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Why Does Algorithmic Management Undermine Employee Creativity?
A Perspective Focused on AMO Theory

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ABSTRACT

With the rapid development of artificial intelligence technology, algorithmic management is increasingly prevalent in enterprises. Despite the considerable scholarly attention given to the impact of algorithmic management, a research gap remains regarding its influence on employee creativity. To address this gap, the authors developed a theoretical model using ability-motivation-opportunity (AMO) theory. This model aims to investigate the direct impacts of algorithmic management (opportunity) on employee creativity (performance) while also considering the mediating roles played by knowledge combination capability (ability) and achievement goal (motivation). Using a sample of 327 paired leader-employee data from an information technology service company, the findings reveal that algorithmic management has a negative effect on employee creativity. Furthermore, the results demonstrate that algorithmic management negatively influences employee creativity through its impact on knowledge combination capability and achievement goal.

KEYWORDS

Achievement Goal, Algorithmic Management, AMO Theory, Employee Creativity, Knowledge Combination Capability

INTRODUCTION

With the global rise of the fourth industrial revolution, the rapid advancement of big data, digitization, and cloud computing technologies has led to a substantial influx of data (Petrillo et al., 2018; Xia et

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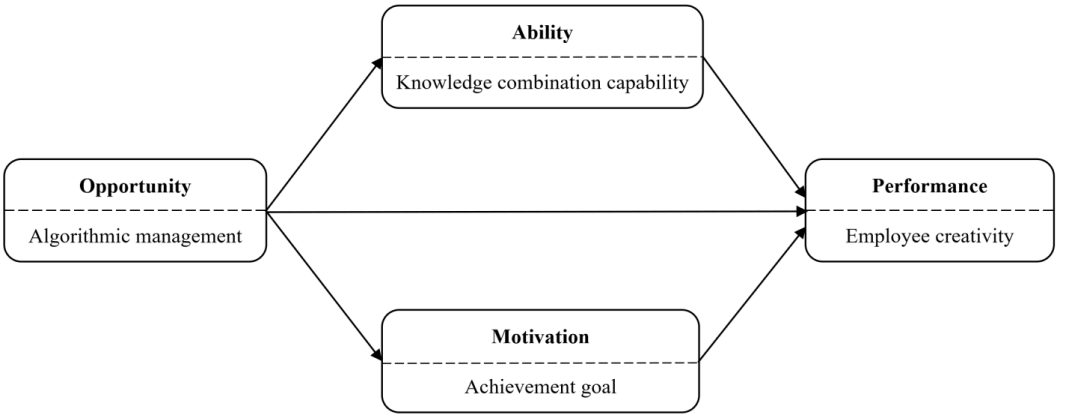
al., 2023; Xu et al., 2018). Algorithmic management, which refers to utilizing advanced data analytics for automating managerial decision-making and employee supervision, represents a pivotal shift in contemporary organizational operations (Jarrahi et al., 2023; Tomprou & Lee, 2022). In recent years, algorithmic management has garnered widespread adoption in various business sectors due to its potential to enhance operational efficiency and overall organizational performance (Cheng & Foley, 2019; Duggan et al., 2020; Meijerink & Bondarouk, 2023; Parent-Rocheleau & Parker, 2022).

However, despite the enthusiasm for this management paradigm, its underlying operational patterns have become clear: It serves as a rigid mechanism that allows managers to control workers and limit employee autonomy, potentially leading to inflexibility in organizational structures and processes (Meijerink & Bondarouk, 2023). While streamlining certain operations, this control-centric approach can inadvertently create an environment where employees are less able to exercise discretion or engage in creative problem-solving (Benlian et al., 2022). Under these controlling and restrictive conditions, employees face the significant challenge of independently synthesizing information to innovate since their creative thinking is limited by algorithm-driven directives (Kellogg et al., 2020). Previous research has demonstrated that such rigid situations can elicit unfavorable employee emotional responses, such as feelings of detachment or powerlessness (Lee, 2018), reduce trust and engagement among them (Kellogg et al., 2020; Morse et al., 2021), and induce work overload due to inflexible task assignments and performance metrics (Wood et al., 2019). However, our understanding of how algorithmic management specifically influences employee creativity remains limited. Considering the apparent contradiction between businesses' implementations of algorithmic management and their demand for employee innovation to thrive in a rapidly evolving environment, it is imperative to delve into the nuanced impact of algorithmic management on employee creativity and to explore how algorithmic management is stifling workplace dynamics.

Moreover, as a situational factor, the impact of algorithmic management on work is not only determined by its characteristics but also influenced by the interaction with individual factors of employees (Parker & Grote, 2022). Algorithms may struggle to fully understand and adapt to the diversity and complexity of individual human factors when processing them, which can be related to the impact on employee motivation and abilities (Lee et al., 2015). Thus, we will focus on exploring the impacts of how algorithmic management and other factors (i.e., employee ability and motivation) influence employee creativity, which remains a largely unexplored realm of inquiry.

