglu, and Gry A. Alsos. 2020. “Intensity of Innovation in Public Sector Organizations: The Role of Push and Pull Factors.” *Public Administration* 98 (1): 159–76. https://doi.org/10.1111/padm.12617.

Clinton, Joshua D., David E. Lewis, and Jennifer L. Selin. 2014. “Influencing the Bureaucracy: The Irony of Congressional Oversight.” *American Journal of Political Science* 58 (2): 387–401.

Cook, Brian J. 1992. “The Representative Function of Bureaucracy: Public Administration in Constitutive Perspective.” *Administration & Society* 23 (4): 403–29. https://doi.org/10.1177/009539979202300401.

Cyert, Richard M., and James G. March. 1992. *Behavioral Theory of the Firm*. 2nd edition. Cambridge, Mass., USA: Wiley-Blackwell.

Daft, Richard L. 1982. “Bureaucratic versus Nonbureaucratic Structure and the Process of Innovation and Change.” *Research in the Sociology of Organizations* 1: 129–66.

———. 2012. *Organization Theory and Design*. 11th edition. Mason, OH: Cengage Learning.

Dahl, Robert A., and Charles E. Lindblom. 2017. *Politics, Economics, and Welfare*. 1st edition. Routledge.

Damanpour, F. 1991. "Organizational Innovation: A Meta-Analysis of Effects of Determinants and Moderators." *Academy of Management Journal* 34 (3): 555–90. https://doi.org/10.2307/256406.

Damanpour, F., and M. Schneider. 2008. "Characteristics of Innovation and Innovation Adoption in Public Organizations: Assessing the Role of Managers." *Journal of Public Administration Research and Theory* 19 (3): 495–522. https://doi.org/10.1093/jopart/mun021.

Damanpour, F., and William M. Evan. 1984. "Organizational Innovation and Performance: The Problem of 'Organizational Lag.'" *Administrative Science Quarterly* 29 (3): 392. https://doi.org/10.2307/2393031.

Davis, Charles R. 1996. *Organization Theories and Public Administration*. Westport, Conn: Holtzbrinck.

DeHart-Davis, Leisha, Randall S. Davis, and Zachary Mohr. 2015. "Green Tape and Job Satisfaction: Can Organizational Rules Make Employees Happy?" *Journal of Public Administration Research and Theory* 25 (3): 849–76. https://doi.org/10.1093/jopart/muu038.

Dietvorst, Berkeley J., Joseph P. Simmons, and Cade Massey. 2015. "Algorithm Aversion: People Erroneously Avoid Algorithms after Seeing Them Err." *Journal of Experimental Psychology: General* 144 (1): 114–26. https://doi.org/10.1037/xge0000033.

———. 2018. “Overcoming Algorithm Aversion: People Will Use Imperfect Algorithms If They Can (Even Slightly) Modify Them.” *Management Science* 64 (3): 1155–70. https://doi.org/10.1287/mnsc.2016.2643.

DiMaggio, Paul J., and Walter W. Powell. 1983. “The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields.” *American Sociological Review* 48 (2): 147–60. https://doi.org/10.2307/2095101.

Downs, Anthony. 1967. *Inside Bureaucracy*. Boston: Little, Brown.

Elster, Jon. 1989. *Nuts and Bolts for the Social Sciences*. Cambridge ; New York: Cambridge University Press.

Farber, Ken, Anthony Boese, Sandy Barsky, Tom Brown, Kyoung-cheol (Casey) Kim, Ansgar Koene, Yvette Gibson, et al. 2023. “The Ghost in the Machine – Exploring AI Personhood and Policy.” Washington, D.C.: Advanced Technology Academic Research Center. https://atarc.org/project/wp-ai-personhood-and-policy/.

Feldman, Martha S., and Brian T. Pentland. 2003. “Reconceptualizing Organizational Routines as a Source of Flexibility and Change.” *Administrative Science Quarterly* 48 (1): 94–118. https://doi.org/10.2307/3556620.

Finer, Herman. 1936. “Better Government Personnel.” *Political Science Quarterly* 51 (4): 569–99.

———. 1941. “Administrative Responsibility in Democratic Government.” *Public Administration Review* 1 (4): 335–50.

Frederickson, H. George, Kevin B. Smith, Christopher W. Larimer, and Michael J. Licari. 2011. *The Public Administration Theory Primer*. 2nd edition. Boulder, CO: Westview Press.

Friedrich, Carl J. 1935. “Responsible Government Service under the American Constitution.” In *Problems of the American Public Service*, by Carl J. Friedrich et al., Monograph no. 7. New York: McGraw-Hill.

———. 1945. “Planning for the Greater Boston Metropolitan Area.” *Public Administration Review* 5 (2): 113–26.

Fu, Runshan, Manmohan Aseri, Param Vir Singh, and Kannan Srinivasan. 2022. “‘Un’Fair Machine Learning Algorithms.” *Management Science* 68 (6): 4173–95. https://doi.org/10.1287/mnsc.2021.4065.

Fügener, Andreas, Jörn Grahl, University of Cologne, Alok Gupta, University of Minnesota, Wolfgang Ketter, University of Cologne, and Erasmus University. 2021. “Will Humans-in-the-Loop Become Borgs? Merits and Pitfalls of Working with AI.” *Management Information Systems Quarterly* 45 (3): 1527–56. https://doi.org/10.25300/MISQ/2021/16553.

Galbraith, Jay R. 1973. *Designing Complex Organizations*. Addison-Wesley Publishing Company.

———. 1977. *Organization Design*. Reading, Mass: Addison-Wesley.

Giddens, Anthony. 1986. *The Constitution of Society: Outline of the Theory of Structuration*. New Ed edition. Berkeley, Los Angeles: University of California Press.

Gilpin, Leilani H., David Bau, Ben Z. Yuan, Ayesha Bajwa, Michael Specter, and Lalana Kagal. 2018. “Explaining Explanations: An Overview of Interpretability of Machine Learning.” In *2018 IEEE 5th International Conference on Data Science and Advanced Analytics (DSAA)*, 80–89. Turin, Italy: IEEE. https://doi.org/10.1109/DSAA.2018.00018.

Glikson, Ella, and Anita Williams Woolley. 2020. “Human Trust in Artificial Intelligence: Review of Empirical Research.” *Academy of Management Annals* 14 (2): 627–60. https://doi.org/10.5465/annals.2018.0057.

Goodnow, Frank J. 1886. “The Executive and the Courts.” *Political Science Quarterly* 1 (4): 533–55.

Gordon, James. 2022. “Google Engineer Claims New AI Robot Has FEELINGS: Blake Lemoine Says LaMDA Device Is Sentient.” *Daily Mail Online*, June 12, 2022. https://www.dailymail.co.uk/news/article-10907853/Google-engineer-claims-new-AI-robot-FEELINGS-Blake-Lemoine-says-LaMDA-device-sentient.html.

Hackman, J. Richard, and Greg R. Oldham. 1976. “Motivation through the Design of Work: Test of a Theory.” *Organizational Behavior and Human Performance* 16 (2): 250–79. https://doi.org/10.1016/0030-5073(76)90016-7.

Hao, Karen. 2020. “A Debate between AI Experts Shows a Battle over the Technology’s Future.” *MIT Technology Review*, March 27, 2020. https://www.technologyreview.com/2020/03/27/950247/ai-debate-gary-marcus-danny-lange/.

Hassan, Shahidul, and Deneen M. Hatmaker. 2015. “Leadership and Performance of Public Employees: Effects of the Quality and Characteristics of Manager-Employee Relationships.” *Journal of Public Administration Research and Theory* 25 (4): 1127–55. https://doi.org/10.1093/jopart/muu002.