In this study, we develop a theoretical model to explore the influence of algorithmic management on employee creativity. Recognizing that employee creativity does not depend on a single factor alone but includes dimensions of ability, motivation, and opportunity, we turned to ability-motivation-opportunity theory (AMO; Blumberg & Pringle, 1982; Bo-Nehles et al., 2013; Obeidat et al., 2016) to decipher the relationship between algorithmic management and employee creativity. According to the theory, opportunity refers to the situational conditions that enable individuals to engage in specific behaviors (Appelbaum et al., 2000; Blumberg & Pringle, 1982). Given the algorithmic management's controlling, demanding, and inflexible nature, we believe that algorithmic management has a direct negative impact on employee creativity. Moreover, the AMO framework accentuates the influence of ability, motivation, and opportunity on behavior and performance (Blumberg & Pringle, 1982). Therefore, the research further investigates knowledge combination capability (ability) and achievement goal (motivation) as mediators between algorithmic management (opportunity) and employee creativity. *Knowledge combination capability* was chosen as a mediator for ability because it reflects the extent to which employees can synthesize and integrate diverse information and ideas (Ruiz-Jiménez et al., 2016), a critical skill in creative processes, which the constraints of algorithmic management may significantly impact. *Achievement goal* was selected as a mediator for motivation as it encapsulates the intrinsic and extrinsic drivers that propel employees toward creative endeavors (Senko & Tropiano, 2016), potentially influenced by the degree of autonomy and flexibility (or lack thereof) inherent in algorithmic management. Figure 1 illustrates our theoretical framework.

Figure 1. Conceptual Model



This study contributes to the literature in several ways. First, it expands on the existing research on the impact of algorithmic management on employee creativity. Although previous studies have raised the question of whether excessive reliance on algorithmic approaches hinders innovation, there remains a scarcity of research in this area (Andriani et al., 2017; Duggan et al., 2020; Jaiswal et al., 2022; Vargo et al., 2020). We construct a mediating model based on the AMO theory to address this gap to explore how algorithms influence employee creativity. Second, it uncovers the underlying mechanism of algorithmic management concerning employee creativity. Drawing upon the AMO theory, we examined the impact of algorithmic management (representing opportunities), knowledge combination capability (indicative of ability), and achievement goal (linked to motivation) on employee creativity from multiple dimensions. This comprehensive perspective enhances our understanding of the influence of algorithmic management on employee creativity. Additionally, it enriches the AMO literature by introducing algorithmic management as a situational factor. Thirdly, our study contributes to the research on the consequences of algorithmic management. By analyzing algorithmic management's rigidity and inflexibility, we explore its negative impact on employee ability and motivation.

THEORY AND HYPOTHESES

AMO Theory

Within the realm of behavioral sciences, a profound emphasis has consistently been placed on the dual pillars of ability and willingness when examining employee work behaviors (Afsar & Masood, 2018; Kim & Kuo, 2015). Historically, these constructs have been viewed as paramount in decoding the underpinnings of individual actions. The prevailing perspective posits that their inherent capabilities (ability) and internal drive or enthusiasm (motivation) are intrinsically tied to an individual's behavior. However, the landscape of this discourse witnessed an evolution when scholars such as Blumberg and Pringle (1982) introduced a third pivotal element: opportunity. They contended that even when an individual is equipped with the requisite skills and fervor to undertake an activity, the actual execution of said activity is inextricably linked to the surrounding context. In essence, the tangible environment, or the constellation of opportunity factors, wields significant influence on one's engagement in a particular endeavor. Furthermore, they proposed an interaction model highlighting the relationship among opportunity, ability, motivation, and performance. They emphasized that opportunity encompasses the specific arrangement of factors and circumstances around a person and their task, which can influence their abilities and motivation.

Taking a more comprehensive approach, Appelbaum et al. (2000) thoroughly examined the AMO theory, postulating that the convergence of competence (ability), intrinsic drive (motivation), and circumstantial factors (opportunity) shape employee behaviors and, consequently, performance outcomes. In this context, *ability* encompasses psychological and cognitive faculties that enable individuals to navigate tasks proficiently. *Motivation* represents the psychological propensities and emotional inclinations that drive individuals to take action. Lastly, *opportunity* encompasses unpredictable external factors, including situational dynamics, interpersonal interactions, and broader environmental determinants, which can either enhance or hinder individual engagement.

Following the AMO theoretical framework (Appelbaum et al., 2000; Blumberg & Pringle, 1982), algorithmic management, characterized as a situational factor in the employee work environment, imposes a strict framework and emphasizes algorithmic solutions, potentially diminishing employee creative behavior. By heavily relying on data-driven decision-making and rigid task structuring (opportunity), this management style may inadvertently constrain employee knowledge combination capability (ability) by limiting their exposure to diverse information and cross-functional interactions essential for fostering creativity. Simultaneously, the overemphasis on algorithmic efficiency could stifle the intrinsic and extrinsic motivation factors encapsulated in their achievement goal (motivation) necessary for creative exploration and innovation. Thus, we propose examining how algorithmic management's restrictive and control-oriented nature may inadvertently undermine the critical components of the AMO framework, thereby leading to a decrease in employee creative behavior in contemporary work environments.

Algorithmic Management and Employee Creativity

Given the weight of the tangible environment, numerous scholars have examined the concept of algorithmic management, particularly its influence on employee behavior from an environmental standpoint. Under this environmental lens, some researchers interpret algorithmic management as the collective shared experiences of organizational members with the concrete algorithmic attributes prevalent within their work environment (Jarrahi et al., 2023; Kelan, 2023; Tomprou & Lee, 2022). Moreover, others also view algorithmic management as an individual's direct encounter characterizing the extent to which the organization is regimented by algorithms (Anicich, 2022; Meijerink & Bondarouk, 2023; Morse et al., 2021). This study leans toward the synthesized perspectives, contending that algorithmic management represents the tangible exposure of organizational members to the extent to which rigid, data-driven algorithms influence their behavior.

Employee creativity is "the entirety of individual actions, at any hierarchical level within an organization, that engenders, assimilates, and applies beneficial innovative perspectives" (Oldham & Cummings, 1996; Scott & Bruce, 1994). Some scholars have endeavored to segment the individual creativity factors into different dimensions: recognizing one's role in innovation (subject to being creative), believing in one's capability to innovate (ability to be creative), and harboring the desire to do so (motivation to be creative; Pieterse et al., 2010; Reuvers et al., 2008). Existing research points out that enterprise environment factors have a meaningful impact on the development of employee creativity (Hon & Lui, 2016; Zhou & Shalley, 2003). Given algorithmic management's controlling, demanding, and inflexible nature (Kellogg et al., 2020), which seemingly stifles the development of new ideas and ways of solving problems in the workplace, we argue that algorithmic management negatively affects employee creativity.

Algorithmic management centralizes decision-making processes based on data analytics, often sidelining employee intuition and experiential knowledge. This mechanistic approach can foster perceptions of an overly controlled work environment among organizational members. Employees may feel that their contributions, ideas, and spontaneity are undervalued or even overlooked in favor of algorithmically determined outcomes. Furthermore, in an environment where algorithms dictate the course of action, employees might be less inclined to deviate from established patterns or challenge the status quo. This inclination is because the continuous emphasis on data-driven

solutions could discourage risk-taking, a key component of creative endeavors. The fear of making mistakes or going against the algorithmic grain may overshadow their creative impulses. Therefore, by imposing a strict framework and emphasizing algorithmic solutions, algorithmic management might lead to a potential decrease in employee creativity. Some studies affirm the negative repercussions of excessive reliance on algorithmic management for fostering innovative behavior among employees. Holford (2019) opined that an overly algorithmic environment can stifle the intrinsic factors that spur organizational members toward innovation. Additionally, research by Möhlmann et al. (2021) underscored a significant negative correlation between employee perceptions of high algorithmic control and their propensity for innovative behavior.

From the perspective of the AOM theory, opportunity is regarded as the conditions or situational factors that allow individuals to perform specific behaviors. Algorithmic management, an essential aspect of the internal conditions of the organization, plays a pivotal role in dictating the scope and nature of such opportunities. This study posits that algorithmic management potentially diminishes the opportunity elements vital for nurturing innovative behavior among employees. In an algorithm-dominated environment, employees may experience reduced empowerment to seize innovative opportunities, hindering their capacity to generate novel perspectives and execute creative endeavors. Therefore, we hypothesize:

Hypothesis 1: Algorithmic management is negatively related to employee creativity.

The Mediating Role of Knowledge Combination Capability in Algorithmic Management and Employee Creativity

According to AMO theory, opportunity influences the individual's inclination and capability to engage in particular behaviors (Appelbaum et al., 2000; Blumberg & Pringle, 1982). Thus, we postulate that algorithmic management influences employee creativity by affecting their knowledge combination capability. Knowledge combination capability is the faculty that allows individuals to synergistically integrate diverse pieces of information to produce novel insights and solutions (Ruiz-Jiménez et al., 2016; Song et al., 2021). It is rooted in one's ability to assimilate domain-specific knowledge from various sources, juxtapose differing cognitive perspectives, and generate original and pertinent ideas (Zheng et al., 2011). This capability involves deep knowledge in a specific field, a broad understanding across disciplines, and the ability to quickly connect different concepts.