Heclo, Hugh. 1978. “Issue Networks and the Executive Establishment.” *The New American Political System,* The new American political system. - Washington : American Enterprise Institute for Public Policy Research, ISBN 0-8447-3315-6. - 1978, p. 87-124, .

Henderson, Nikki. 2022. “DOD Reveals More Details for New Chief Digital and AI Officer.” *GovCIO*, February 2, 2022. https://governmentciomedia.com/dod-reveals-more-details-new-chief-digital-and-ai-officer.

Hernes, Tor, and David Obstfeld. 2022. “A Temporal Narrative View of Sensemaking.” *Organization Theory* 3 (4): 263178772211315. https://doi.org/10.1177/26317877221131585.

Heyck, Hunter. 2008a. “Defining the Computer: Herbert Simon and the Bureaucratic Mind–Part 1.” *IEEE Annals of the History of Computing* 30 (2): 42–51. https://doi.org/10.1109/MAHC.2008.18.

———. 2008b. “Defining the Computer: Herbert Simon and the Bureaucratic Mind–Part 2.” *IEEE Annals of the History of Computing* 30 (2): 52–63. https://doi.org/10.1109/MAHC.2008.19.

Hill, Kashmir. 2020. “Wrongfully Accused by an Algorithm.” *The New York Times*, June 24, 2020, sec. Technology. https://www.nytimes.com/2020/06/24/technology/facial-recognition-arrest.html.

Hollibaugh, Gary. E. 2015. “Naive Cronyism and Neutral Competence: Patronage, Performance, and Policy Agreement in Executive Appointments.” *Journal of Public Administration Research and Theory* 25 (2): 341–72. https://doi.org/10.1093/jopart/muu016.

Huang, Hsini, Kyoung-cheol (Casey) Kim, Matthew M. Young, and Justin B. Bullock. 2021. “A Matter of Perspective: Differential Evaluations of Artificial Intelligence between Managers and Staff in an Experimental Simulation.” *Asia Pacific Journal of Public Administration,* September, 1–19. https://doi.org/10.1080/23276665.2021.1945468.

Kaufman, Herbert. 2006. *The Forest Ranger: A Study in Administrative Behavior*. 1st edition. Washington, DC: Routledge.

Kettl, Donald F. 1997. "The Global Revolution in Public Management: Driving Themes, Missing Links." *Journal of Policy Analysis and Management* 16 (3): 446–62. https://doi.org/10.1002/(SICI)1520-6688(199722)16:3<446::AID-PAM5>3.0.CO;2-H.

Kim, Kyoung-cheol (Casey). 2024a. "Administrative Behavior, Accountability and Responsibility: In the Technology Innovation Use Case of US Federal Agencies." *Typescript*. University of Georgia.

———. 2024b. "Cognitive Impacts of AI on Administration." *Typescript*. University of Georgia.

Koski, Jessica E., Hongling Xie, and Ingrid R. Olson. 2015. "Understanding Social Hierarchies: The Neural and Psychological Foundations of Status Perception." *Social Neuroscience* 10 (5): 527–50. https://doi.org/10.1080/17470919.2015.1013223.

Lee, Ronald M. 1984. "Bureaucracies, Bureaucrats and Information Technology." *European Journal of Operational Research* 18 (3): 293–303.

Lipsky, Michael. 1980. *Street-Level Bureaucracy: Dilemmas of the Individual in Public Service*. New York: Russell Sage Foundation.

Long, John Scott. 1997. *Regression Models for Categorical and Limited Dependent Variables*. 1st edition. Thousand Oaks: SAGE Publications, Inc.

Long, Norton E. 1952. "Bureaucracy and Constitutionalism." *American Political Science Review* 46 (3): 808–18. https://doi.org/10.2307/1952286.

Lynn Jr., Laurence E. 2009. "Restoring the Rule of Law to Public Administration: What Frank Goodnow Got Right and Leonard White Didn't." *Public Administration Review* 69 (5): 803–13. https://doi.org/10.1111/j.1540-6210.2009.02030.x.

Madan, Rohit, and Mona Ashok. 2022. “AI Adoption and Diffusion in Public Administration: A Systematic Literature Review and Future Research Agenda.” *Government Information Quarterly*, October, 101774. https://doi.org/10.1016/j.giq.2022.101774.

March, James G., and Herbert A. Simon. 1993. *Organizations*. 2nd ed. New York: Wiley.

Marcus, Gary, and Ernest Davis. 2019. *Rebooting AI: Building Artificial Intelligence We Can Trust*. Illustrated edition. New York: Pantheon.

Martela, Frank. 2022. “The Social Ontology of Purpose - How Organizations Can Have Goals and Intentions without Having a Mind.” *Academy of Management Review*, February, amr.2021.0501. https://doi.org/10.5465/amr.2021.0501.

Meier, Kenneth J. 1975. “Representative Bureaucracy: An Empirical Analysis.” *The American Political Science Review* 69 (2): 526–42. https://doi.org/10.2307/1959084.

Meijer, Albert, Lukas Lorenz, and Martijn Wessels. 2021. “Algorithmization of Bureaucratic Organizations: Using a Practice Lens to Study How Context Shapes Predictive Policing Systems.” *Public Administration Review*, April, puar.13391. https://doi.org/10.1111/puar.13391.

Meyer, John W., and Brian Rowan. 1977. “Institutionalized Organizations: Formal Structure as Myth and Ceremony.” *American Journal of Sociology* 83 (2): 340–63.

Miller, Gary J. 2000. “Above Politics: Credible Commitment and Efficiency in the Design of Public Agencies.” *Journal of Public Administration Research and Theory* 10 (2): 289–328. https://doi.org/10.1093/oxfordjournals.jpart.a024271.

Miller, Gary J., and Andrew B. Whitford. 2006. “The Principal’s Moral Hazard: Constraints on the Use of Incentives in Hierarchy.” *Journal of Public Administration Research and Theory* 17 (2): 213–33. https://doi.org/10.1093/jopart/mul004.

———. 2016. *Above Politics: Bureaucratic Discretion and Credible Commitment*. Reprint edition. New York, NY: Cambridge University Press.

Mintzberg, Henry. 1978. *The Structuring of Organizations [Paperback] [1979] 1st Ed. Henry Mintzberg*. 1st ed. Prentice Hall.

Moe, Terry M. 1989. "The Politics of Bureaucratic Structure." In *Can the Government Govern?*, edited by John E. Chubb and Paul E. Peterson, 267–329. Washington, D.C.:

Moldogaziev, Tima T., and William G. Resh. 2016. "A Systems Theory Approach to Innovation Implementation: Why Organizational Location Matters." *Journal of Public Administration Research and Theory* 26 (4): 677–92. https://doi.org/10.1093/jopart/muv047.

Montesquieu, Charles. 2002. *The Spirit of Laws*. Revised edition. Amherst, N.Y: Prometheus.

Morrison, Alan D., and Rita Mota. 2021. "A Theory of Organizational Purpose." *Academy of Management Review*, September, amr.2019.0307. https://doi.org/10.5465/amr.2019.0307.

———. 2022. "The Ontology of the Corporate Mind." *Academy of Management Review*, April, amr.2022.0161. https://doi.org/10.5465/amr.2022.0161.

Mosher, Frederick C. 1982. *Democracy and the Public Service*. 2nd edition. New York: Oxford University Press.

Moynihan, Donald, Pamela Herd, and Hope Harvey. 2015. "Administrative Burden: Learning, Psychological, and Compliance Costs in Citizen-State Interactions." *Journal of Public Administration Research and Theory: J-PART* 25 (1): 43–69.

Moynihan, Donald, and Stéphane Lavertu. 2012. "Cognitive Biases in Governing: Technology Preferences in Election Administration." *Public Administration Review* 72 (1): 68–77. https://doi.org/10.1111/j.1540-6210.2011.02478.x.