Algorithmic management, characterized by data-driven decision-making processes, automation, and procedural optimization (Jarrahi et al., 2023; Kelan, 2023; Tomprou & Lee, 2022), promises enhanced work efficiency but raises concerns about its impact on employee cognitive processes, particularly knowledge combination capability. The deterministic and often rigid nature of algorithm-driven systems can lead to a homogenization of information inputs and decision-making pathways. This limitation could reduce employee exposure to diverse perspectives and experiences, essential for cross-fertilizing ideas. Furthermore, the emphasis on algorithmic efficiency prioritizes quick, linear solutions over complex, creative problem-solving. As a result, employees might find themselves confined to convergent thinking patterns, where their cognitive processes are geared more toward finding the most efficient solution within a narrow parameter rather than exploring a broad range of possibilities. This could inadvertently stifle the richness and depth of their knowledge combination capability, limiting the opportunity to make connections between seemingly unrelated ideas.

Knowledge combination capability is the essence of creativity. It is the ability to merge existing information, ideas, and practices to generate novel solutions (Ruiz-Jiménez et al., 2016; Song et al., 2021). Employees with high capability in this domain can cross-pollinate ideas from diverse fields, thus leading to innovative solutions. Ruiz-Jiménez et al. (2016) have touched upon the broader spheres of knowledge amalgamation in the creative process. Their research suggests that the capability to combine knowledge effectively has multifaceted benefits. First, individuals with this capability are

inherently positioned to identify interconnections and patterns that might elude others. Second, the flexibility and diversity of thought processes enable these individuals to adapt and modify their innovative strategies, drawing from a richer pool of resources. Subsequent research has elucidated that: (a) an individual with a high knowledge combination capability can discern novel intersections of ideas, thereby generating unprecedented solutions; (b) such an individual, confident in their capacity to amalgamate varied knowledge sources, is more likely to experiment with unconventional approaches, leading to potential breakthroughs; (c) the ability to build upon and refine ideas, taking insights from various fields, enables these individuals to iterate and enhance their innovative propositions continually; and (d) their ability to think laterally and draw parallels across disciplines means they can approach problems from multiple angles, leading to more comprehensive and effective solutions (Carmeli & Azeroual, 2009; Song et al., 2021). Hence, any factor, such as algorithmic management, impeding knowledge combinations can dampen creativity.

Empirical evidence lends weight to these assertions. Pivoting to the influence of algorithmic management on knowledge combination capability and its ripple effects on innovative behaviors, research by Ruiz-Jiménez et al. (2016) empirically corroborated that knowledge combination capability acts as a conduit, mediating the relationship between algorithmically managed organizational environment and innovative behaviors. To conclude, implementing algorithmic management may restrict the opportunities for employees to engage in diverse thinking, potentially impeding their capacity to creatively combine knowledge. This could have subsequent implications for their innovative behavior. To summarize the above, we present the following hypothesis:

Hypothesis 2: Employee knowledge combination capability mediates the relationship between algorithmic management and employee creativity.

The Mediating Role of the Achievement Goal in Algorithmic Management and Employee Creativity

A multitude of studies exploring organizational creativity and innovative behavior are deeply rooted in the paradigm of achievement goals, predicated upon the notion that such goals shape the manner, direction, intensity, and duration of an individual's actions, serving as the quintessential wellspring of their endeavors (Elliot & McGregor, 2001; Elliot & Thrash, 2001; Senko & Tropiano, 2016). Renowned scholars tend to delineate work motivation into two broad categories: intrinsic and extrinsic (Amabile, 1993). Within this framework, achievement goals pertain to undertaking a task or addressing a quandary primarily due to the inherent challenge, satisfaction, or interest it presents rather than being swayed by external motivations such as rewards, oversight, competition, evaluations, or prescriptive demands (Elliot & Thrash, 2001).

Drawing on the AMO theoretical framework, this study hypothesizes that innovative employee behavior is subject to perceived opportunities and innovative motivation. This research postulates that algorithmic management influences employee creativity by affecting their achievement goal. Algorithmic management, characterized by its data-driven nature, can profoundly influence employee achievement goals. Such mechanistic approaches might lead employees to perceive diminished autonomy, potentially skewing their focus from mastery-based goals to performance-centric ones. The overt metric-driven nature of this management style might amplify the pursuit of external validation, sidelining intrinsic motivation. Further, the immediacy with which algorithmic systems highlight errors could foster a heightened fear of failure, pushing employees toward performance-avoidance goals.