Murray, Alex, Jen Rhymer, and David G. Sirmon. 2021. “Humans and Technology: Forms of Conjoined Agency in Organizations.” *Academy of Management Review* 46 (3): 552–71. https://doi.org/10.5465/amr.2019.0186.

Neate, Rupert. 2022. “Elon Musk’s Brain Chip Firm Neuralink Lines up Clinical Trials in Humans.” *The Guardian*, January 20, 2022, sec. Technology. https://www.theguardian.com/technology/2022/jan/20/elon-musk-brain-chip-firm-neuralink-lines-up-clinical-trials-in-humans.

Neumann, Oliver, Katharina Guirguis, and Reto Steiner. 2022. “Exploring Artificial Intelligence Adoption in Public Organizations: A Comparative Case Study.” *Public Management Review*, March, 1–27. https://doi.org/10.1080/14719037.2022.2048685.

Newell, Allen, and Herbert A. Simon. 1972. *Human Problem Solving*. New Jersey: Prentice-Hall.

Nicholson-Crotty, Sean, Jill Nicholson-Crotty, and Sean Webeck. 2019. “Are Public Managers More Risk Averse? Framing Effects and Status Quo Bias across the Sectors.” *Journal of Behavioral Public Administration* 2 (1). https://doi.org/10.30636/jbpa.21.35.

Nigro, Lloyd G., and J. Edward Kellough. 2014. *The New Public Personnel Administration*. Cengage Learning.

Nowlin, Matthew C. 2018. “Improving Governance of Risk and Uncertainty.” *Journal of Public Administration Research and Theory* 28 (1): 158–60. https://doi.org/10.1093/jopart/mux031.

Oldham, Greg R., and J. Richard Hackman. 1981. “Relationships Between Organizational Structure and Employee Reactions: Comparing Alternative Frameworks.” *Administrative Science Quarterly* 26 (1): 66. https://doi.org/10.2307/2392600.

O'Toole, Laurence J. 2015. "Networks and Networking: The Public Administrative Agendas." *Public Administration Review* 75 (3): 361–71. https://doi.org/10.1111/puar.12281.

Pentland, Brian T., and Henry H. Rueter. 1994. "Organizational Routines as Grammars of Action." *Administrative Science Quarterly* 39 (3): 484. https://doi.org/10.2307/2393300.

Perrow, Charles. 1967. "A Framework for the Comparative Analysis of Organizations." *American Sociological Review* 32 (2): 194–208. https://doi.org/10.2307/2091811.

Perry, James L., Debra Mesch, and Laurie Paarlberg. 2006. "Motivating Employees in a New Governance Era: The Performance Paradigm Revisited." *Public Administration Review* 66 (4): 505–14.

Perry, James L., and Hal G. Rainey. 1988. "The Public-Private Distinction in Organization Theory: A Critique and Research Strategy." *Academy of Management Review* 13 (2): 182–201. https://doi.org/10.5465/amr.1988.4306858.

Piazza, Alessandro, Patrick Bergemann, and Wesley Helms. 2022. "Getting Away with It (Or Not): The Social Control of Organizational Deviance." *Academy of Management Review*, October, amr.2021.0066. https://doi.org/10.5465/amr.2021.0066.

Plant, Jeremy F. 2011. "Carl J. Friedrich on Responsibility and Authority." *Public Administration Review* 71 (3): 471–82. https://doi.org/10.1111/j.1540-6210.2011.02368.x.

Rahwan, Iyad, Manuel Cebrian, Nick Obradovich, Josh Bongard, Jean-François Bonnefon, Cynthia Breazeal, Jacob W. Crandall, et al. 2019. "Machine Behaviour." *Nature* 568 (7753): 477–86. https://doi.org/10.1038/s41586-019-1138-y.

Rai, Arun, Panos Constantinides, and Saonee Sarker. 2019. "Next-Generation Digital Platforms: Toward Human–AI Hybrids." *Management Information Systems Quarterly* 43 (1): iii–ix.

Rainey, Hal G., and Barry Bozeman. 2000. “Comparing Public and Private Organizations: Empirical Research and the Power of the A Priori.” *Journal of Public Administration Research and Theory* 10 (2): 447–70. https://doi.org/10.1093/oxfordjournals.jpart.a024276.

Rainey, Hal G., Sergio Fernandez, and Deanna Malatesta. 2021. *Understanding and Managing Public Organizations*. 6th edition. Hoboken, New Jersey: Wiley.

Raisch, Sebastian, and Sebastian Krakowski. 2020. “Artificial Intelligence and Management: The Automation-Augmentation Paradox.” *Academy of Management Review*, February, 2018.0072. https://doi.org/10.5465/2018.0072.

Rep. Malinowski, Tom [D-NJ-7. 2020. “Text - H.R.8636 - 116th Congress (2019-2020): Protecting Americans from Dangerous Algorithms Act.” Legislation. 10/20/2020. October 20, 2020. http://www.congress.gov/.

Rosenbloom, David, Robert Kravchuk, and Richard Clerkin. 2008. *Public Administration: Understanding Management, Politics, and Law in the Public Sector*. 7th edition. Boston, Mass.: McGraw-Hill Humanities/Social Sciences/Languages.

Rourke, Francis E. 1972. *Bureaucratic Power in National Politics*. Second Edition, First Printing. Little, Brown.

Rousseau, Denise M. 1995. *Psychological Contracts in Organizations: Understanding Written and Unwritten Agreements*. 1st edition. Thousand Oaks: SAGE Publications, Inc.

Russell, Stuart. 2019. *Human Compatible: Artificial Intelligence and the Problem of Control*. Penguin Random House.

Russell, Stuart, and Peter Norvig. 2009. *Artificial Intelligence: A Modern Approach*. 3 edition. Upper Saddle River: Pearson.

Salge, Carolina Alves, and Nicholas Berente. 2017. “Is That Social Bot Behaving Unethically?” *Communications of the ACM* 60 (9): 29–31. https://doi.org/10.1145/3126492.

Sayre, Wallace S. 1958. “Premises of Public Administration: Past and Emerging.” *Public Administration Review* 18 (2): 102–5. https://doi.org/10.2307/973789.

Schweitzer, Shane, and David De Cremer. 2023. “When Being Managed by Technology: Does Algorithmic Management Affect Perceptions of Workers’ Creative Capacities?” *Academy of Management Discoveries,* November. https://doi.org/10.5465/amd.2022.0115.

Selten, Friso, Marcel Robeer, and Stephan Grimmelikhuijsen. 2023. “‘Just like I Thought’: Street-Level Bureaucrats Trust AI Recommendations If They Confirm Their Professional Judgment.” *Public Administration Review* 83 (2): 263–78. https://doi.org/10.1111/puar.13602.

Selznick, Philip. 1984. *Leadership in Administration: A Sociological Interpretation*. First Edition. Berkeley, Cal.: University of California Press.

Shalev-Shwartz, Shai, and Shai Ben-David. 2014. *Understanding Machine Learning: From Theory to Algorithms*. 1st edition. New York, NY, USA: Cambridge University Press.

Sheagley, Geoffrey, and Scott Clifford. 2023. “No Evidence That Measuring Moderators Alters Treatment Effects.” *American Journal of Political Science*. https://doi.org/10.1111/ajps.12814.

Simon, Herbert A. 1946. “The Proverbs of Administration.” *Public Administration Review* 6 (Winter): 53–67.

———. 1955. “A Behavioral Model of Rational Choice.” *The Quarterly Journal of Economics* 69 (1): 99–118. https://doi.org/10.2307/1884852.

———. 1996. *The Sciences of the Artificial*. 3rd ed. Cambridge, MA: The MIT Press.