Extant research has illuminated that when individuals are primarily propelled by a zeal for challenges, pleasure, satisfaction, and the intrinsic allure of the task at hand, they exhibit heightened cognitive flexibility, gravitating toward intricacy and originality, which consequently amplifies their creative prowess (Morris & Leung, 2010). This is discernible in the nascent phase of ideation, wherein achievement goals galvanize employees to narrow their focus on specific domain challenges, fostering

an environment of exploration and audacity (Sijbom et al., 2015; Miron-Spektor & Beenen, 2015). The seminal work by Csikszentmihalyi and Getzels (1971) on problem discovery posited that pinpointing issues that can unlock creative potential is partly contingent upon an intense proclivity toward interest and curiosity. As individuals transition to implementing innovative ideas, achievement goals serve as an indomitable, unwavering catalyst, emboldening individuals to persevere amidst the inherent vicissitudes of creative endeavors, including copious iterations and the looming specter of failure. This fortitude is particularly potent even in scenarios marred by external skepticism and incredulity. A plethora of empirical studies echo this nexus. For instance, Amabile et al. (1994), through their exploration using work preference scales, discerned that individuals with an orientation toward achievement goals tend to exhibit more frequent innovative behavior. Additionally, researchers have corroborated the pronounced impact of achievement goals on innovative behaviors among employees (Miron-Spektor & Beenen, 2015).

Drawing on Shalley et al. (2004), this study contends that situational factors significantly impact employees' intrinsic motivation, shaping their creative endeavors. Furthermore, it suggests that algorithmic management may influence goal achievement and subsequently affect creativity. Miron-Spektor and Beenen (2015) emphasized that organizational situational elements primarily foster intrinsic motivation by fulfilling psychological needs, which, in conjunction with aligned extrinsic motivations, conjointly exert a positive influence on innovative actions. Within the AMO framework, algorithmic management directly impacts motivation, particularly achievement goals, decreasing employee creativity. As such, an over-reliance on algorithmic processes might stifle the intrinsic motivation for fostering innovative behaviors. The above leads us to propose the following hypothesis.

Hypothesis 3: Employee achievement goal mediates the relationship between algorithmic management and employee creativity.

METHOD

Participants and Procedure

Our study examined employees from an information technology service company in China. A series of employee interviews were conducted before deploying our comprehensive survey. These early conversations highlighted algorithmic management's significant role in the company, making it relevant to our study. We got permission from the company's chief executive officer before starting. Each employee was given a unique four-number code for identification.

We explained the survey to the employees, asked them to join willingly, and ensured their answers would be kept private. The company's HR team guided each employee to a meeting room, provided them with pens and the survey, and let them fill it out. Once done, they sealed their answers in envelopes and handed them to our team. In recognition of their participation, a nominal sum (20RMB) was awarded to each participant upon completion.

We finally received 327 valid responses from 453 employees, with an effective response rate of 72.19%. The demographic composition of the participants revealed that 21.10% were male, with a mean age of 26.99 years (SD = 3.33). The average tenure within the organization was 3.48 years. Concerning educational attainment, 95.11% held a bachelor's degree or higher.

Measures

Since all the measures were originally constructed in English, we used the back-translation method to translate all items. We used a five-point Likert scale (1 = *completely disagree* to 5 = *completely agree*) for all the measures.

Algorithmic Management

We used a 20-item scale from Parent-Rocheleau et al. (in press) to assess the algorithmic management of the employees. The scale contains five dimensions: monitoring, goal setting, scheduling, performance management, and compensation. A sample item is, "An automated system tracks me carefully to ensure I am completing my tasks" ($\alpha = .889$).

Knowledge Combination Capability

Employees reported their knowledge combination capability using a five-item scale from Ruiz-Jiménez et al. (2016). A sample item is, "I am highly capable of collaborating and of combining and exchanging ideas among themselves to diagnose and solve problems and create opportunities" ($\alpha = .936$).

Achievement Goal

Employee achievement goals were assessed using the 12-item scale from Elliot and McGregor (2001; three items each for performance approach, mastery avoidance, mastery approach, and performance-avoidance). A sample item is: "It is important for me to do better than other employees" ($\alpha = .964$).

Employee Creativity

We adapted the seven-item scale by Gong et al. (2009) to measure employee creativity. A sample item is, "This employee's work is original and practical" ($\alpha = .950$).

Control Variables

focusing on the encompassing idiosyncrasies of the mutable elements, we controlled for employee gender, age, education, and organizational tenure to rule out the possibility that those demographics might influence the outcomes. We used the number of years to measure age and organizational tenure. Gender was a dummy variable, 1 = *male* and 2 = *female*. Education was assessed at 1 = *middle school or below* and 5 = *master's degree or above*.

RESULTS

Common Method Bias

We performed Harman's single-factor test to assess the presence of common method bias. Results show that the first factor explained 30.16% of the total variance, which is less than the critical standard of 40%, and that 70.07% of the total variance was explained. Thus, this study had no serious common method bias (Podsakoff & Organ, 1986).