———. 1997. *Administrative Behavior*. 4th ed. New York: Simon & Schuster.

Simon, Herbert A., Donald W. Smithburg, and Victor A. Thompson. 1950. *Public Administration*. Transaction Publishers.

Tan, Sarah, Julius Adebayo, Kori Inkpen, and Ece Kamar. 2018. "Investigating Human + Machine Complementarity for Recidivism Predictions." arXiv:1808.09123. arXiv. http://arxiv.org/abs/1808.09123.

Taylor, Josh. 2021. "I'm Sorry Dave I'm Afraid I Invented That: Australian Court Finds AI Systems Can Be Recognised under Patent Law | Artificial Intelligence (AI) | The Guardian." *The Guardian*, July 30, 2021. https://www.theguardian.com/technology/2021/jul/30/im-sorry-dave-im-afraid-i-invented-that-australian-court-finds-ai-systems-can-be-recognised-under-patent-law.

Teisman, Geert R., and Erik-Hans Klijn. 2002. "Partnership Arrangements: Governmental Rhetoric or Governance Scheme?" *Public Administration Review* 62 (2): 197–205. https://doi.org/10.1111/0033-3352.00170.

Thompson, James D. 2003. *Organizations in Action: Social Science Bases of Administrative Theory*. 1st edition. New Brunswick, NJ: Routledge.

Tyskbo, Daniel, and Alexander Styhre. 2022. "Karma Chameleon: Exploring the Leadership Complexities of Middle Managers in the Public Sector." *International Public Management Journal*, August, 1–22. https://doi.org/10.1080/10967494.2022.2106330.

Walker, Richard M. 2007. "An Empirical Evaluation of Innovation Types and Organizational and Environmental Characteristics: Towards a Configuration Framework." *Journal of*

Public Administration Research and Theory 18 (4): 591–615. https://doi.org/10.1093/jopart/mum026.

Wamsley, Gary L., and Mayer N. Zald. 1973. "The Political Economy of Public Organizations." *Public Administration Review* 33 (1): 62. https://doi.org/10.2307/974786.

Wang, Ge, Shenghua Xie, and Xiaoqian Li. 2022. "Artificial Intelligence, Types of Decisions, and Street-Level Bureaucrats: Evidence from a Survey Experiment." *Public Management Review* 0 (0): 1–23. https://doi.org/10.1080/14719037.2022.2070243.

Waters, Tony, and Dagmar Waters, eds. 2015. *Weber's Rationalism and Modern Society*. New York: Palgrave Macmillan US. https://doi.org/10.1057/9781137365866.

Weber, Max. 1978. *Economy and Society: An Outline of Interpretive Sociology*. University of California Press.

Weick, Karl E. 1995. *Sensemaking in Organizations*. 1st edition. Thousand Oaks: SAGE Publications, Inc.

White, Leonard. 1926. *Introduction to the Study of Public Administration*. New York: Macmillan.

Williamson, Oliver E. 1975. *Markets and Hierarchies: Analysis and Antitrust Implications, A Study in the Economics of Internal Organization*. New York: The Free Press.

———. 1999. "Public and Private Bureaucracies: A Transaction Cost Economics Perspective." *Journal of Law, Economics, & Organization* 15 (1): 306–42.

Willoughby, Katherine G. 2014. *Public Budgeting in Context: Structure, Law, Reform and Results*. John Wiley & Sons.

Wilson, James Q. 1991. *Bureaucracy: What Government Agencies Do And Why They Do It*. First Edition. New York, NY: Basic Books.

Wilson, Woodrow. 1887. “The Study of Administration.” *Political Science Quarterly* 2 (2): 197–222.

Wright, Bradley E. 2007. “Public Service and Motivation: Does Mission Matter?” *Public Administration Review* 67 (1): 54–64. https://doi.org/10.1111/j.1540-6210.2006.00696.x.

Wright, Bradley E., and Sanjay K. Pandey. 2008. “Public Service Motivation and the Assumption of Person—Organization Fit: Testing the Mediating Effect of Value Congruence.” *Administration & Society* 40 (5): 502–21. https://doi.org/10.1177/0095399708320187.

Yackee, Susan Webb. 2006. “Sweet-Talking the Fourth Branch: The Influence of Interest Group Comments on Federal Agency Rulemaking.” *Journal of Public Administration Research and Theory* 16 (1): 103–24. https://doi.org/10.1093/jopart/mui042.

Young, Matthew M., Justin B. Bullock, and Jesse D. Lecy. 2019. “Artificial Discretion as a Tool of Governance: A Framework for Understanding the Impact of Artificial Intelligence on Public Administration.” *Perspectives on Public Management and Governance* 2 (4): 301–13. https://doi.org/10.1093/ppmgov/gvz014.

Young, Matthew M., Johannes Himmelreich, Justin B. Bullock, and Kyoung-cheol (Casey) Kim. 2021. “Artificial Intelligence and Administrative Evil.” *Perspectives on Public Management and Governance* 4 (3): 244–58. https://doi.org/10.1093/ppmgov/gvab006.

Zaltman, Gerald, Robert Duncan, and Jonny Holbek. 1973. *Innovations and Organizations*. New York: Wiley.

APPENDICES

APPENDIX A: DESCRIPTIVE STATISTICS

Table A-1. Descriptive Statistics

Criteria	Dimension	Variables	Obs	Mean	S.D.	Min	Max
DV	Innovation Use	Innovation Use: Satisfaction	13,327	3.628	1.102	1	5
IV	Political Control	Mission-Focused Public Support (Political-Institutional Control)	13,314	3.501	1.161	1	5
		Performance-Focused Public Perception (Administrative Reputation)	13,329	3.323	1.229	1	5
	Organizational Principle	Job Specialization *	14,488	3.828	1.145	1	5
		Job Specification *	14,488	4.143	0.880	1	5
		Satisfaction with Supervisor **	14,421	3.873	1.168	1	5
		Satisfaction with Higher Manager **	14,373	3.428	1.258	1	5
		Satisfaction with Interests **	14,359	3.293	1.254	1	5
CV	Innovation Adoption	Manager	12,262	0.190	0.392	0	1
		Male	12,108	0.583	0.493	0	1
		Older	12,125	0.861	0.346	0	1
		College	12,185	0.819	0.385	0	1

Note:
* Composes an integrated (averaged) variable: Specification of Order.
** Composes an integrated (averaged) variable: Satisfaction of Interest.

APPENDIX B: EXPLORATORY FACTOR ANALYSIS

Table A-2. Exploratory Factor Analysis (Entire Covariates)

Variables	Factor 1	Factor 2	Factor 3	Uniqueness
Public Support	0.8917	0.106	0.1049	0.1827
Public Perception	0.9238	0.1067	0.1113	0.1228
Job Specification	0.1198	0.2119	0.9699	0
Job Specialization	0.1984	0.4723	0.5063	0.4812
Satisfaction with Supervisor	0.0725	0.6649	0.3409	0.4365
Satisfaction with Manager	0.2024	0.671	0.3128	0.4111
Satisfaction with Interests	0.1986	0.6242	0.2747	0.4954

Table A-3. Exploratory Factor Analysis (Administration-Related Covariates)

Variables	Factor 1	Factor 2	Uniqueness
Job Specification	0.6151	0.2818	0.5422
Job Specialization	1	0	0
Satisfaction with Supervisor	0.4791	0.6001	0.4103
Satisfaction with Manager	0.5122	0.5602	0.4239
Satisfaction with Interests	0.5024	0.4657	0.5307

APPENDIX C: EXPLORATORY ANALYSIS

Table A-4. Multinomial Regression Results

Variables	DV-Value (2)	DV-Value (3)	DV-Value (4)	DV-Value (5)
Public Support	0.090	0.001	0.118	0.276***
	(0.095)	(0.086)	(0.083)	(0.088)
Public Perception	0.069	0.214**	0.321***	0.528***
	(0.103)	(0.087)	(0.093)	(0.102)
Order Specification	0.209***	0.404***	0.650***	1.176***
	(0.067)	(0.071)	(0.083)	(0.096)
Interest Satisfaction	0.380***	0.473***	0.745***	1.075***
	(0.080)	(0.071)	(0.090)	(0.087)
Older	0.360***	0.608***	0.852***	0.933***
	(0.137)	(0.138)	(0.140)	(0.156)
College	-0.016	-0.033	-0.148	-0.508***
	(0.167)	(0.163)	(0.114)	(0.122)
Manager	0.078	0.066	0.038	-0.152
	(0.209)	(0.176)	(0.190)	(0.235)
Agency Dummy	Yes	Yes	Yes	Yes
Constant	-1.378***	-1.826***	-4.219***	-9.481***
	(0.267)	(0.268)	(0.224)	(0.412)
Observations	10,999	10,999	10,999	10,999

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: The base value is 1.

APPENDIX D: DESCRIPTIVE INFORMATION ON RESPONDENTS' AFFILIATION

Table A-5. Organizational Affiliation

Code	Affiliation Name	Count	Percent
AF	Air Force	323	2.20%
AG	Agriculture	714	4.90%
AR	Army	667	4.60%
CM	Commerce	663	4.60%
DD	Defense	941	6.50%
DJ	Justice	1170	8.10%
DL	Labor	704	4.90%
DN	Energy	411	2.80%
ED	Education	100	0.70%
EP	EPA	408	2.80%
FD	FDIC	427	2.90%
GS	GSA	423	2.90%
HS	Homeland Security	1615	11.10%
HU	HUD	322	2.20%
IN	Interior	778	5.40%
NN	NASA	410	2.80%
NV	Navy	404	2.80%
OM	OPM	285	2.00%
SE	SEC	354	2.40%
ST	State	397	2.70%
SZ	SSA	610	4.20%
TD	Transportation	520	3.60%
TR	Treasury	769	5.30%
VA	Veterans Affairs	1100	7.60%

APPENDIX E: EXPLORATORY FACTOR ANALYSIS

Exploratory Factor Analysis (EFA) was performed on perceptions of agreement estimated for eight different tasks related to the application of AI. The analysis was conducted in a non-stacked setting, which included estimations measured during both the pre- and post-experimental task sessions. However, the original eight agreement perceptions measured in each session did not yield meaningful eigenvalues. Hence, as mentioned earlier, I averaged the eight estimations in each session. In the stacked setting for the D-i-D analysis, I integrated these

averaged agreement perceptions into a short two-term panel data format. The Post-Agreement dummy variable distinguishes the estimations based on the time difference. Scree Plot results visualizing the EFA outcomes in each session are presented in **Figure A-1**.

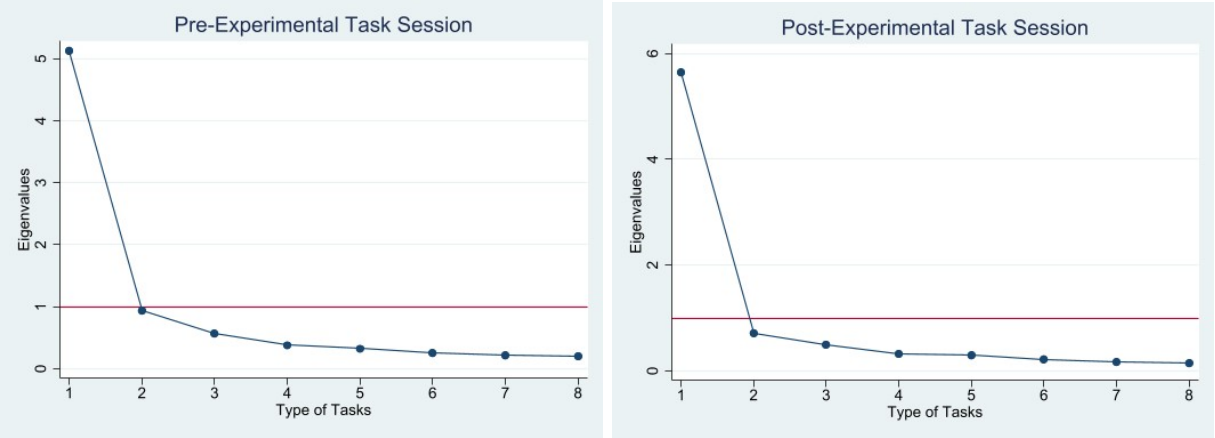


Figure A-1. Exploratory Factor Analysis (EFA) on Agreement Perceptions by 8 Tasks

Note: The label for the type of tasks is denoted as follows, "1 = Operating Machines, 2 = Administrative Office Work, 3 = Communication with Customers, 4 = Coordination with Colleagues, 5 = Hiring Processes, 6 = Employee Performance Evaluation, 7 = Strategy or Policy Planning, 8 = Goal and Object Setting."

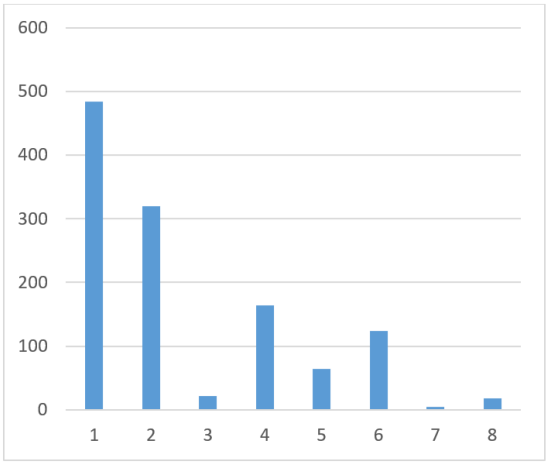
APPENDIX F: DESCRIPTIVE STATISTICS

Table A-6. Descriptive Statistics (Stacked Model, Public and Private Sectors)

Variable	Obs	Mean	S.D.	Min	Max
Agreement Perception	2,400	3.536	0.7526	1	5
Post-Agreement	2,400	0.5	0.5001	0	1
AI Intervention	2,400	0.849	0.3580	0	1
(Public) Sector	2,400	0.5	0.5001	0	1
Manager	2,400	0.2	0.4001	0	1

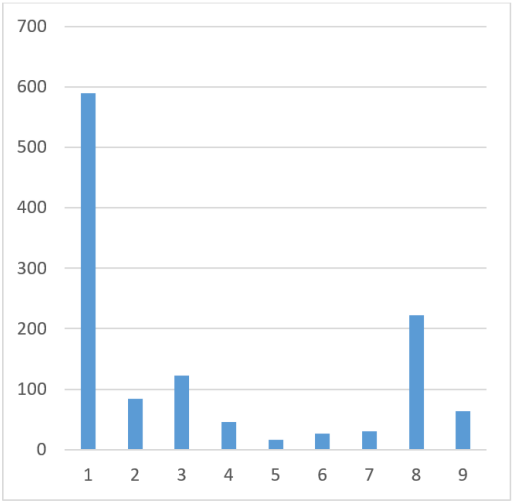
APPENDIX G: EXPERIMENT PARTICIPANTS' SECTORAL AFFILIATION

It shows that the analysis of the experimental task and AI intervention, which involved performing facial recognition to identify suspects, was not significantly biased by the type of jobs in both sectors. As shown in **Figure A-2** and **Figure A-3**, the majority of participants in the public and private sector, respectively, held general administrative agency jobs or worked in private companies, where identifying suspects with facial recognition is not the main task.