Confirmatory Factor Analysis

To calculate the discriminant validity of the measurement model, we performed a confirmatory factor analysis and compared the hypothesized four-factor model with several alternative models. The fit indices in Table 1 show that the four-factor model better fits the data than the competing models.

Descriptive Analyses

The research used SPSS 29.0 for descriptive analyses. Table 2 shows the means, standard deviations, and correlations among the variables in the present study. All variables are significantly correlated as predicted, and these results provide the basis for subsequent hypothesis testing.

The indirect effects were calculated, and 95% confidence intervals were obtained with a bootstrapping approach using a sample size of 5000. The indirect effect of algorithmic management via knowledge combination capability (-0.107) is negative and significant at the 0.01 level, as the 95% confidence interval [-0.177, -0.043] excludes zero values, which supports H2. The indirect effect

Table 1. Confirmatory Factor Analysis

Model	Factors	χ^2	df	χ^2/df	CFI	TLI	RMSEA	SRMR
1	Four: AM, AGO, KCC, ERC	1107.125	371	2.98	0.910	0.901	0.078	0.042
2	Three: AM + AGO, KCC, ERC	1406.976	374	3.76	0.875	0.864	0.092	0.070
3	Three: AM + KCC, AGO, ERC	1420.800	374	3.80	0.873	0.863	0.093	0.079
4	Three: AM + ERC, AGO, KCC	1446.942	374	3.87	0.870	0.859	0.094	0.087
5	Three: AM, AGO + KCC, ERC	2335.303	374	6.24	0.763	0.743	0.127	0.109
6	Three: AM, AGO + ERC, KCC	2993.754	374	8.00	0.683	0.656	0.146	0.144
7	Three: AM, AGO, KCC + ERC	2371.936	374	6.34	0.758	0.738	0.128	0.122
8	Two: AM + AGO, KCC + ERC	2652.805	376	7.06	0.725	0.703	0.136	0.134
9	Two: AM + KCC, AGO + ERC	3292.091	376	8.76	0.647	0.619	0.154	0.159
10	Two: AM + ERC, AGO + KCC	2656.264	376	7.06	0.724	0.702	0.136	0.133
11	One: AM + AGO + KCC + ERC	4434.613	377	11.76	0.509	0.472	0.181	0.171

Note. AM = algorithmic management; AGO = achievement goal; KCC = knowledge combination capability; ECR = employee creativity; CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual.

Table 2. Variables' Means, Standard Deviations, and Correlations

	Variable	M	SD	1	2	3	4	5	6	7
1	Gender[a]	1.79	0.41							
2	Age	26.99	3.33	.07						
3	Education[b]	4.04	0.37	-.04	.01					
4	Tenure	3.48	1.39	.03	.76**	-.16**				
5	Algorithmic management	3.73	0.56	-.09	.01	.05	.00			
6	Knowledge combination capability	3.31	0.88	.08	-.01	-.05	.02	-.36**		
7	Achievement goal	3.74	0.80	.05	.07	.04	.04	-.38**	.38**	
8	Employee creativity	3.48	0.84	-.03	-.08	-.00	-.07	-.33**	.34**	.33**

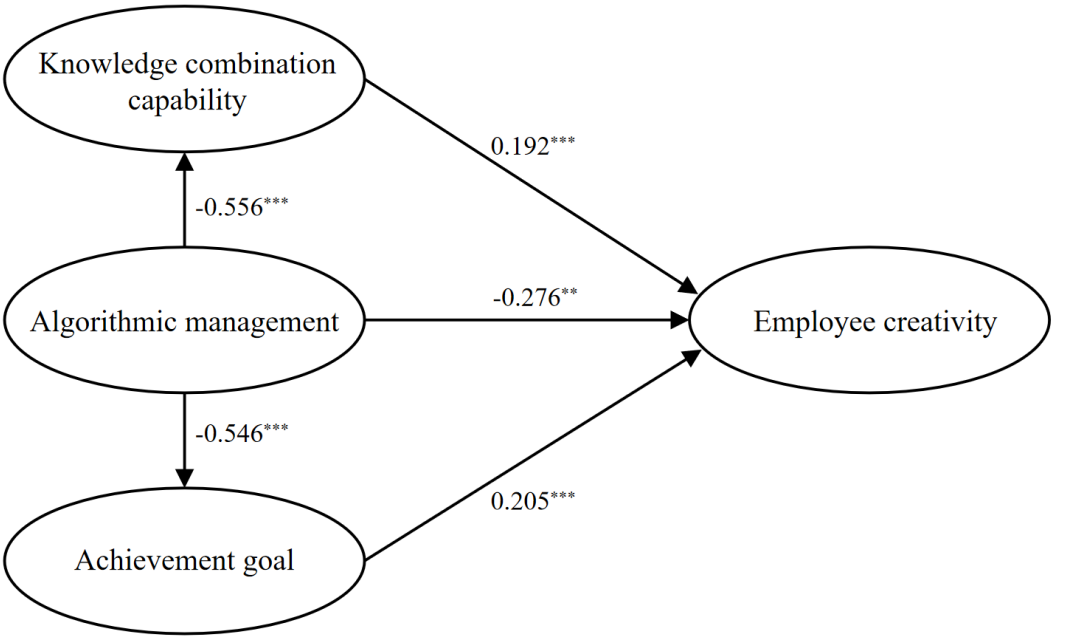
Note. [a] Gender (1 = male, 2 = female); [b] Education (1 = middle school and below, 2 = high school, 3 = technical college, 4 = bachelor's degree, 5 = master's degree or above); * $p < 0.05$; ** $p < 0.01$.

of algorithmic management via achievement goal on employee creativity (-0.112) was negative and significant at the 0.01 level, as the 95% confidence interval [-0.180, -0.044] excludes zero values, which supports H3.

Hypothesis Testing

A structural equation modeling was conducted to test the direct and mediation analyses in Mplus 8.10. A bootstrap method produced the 95% confidence interval for the indirect effects. The results showed that algorithmic management had a negative effect ($\beta = -0.276$, SE = 0.084, $p < 0.01$) on employee creativity (see Figure 2), supporting H1. Algorithmic management also had a negative effect on knowledge combination capability ($\beta = -0.556$, SE = 0.082, $p < 0.001$) and achievement goal ($\beta = -0.546$, SE = 0.074, $p < 0.001$). Knowledge combination capability positively affected employee creativity ($\beta = 0.192$, SE = 0.053, $p < 0.001$). Achievement goals positively affected employee creativity ($\beta = 0.205$, SE = 0.059, $p < 0.001$).

Figure 2. Results of Structural Relationship Analysis
*Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.*



DISCUSSION

Using the theoretical framework of AMO, this study examines the influence of algorithm management on employee creativity. We meticulously identified three variables, *algorithmic management*, *knowledge combination capability*, and *achievement goal*, as operational indicators for opportunity, ability, and motivation, respectively. The findings suggest two salient points. First, ability, motivation, and opportunity individually influence employee creativity. More specifically, with algorithmic management acting as the element of opportunity, a strong perception of its presence negatively correlates with creativity.

Conversely, knowledge combination capability and achievement goal serve as determinants of an employee's ability and motivation, directly impacting their creative endeavors positively. Second, the opportunity element influences employee creativity through the conduit of the ability and motivation facets. Explicitly, the ability (knowledge combination capability) and motivational (achievement goal) elements partially mediate the relationship between the opportunity component (algorithmic management) and employee creativity.

Theoretical Implications

The study makes several theoretical contributions. First, a primary contribution of this research lies in its nuanced exploration of the adverse mechanisms through which algorithmic management impacts employee creativity. While algorithmic management is considered a digital management approach to increase the operational efficiency and profitability of organizations, several scholars have cautioned against its inadvertent stifling effects on spontaneity and fresh ideation (Anicich, 2022; Gagné et al., 2022; Meijerink & Bondarouk, 2023). Some researchers have called attention to the potential pitfalls of algorithmic management, particularly that overemphasizing algorithmic protocols may inhibit employee innovation (Duggan et al., 2020; Jaiswal et al., 2022). Such views emphasize the necessity to demystify the relationship between algorithmic management and employee creativity.

However, despite the pressing need, the extant literature in this area remains in its formative phase. Prevailing studies are preliminary explorations and skewed positive views of algorithmic management, underscoring the limitations of current research in this domain (Andriani et al., 2017; De Stobbeleir et al., 2011; Vargo et al., 2020). This study delved deeper into the negative relationship between algorithmic management and employee creativity.

Second, based upon the AMO theoretical framework (Blumberg & Pringle, 1982; Bo-Nehles et al., 2013; Obeidat et al., 2016), this study systematically elucidates the genesis of employee creativity through the tripartite conduits of ability, motivation, and opportunity, focusing on variables such as algorithmic management (corresponding to opportunity), knowledge combination capability (corresponding to ability), and achievement goal (corresponding to motivation). Previous scholarly endeavors based on AMO theory have robustly posited that tailored human resource management can decisively influence individualized behaviors and performance outcomes (Bo-Nehles et al., 2013; Obeidat et al., 2016). Nevertheless, a conspicuous dearth exists from the AMO perspective in understanding such specialized management's impact and underlying mechanisms on the nuanced interplay between algorithmic management and employee creativity. Thus, in line with the perspectives of prior research, this research affirms that algorithmic management plays a pivotal role in suppressing employee creativity (Kellogg et al., 2020). Bridging with AMO theory, it delves profoundly into the operative mechanism bridging algorithmic management and employee creativity. Our findings suggest that algorithmic management attenuates employee knowledge combination capability and achievement goal. Such a constriction, in turn, curtails their inherent capacity and zeal to harness and showcase elevated creative prowess.