Label	Type of Jobs (Public Sector)
1	Administrative Agency
2	Public Enterprise
3	Representatives
4	Public-school Teachers
5	Medical staff (Doctor, Pharmacist, Nurse, and Medical Personnel)
6	Military, Police, Investigator, or Firefighter
7	Judge, Prosecutor, or Clerk
8	Other

Figure A-2. Experiment Participants' Type of Jobs in the Public Sector



Label	Type of Jobs (Private Sector)
1	Private Company
2	Private-school Teacher
3	Private Research Institute
4	Agriculture, Forestry, Fishing and Animal Husbandry
5	Professional Athletics
6	Private Medical Staff
7	Lawyers, Accountant, Architect, or other Professional workers
8	Personal Servicers (Vendors, Personal Servicers, Taxi drivers)
9	Other

Figure A-3. Experiment Participants' Type of Jobs in the Private Sector

APPENDIX H: SUPPLEMENTARY ANALYSIS

As ancillary analyses, in terms of job characteristics, I considered cases exclusively involving agencies/companies, medical task forces, and school teachers, respectively, dealing with both the public and private sectors. In doing so, I intended to maintain a similar organizational context—through each case—for comparing entities in different sectors; other than these three cases, it seemed not reasonable to consider matching identities among jobs in the sectors. Other jobs deemed too different to try matching. The Difference-in-Differences (D-i-D) analysis outcomes are presented in **Tables A-7** and **A-8**, **A-9** and **A-10**, and **A-11** and **A-12**, respectively. After all, like the original analysis, none of these cases show statistical significance of Average Treatment Effect (ATE). Nevertheless, the patterns reflected on hypotheses generally maintain; specific outcomes remain intriguing for additional considerations.

First, in the case of agencies/companies, the outcomes generally **support** my hypotheses in terms of the patterns in comparisons of relative effect sizes of AI intervention (i.e., public staff, rather than public managers, will have a 'greater' positive AI intervention impact), but the effects lack statistical significance. Second, in the case of medical task forces, the patterns and statistical significance of AI intervention are **similar** to the original analyses. However, in this case, the sign is ***negative***, which can be understandable considering that medical task forces can be very critical and sensitive in perceiving a poor AI system—as utilized in the experiment which is employed in the current study—to use for their tasks, which deal with people's lives. Medical forces will have very high expectations with regard to AI's performance such as precision rates, meaning they can have relatively harsh evaluations and perceptions on using an AI system for tasks. Third, in the case of school teachers, the outcomes generally **contradict** my hypotheses, while the effects lack statistical significance. Instead of organizational employees in

the public sector, those in the private sector showed a greater positive impact of AI on the perception of agreement to use AI for tasks.

It is worth additionally noting that the case of school teachers is quite different from my original hypothetical expectation. When interpreting the impacts of an AI system for individuals through the experimental task (using a facial recognition AI system for a suspect identification task), the use target of the AI system and the nature of the experimental task could be critical. To this extent, the AI system and the experimental task reflected in this study may have very unique or unusual implications for school teachers whose focus is on caring for and educating students, compared to the other organizational administrative entities, dealing with the matters of facial recognition and suspect identification. While this case may deviate from the main frame of my original theorization, it may be worth considering in terms of the occupational and social implications of using various types of AI.

Table A-7. OLS Regression Analysis of Stacked Model: Agency/Company (Public Sector)

VARIABLES	Manager as Case Moderator not Considered				Manager as Case Moderator Considered			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Post-Agreement	0.149**		0.149**	0.083	0.297**	0.087	0.221	0.005
	(0.070)		(0.070)	(0.182)	(0.127)	(0.080)	(0.299)	(0.219)
AI Intervention		0.099	0.099	0.060	0.239	0.073	0.192	0.026
		(0.099)	(0.099)	(0.139)	(0.165)	(0.117)	(0.234)	(0.166)
Post-Agreement x AI Intervention				0.077			0.092	0.094
				(0.197)			(0.331)	(0.235)
Constant	3.617***	3.608***	3.533***	3.566***	3.645***	3.459***	3.683***	3.500***
	(0.050)	(0.091)	(0.097)	(0.129)	(0.162)	(0.116)	(0.212)	(0.155)
Manager Case Moderator	No	No	No	No	Yes (Manager)	Yes (Staff)	Yes (Manager)	Yes (Staff)
Observations	484	484	484	484	144	340	144	340
R-squared	0.009	0.002	0.011	0.012	0.051	0.005	0.052	0.005

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A-8. OLS Regression Analysis of Stacked Model: Agency/Company (Private Sector)

VARIABLES	Manager as Case Moderator not Considered				Manager as Case Moderator Considered			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Post-Agreement	0.017		0.017	0.102	0.101	0.004	0.200	0.085
	(0.062)		(0.062)	(0.186)	(0.176)	(0.066)	(0.482)	(0.199)
AI Intervention		-0.032	-0.032	0.016	-0.406	0.044	-0.349	0.089
		(0.099)	(0.099)	(0.140)	(0.257)	(0.106)	(0.366)	(0.149)
Post-Agreement x AI Intervention				-0.097			-0.114	-0.090
				(0.197)			(0.518)	(0.211)
Constant	0.017		0.017	0.102	0.101	0.004	0.200	0.085
	(0.062)		(0.062)	(0.186)	(0.176)	(0.066)	(0.482)	(0.199)
Manager Case Moderator	No	No	No	No	Yes (Manager)	Yes (Staff)	Yes (Manager)	Yes (Staff)
Observations	590	590	590	590	74	516	74	516
R-squared	0.000	0.000	0.000	0.001	0.038	0.000	0.039	0.001

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A-9. OLS Regression Analysis of Stacked Model: Medical Task Forces (Public Sector)

VARIABLES	Manager as Case Moderator not Considered				Manager as Case Moderator Considered			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Post-Agreement	0.113		0.113	0.141	0.406	0.071	0.250	0.104
	(0.167)		(0.164)	(0.331)	(0.229)	(0.183)	(0.345)	(0.400)
AI Intervention		-0.320*	-0.320*	-0.302	-0.531*	-0.220	-0.688	-0.199
		(0.189)	(0.190)	(0.270)	(0.229)	(0.223)	(0.345)	(0.319)
Post-Agreement x AI Intervention				-0.036			0.313	-0.042
				(0.382)			(0.488)	(0.451)
Constant	3.617***	3.914***	3.857***	3.844***	4.047***	3.766***	4.125***	3.750***
	(0.118)	(0.163)	(0.184)	(0.234)	(0.199)	(0.218)	(0.244)	(0.283)
Manager Case Moderator	No	No	No	No	Yes (Manager)	Yes (Staff)	Yes (Manager)	Yes (Staff)
Observations	64	64	64	64	8	56	8	56
R-squared	0.007	0.044	0.052	0.052	0.630	0.021	0.664	0.021

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A-10. OLS Regression Analysis of Stacked Model: Medical Task Forces (Private Sector)

VARIABLES	Manager as Case Moderator not Considered				Manager as Case Moderator Considered			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Post-Agreement	-0.048		-0.048	0.375	-0.125	-0.042	-0.125	0.375
	(0.186)		(0.170)	(0.431)	(0.000)	(0.180)	(0.000)	(0.439)
AI Intervention		-0.568**	-0.568**	-0.318	-	-0.600**	-	-0.350
		(0.230)	(0.235)	(0.331)	Omitted	(0.241)	Omitted	(0.340)
Post-Agreement x AI Intervention				-0.500			-	-0.500
				(0.468)			Omitted	(0.481)
Constant	3.356***	3.813***	3.837***	3.625***	3.625	3.833***	3.625	3.625***
	(0.131)	(0.212)	(0.232)	(0.305)	(0.000)	(0.238)	(0.000)	(0.311)
Manager Case Moderator	No	No	No	No	Yes (Manager)	Yes (Staff)	Yes (Manager)	Yes (Staff)
Observations	26	26	26	26	2	24	2	24
R-squared	0.003	0.202	0.205	0.244	1.000	0.229	1.000	0.269

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A-11. OLS Regression Analysis of Stacked Model: School Teachers (Public Sector)

VARIABLES	Manager as Case Moderator not Considered				Manager as Case Moderator Considered			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Post-Agreement	0.104		0.104	0.021	-0.031	0.118	0.375	-0.011
	(0.133)		(0.132)	(0.347)	(0.301)	(0.142)	(0.878)	(0.370)
AI Intervention		-0.240	-0.240	-0.289	-0.250	-0.246	-0.018	-0.322
		(0.187)	(0.187)	(0.265)	(0.455)	(0.200)	(0.663)	(0.284)
Post-Agreement x AI Intervention				0.097			-0.464	0.152
				(0.375)			(0.938)	(0.401)
Constant	3.337***	3.594***	3.542***	3.583***	3.953***	3.503***	3.750***	3.568***
	(0.094)	(0.173)	(0.185)	(0.245)	(0.452)	(0.198)	(0.621)	(0.262)
Manager Case Moderator	No	No	No	No	Yes (Manager)	Yes (Staff)	Yes (Manager)	Yes (Staff)
Observations	164	164	164	164	16	148	16	148
R-squared	0.004	0.010	0.014	0.014	0.023	0.015	0.043	0.016

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A-12. OLS Regression Analysis of Stacked Model: School Teachers (Private Sector)

VARIABLES	Manager as Case Moderator not Considered				Manager as Case Moderator Considered			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Post-Agreement	-0.054		-0.054	-0.138	0.250	-0.061	0.250	-0.138
	(0.168)		(0.169)	(0.252)	(0.000)	(0.172)	(0.000)	(0.254)
AI Intervention		0.036	0.036	-0.041	-	0.012	-	-0.060
		(0.169)	(0.170)	(0.241)	Omitted	(0.172)	Omitted	(0.245)
Post-Agreement x AI Intervention				0.154			-	0.144
				(0.341)			Omitted	(0.347)
Constant	3.497***	3.451***	3.477***	3.520***	3.875	3.481***	3.875	3.520***
	(0.119)	(0.125)	(0.151)	(0.178)	(0.000)	(0.153)	(0.000)	(0.180)
Manager Case Moderator	No	No	No	No	Yes (Manager)	Yes (Staff)	Yes (Manager)	Yes (Staff)
Observations	84	84	84	84	2	82	2	82
R-squared	0.001	0.001	0.002	0.004	1.000	0.002	1.000	0.004

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

APPENDIX I: EXPLORATORY FACTOR ANALYSIS

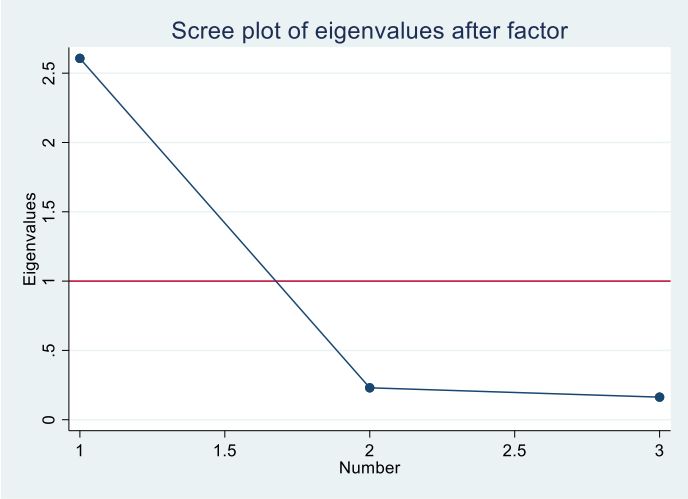


Figure A-4. Exploratory Factor Analysis (EFA) for Self-Performance Efficacy: Scree Plot

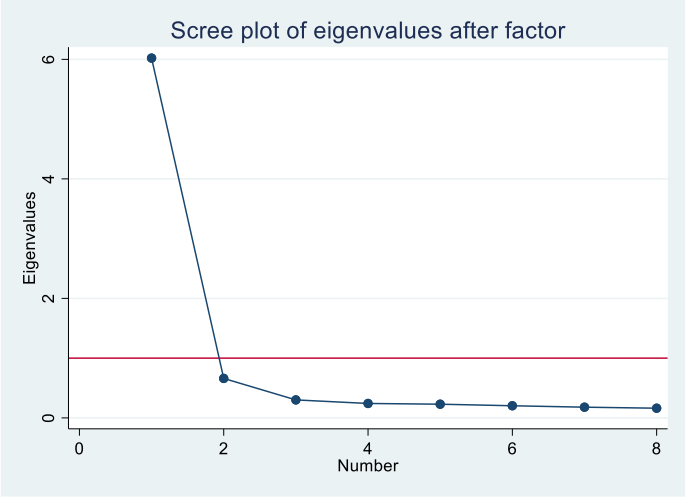


Figure A-5. Exploratory Factor Analysis (EFA) for AI Use Contexts: Scree Plot

APPENDIX J: DESCRIPTIVE STATISTICS

Table A-13. Summary Statistics (The Public and Private Sector, Integrated)

Variables	Obs	Mean	S.D.	Min	Max
Willingness to Use AI	1,200	0.862	0.3454	0	1
AI Intervention	1,200	0.849	0.3580	0	1
Manager	1,200	0.200	0.4002	0	1
AI Performance Information	1,200	0.052	0.8101	-1	1
Responsibility-Taking	1,200	0.481	0.4998	0	1
Self-Performance Efficacy	1,200	6.264	1.9956	1	10
AI Use Contexts	1,200	3.658	0.7059	1	5
Age	1,200	3.648	1.7390	1	7
Education	1,200	2.298	0.9496	1	4
Male	1,200	0.500	0.5002	0	1

Table A-14. Summary Statistics (The Public Sector, Respective)

Variables	Obs	Mean	S.D.	Min	Max
Willingness to Use AI	600	0.862	0.3455	0	1
AI Intervention	600	0.852	0.3557	0	1
Manager	600	0.300	0.4586	0	1
AI Performance Information	600	-0.087	0.8022	-1	1
Responsibility-Taking	600	0.492	0.5003	0	1
Self-Performance Efficacy	600	6.114	2.0675	1	10
AI Use Contexts	600	3.780	0.6961	1	5
Age	600	3.560	1.6178	1	7
Education	600	2.315	0.9647	1	4
Male	600	0.515	0.5002	0	1

Table A-15. Summary Statistics (The Private Sector, Respective)

Variables	Obs	Mean	S.D.	Min	Max
Willingness to Use AI	600	0.862	0.3455	0	1
AI Intervention	600	0.847	0.3606	0	1
Manager	600	0.100	0.3003	0	1
AI Performance Information	600	0.190	0.7947	-1	1
Responsibility-Taking	600	0.470	0.4995	0	1
Self-Performance Efficacy	600	6.415	1.9109	1	10
AI Use Contexts	600	3.535	0.6949	1	5
Age	600	3.735	1.8495	1	7
Education	600	2.282	0.9348	1	4
Male	600	0.485	0.5002	0	1

APPENDIX K: SUPPLEMENTARY ANALYSIS

Table A-16. Regression Specification (No Sectoral Distinction)