Finally, this study contributes to the research on the aftereffects of algorithmic management. Specifically, we delve into the rigidity and inflexibility inherent in algorithmic management, aiming to understand the detrimental effects of algorithmic management on employees. Our findings suggest that this rigid approach to organizational management can prevent employees from developing the ability to effectively combine various types of knowledge and can also affect their achievement goals. Responding to the call by Benlian et al. (2022) to explore algorithmic management's impact on employees, the study reveals the inhibitory effects of algorithmically managed organizational systems on employee work competence development and achievement goal orientation. It investigates into the negative impact of algorithms on employee creativity. Our explorations provide new insights into the aftereffects of algorithmic management by revealing that it hinders employee innovation and limits the creative ability and motivation of employees who work within its confines.

Practical Implications

Our study provides several practical implications. First, enterprises should navigate the negative relationship between algorithmic management and employee creativity. Organizations must enshrine rigorous assessment mechanisms, not merely to gauge the efficiency of their algorithmic processes but, more critically, to discern their adverse effects on the wellsprings of employee creativity. These assessments, demanding both perspicuity and astuteness, should be poised to swiftly curtail and rectify any inadvertent stultification of creativity. Furthermore, we must recalibrate human resource mechanisms. Traditional approaches might fall short; hence, novel training paradigms that allow employees to meander through algorithmic landscapes while retaining their creative zest are essential. Last, an organizational ethos that recognizes and venerates the delicate equipoise between the deterministic realms of algorithms and the capricious nuance of creativity is indispensable. Such a culture will not merely prevent creativity's erosion but will foster an environment where algorithmic precision and creativity coalesce in harmonious synchrony, propelling the enterprise into future realms of innovation.

Second, enterprises should emphasize and reinforce employee knowledge combination capability and achievement goals. This shift facilitates improvements for employees in pivotal trajectories. During the initial phases of talent acquisition and allocation, focus should be levied on assessing

employee adeptness in combining diverse knowledge bases and their collaborative prowess. After this, enterprises should inaugurate training initiatives to enhance these specific capacities. In remuneration and performance appraisal frameworks, it is paramount to unambiguously define incentives that encourage participation in knowledge amalgamation activities. This is instrumental in kindling the intrinsic motivation for employees to amalgamate distinct knowledge facets and steer toward creative endeavors. In addition, within the corporate ambiance, there is an imperative to foster an intricate social network that is both expansive and interlinked. By orchestrating a myriad of discourse and exchange events, enterprises should pave the avenue for experienced employees to mentor and guide the neophytes, creating abundant of latent opportunities for knowledge and creativity diffusion.

Third, promulgate a systemic perspective in triggering employee innovative behavior. Employee creativity is born from the interplay between individual proclivities and the encompassing organizational milieu (Scott & Bruce, 1994). Our research underscores the indelible impact of the AMO paradigm on employee creativity. Thus, when steering the helm of employee innovative endeavors, organizations should holistically consider the multifarious elements shaping employee capacity, motivation, and the opportune circumstances for creativity. For example, to improve the competence of employees, initiatives for continuous learning and upgrading skills should be introduced. Guiding employees to pursue goals and achieve realization can significantly enhance their motivation. In addition, by promoting open management and flexible collaboration, organizations can create rich opportunities for creative action. Combining these avenues can provide a comprehensive framework for actively encouraging and fostering employee creativity and contributing to the organization's continued development.

Limitations and Future Directions

First, the demographic representation within the sample, particularly the low proportion of male participants, introduces a potential bias that might limit the broader applicability of the research findings. This gender imbalance could influence the interpretation of how algorithmic management impacts employee creativity, as gender-related differences in workplace behavior and perception could be significant. Future research should aim for a more balanced demographic representation to enhance the generalizability of the findings and to understand if and how the impact of algorithmic management on creativity varies across different gender groups.

Second, the limited industry representation in the sample further restricts the study's applicability. This limitation, however, offers a valuable direction for future research. By expanding the study to include a broader range of industries, researchers can gain insights into how the effects of algorithmic management on employee creativity might differ across various sectors. Such an expansion would be crucial in understanding how industry-specific factors might interact with algorithmic management practices to influence employee creativity. Future research can broaden the scope of the investigation, aiming for a diversified sample to obtain richer and more comprehensive information.

Finally, within the AMO framework that impacts innovative behavior, research can further enrich specific variables in ability, motivation, and opportunity. Exploring a more diverse set of variables, such as time pressure, extrinsic and intrinsic work motivations, cognitive skills, and their interplay, can provide a more holistic understanding of the factors influencing employees' innovative ability, motivation, and opportunities in different demographic and industry contexts.

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