Variables	(1) Base Model	(2) Base Model`	(3) Base Model``	(4) Expanded Model	(5) Expanded Model`	(6) Final Model
AI Intervention	0.565***	0.527***	0.431***	0.445***	0.584***	0.431***
	(0.113)	(0.117)	(0.127)	(0.126)	(0.125)	(0.145)
Manager	0.228*	0.185	0.125	0.324**	-0.253*	-0.296*
	(0.123)	(0.128)	(0.141)	(0.134)	(0.143)	(0.164)
AI Performance Information		0.055	0.019	0.006	0.063	0.004
		(0.061)	(0.064)	(0.063)	(0.066)	(0.072)
Responsibility-Taking		0.663***	0.545***	0.599***	0.660***	0.474***
		(0.100)	(0.105)	(0.104)	(0.109)	(0.120)
Self-Performance Efficacy				0.213***		0.193***
				(0.025)		(0.033)
AI Use Contexts					0.853***	0.962***
					(0.087)	(0.104)
Age 2 (25-29 Years Old)			-0.753***			-0.899***
			(0.212)			(0.240)
Age 3 (30-34 Years Old)			-0.447**			-0.570**
			(0.211)			(0.239)
Age 4 (35-39 Years Old)			-0.395*			-0.446*
			(0.217)			(0.245)
Age 5 (40-44 Years Old)			-0.313			-0.507*
			(0.245)			(0.276)
Age 6 (45-49 Years Old)			-0.400			-0.653**
			(0.263)			(0.301)
Age 7 (50-64 Years Old)			-0.178			-0.402
			(0.244)			(0.286)
Edu 2 (Some College)			0.274**			0.385***
			(0.126)			(0.145)
Edu 3 (Bachelor)			0.651***			0.549***
			(0.130)			(0.155)
Edu 4 (Graduate School)			0.866***			0.871***
			(0.215)			(0.258)
Male			0.550***			0.554***
			(0.105)			(0.119)
Constant	0.589***	0.369***	0.341	-0.816***	-2.532***	-3.828***
	(0.102)	(0.110)	(0.226)	(0.182)	(0.316)	(0.462)
Observations	1,200	1,200	1,200	1,200	1,200	1,200

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Fixed effects of Age 1 (18-24 Years Old) and Edu 1 (High School-level) are omitted.

Table A-17. Regression Specification (The Public Sector)

Variables	(1) Base Model	(2) Base Model`	(3) Base Model``	(4) Expanded Model	(5) Expanded Model`	(6) Final Model
AI Intervention	0.578***	0.579***	0.442**	0.595***	0.652***	0.519**
	(0.160)	(0.168)	(0.198)	(0.184)	(0.177)	(0.224)
Manager	0.214	0.104	0.115	0.314*	-0.277	-0.227
	(0.148)	(0.160)	(0.189)	(0.171)	(0.178)	(0.221)
AI Performance Information		0.004	0.023	-0.068	-0.009	-0.011
		(0.090)	(0.102)	(0.096)	(0.096)	(0.114)
Responsibility-Taking		0.909***	0.772***	0.896***	0.866***	0.662***
		(0.153)	(0.172)	(0.163)	(0.163)	(0.191)
Self-Performance Efficacy				0.243***		0.157***
				(0.037)		(0.051)
AI Use Contexts					0.721***	0.877***
					(0.117)	(0.149)
Age 2 (25-29 Years Old)			-0.457			-0.629*
			(0.327)			(0.362)
Age 3 (30-34 Years Old)			-0.281			-0.515
			(0.325)			(0.357)
Age 4 (35-39 Years Old)			-0.201			-0.388
			(0.339)			(0.373)
Age 5 (40-44 Years Old)			-0.309			-0.564
			(0.381)			(0.431)
Age 6 (45-49 Years Old)			0.260			-0.144
			(0.460)			(0.520)
Age 7 (50-64 Years Old)			0.906*			0.875
			(0.479)			(0.630)
Edu 2 (Some College)			0.273			0.416*
			(0.194)			(0.221)
Edu 3 (Bachelor)			1.072***			1.048***
			(0.207)			(0.254)
Edu 4 (Graduate School)			1.384***			1.583***
			(0.349)			(0.442)
Male			0.875***			0.821***
			(0.174)			(0.193)
Constant	0.560***	0.261	-0.219	-1.201***	-2.264***	-3.979***
	(0.147)	(0.160)	(0.353)	(0.280)	(0.442)	(0.671)
Observations	600	600	600	600	600	600

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Fixed effects of Age 1 (18-24 Years Old) and Edu 1 (High School-level) are omitted.

Table A-18. Regression Specification (The Private Sector)

Variables	(1) Base Model	(2) Base Model`	(3) Base Model``	(4) Expanded Model	(5) Expanded Model`	(6) Final Model
AI Intervention	0.554***	0.491***	0.405**	0.320*	0.539***	0.292
	(0.159)	(0.164)	(0.176)	(0.176)	(0.179)	(0.212)
Manager	0.319	0.302	0.173	0.230	0.065	-0.140
	(0.244)	(0.247)	(0.264)	(0.257)	(0.283)	(0.325)
AI Performance Information		0.113	0.075	0.109	0.108	0.067
		(0.084)	(0.088)	(0.087)	(0.094)	(0.103)
Responsibility-Taking		0.444***	0.385***	0.325**	0.475***	0.350**
		(0.136)	(0.143)	(0.141)	(0.153)	(0.169)
Self-Performance Efficacy				0.204***		0.214***
				(0.036)		(0.047)
AI Use Contexts					1.081***	1.248***
					(0.139)	(0.173)
Age 2 (25-29 Years Old)			-1.027***			-1.274***
			(0.290)			(0.346)
Age 3 (30-34 Years Old)			-0.489*			-0.536
			(0.295)			(0.352)
Age 4 (35-39 Years Old)			-0.503*			-0.510
			(0.296)			(0.351)
Age 5 (40-44 Years Old)			-0.274			-0.444
			(0.342)			(0.394)
Age 6 (45-49 Years Old)			-0.754**			-1.029**
			(0.339)			(0.403)
Age 7 (50-64 Years Old)			-0.627**			-0.903**
			(0.317)			(0.383)
Edu 2 (Some College)			0.112			0.268
			(0.178)			(0.216)
Edu 3 (Bachelor)			0.269			0.138
			(0.180)			(0.220)
Edu 4 (Graduate School)			0.424			0.317
			(0.295)			(0.349)
Male			0.378***			0.371**
			(0.143)			(0.168)
Constant	0.614***	0.468***	0.822***	-0.564**	-3.116***	-4.226***
	(0.143)	(0.153)	(0.313)	(0.242)	(0.487)	(0.716)
Observations	600	600	600	600	600	600

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Fixed effects of Age 1 (18-24 years old) and Edu 1 (High School-level) are omitted.

APPENDIX L: ROBUSTNESS CHECK WITH FACTOR SCORES

Table A-19. Probit Analysis (Sectoral Comparison)

with Factor Scores for Self-Performance Efficacy and AI Use Contexts (` Marked)

Variables	(Model 1) Public Sector	(Model 2) Private Sector	(Model 3) Public-Private Difference
AI Intervention	0.519**	0.292	0.227
	(0.224)	(0.212)	(0.299)
Manager	-0.228	-0.140	-0.088
	(0.221)	(0.325)	(0.366)
AI Performance Information	-0.011	0.068	-0.079
	(0.114)	(0.103)	(0.155)
Responsibility-Taking	0.664***	0.346**	0.318
	(0.191)	(0.169)	(0.260)
Self-Performance Efficacy`	0.311***	0.424***	-0.113
	(0.102)	(0.094)	(0.145)
AI Use Contexts`	0.621***	0.883***	-0.262*
	(0.105)	(0.122)	(0.157)
Constant	0.211	1.680***	-1.469*
	(0.400)	(0.398)	(0.561)
Age and Education FEs	Yes	Yes	Yes
Male	Yes	Yes	Yes
Observations	600	600	600

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1