

The Impact of Overtime Behavior and Knowledge Sharing on the Innovative Behavior of Knowledge Workers

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Abstract: In the current landscape of rapidly accelerating technological changes and intensifying global competition, innovation has become a fundamental guarantee for the survival and enduring development of enterprises. Employee innovation serves as a primary pillar supporting organizational innovation, making it crucial for businesses to explore methods of inspiring the enthusiasm and innovative behavior of their workforce. This study focuses on knowledge workers at Company A, aiming to construct a model that elucidates the influence mechanism of employee overtime behavior on innovation. It analyzes the impact of overtime work and knowledge sharing on the innovative behavior of knowledge workers at Company A. The results reveal that overtime work exhibits an inverted U-shaped impact on innovation behavior, and knowledge sharing acts as an intermediary between overtime behavior and innovation behavior. Finally, drawing insights from the practical context of Company A, this paper proposes corresponding strategies and recommendations.

Keywords: Knowledge Workers; Overtime Behavior; Knowledge Sharing; Innovative Behavior

1. Introduction

The 20th National Congress report of the Party pointed out: "Accelerate the implementation of the innovation-driven development strategy, and strive to achieve high-level self-reliance in science and technology." For enterprises, innovation is the fundamental guarantee for their survival and the essential driving force for sustained development. The innovation of enterprises mainly relies on the innovation of employees, and employee innovation cannot be separated from teamwork and sharing. Knowledge sharing can promote mutual communication and learning among employees, and it is also a necessary process for the integration and reflection of knowledge in innovation. Therefore, knowledge sharing plays a crucial role in the innovation process.

Overtime behavior refers to employees engaging in work beyond the legally stipulated working hours (Xue, et al., 2021) ^[1]. Ko and Choi (2019) ^[2] found that organizational overtime behavior has a significant inverted U-shaped impact on innovative behavior. Firstly, efficient overtime can provide employees with ample time, promoting knowledge sharing and communication, thereby generating new ideas (Wang, et al., 2017) ^[3]. Secondly, overtime, while consuming employees' time and resources, can hinder individual exploration of new solutions. When the duration of overtime exceeds a critical threshold, it has a negative impact on employees' innovation levels (Geng, et al., 2021) ^[4]. Empirical research by Wharton and Blair-Loy (2006) ^[5] found that overtime behavior can facilitate knowledge exchange among employees. Moderate overtime has a positive impact on knowledge sharing among employees (Wu, 2013) ^[6]. Many scholars have confirmed that knowledge sharing has a positive influence on fostering individual innovation. By sharing knowledge with others, it promotes learning and innovation in others, enhances one's own innovative capabilities, and thereby stimulates employee innovation (Cai, 2014) ^[7]. Currently, studies have found a significant inverted U-shaped impact of overtime behavior on innovative behavior. However, the impact pathway of overtime behavior on employee innovative behavior is not yet clear, and whether it influences innovative behavior through knowledge sharing needs further verification.

Social Exchange Theory (SET) posits that employees will reciprocate organizational care and

concern with more positive work attitudes and behaviors (Blau, 1964) ^[8]. Through such obligation-inducing interactions, a social exchange relationship is formed between employees and the organization (Cropanzano & Byrne, 2001) ^[9]. According to Social Exchange Theory, employees at different levels face varying workloads and difficulties, and the criteria for measuring rewards in social exchange are heterogeneous. This leads to differences in measurement standards, subsequently impacting knowledge sharing and innovative behavior. Knowledge workers, relying on their professional expertise, pursue autonomy, individuality, and diverse innovation (Xiong, et al., 2023) ^[10]. As an internet company, Company A experiences a prevalent phenomenon of overtime among its knowledge workers. Knowledge workers in Company A dedicate more time to completing existing tasks, resulting in a reduced frequency of communication and sharing among employees, diminishing innovative enthusiasm. In light of the actual situation at Company A, it is essential to explore the impact and pathways of overtime behavior among knowledge workers on their innovative behavior.

In summary, based on Social Exchange Theory, this paper focuses on knowledge workers at Company A to investigate the influence of overtime behavior and knowledge sharing on their innovative behavior. The study aims to reveal the pathways of their effects and, in consideration of the specific circumstances at Company A, proposes relevant strategies and recommendations. This provides a theoretical foundation and practical support for the rational adjustment of overtime behavior among knowledge workers and the promotion of individual innovative behavior within the organization.

2. Research design

2.1. Data Collection

This article focuses on knowledge workers in Company A and employs a questionnaire survey to collect data. The formal questionnaire consists of the following sections: The first part covers basic information about knowledge workers in Company A, including gender, age, education level, and more. The second part explores the overtime situation in employees' daily work. The third part investigates employees' knowledge-sharing practices. The fourth part examines employees' innovative behavior. Likert 5-point scales are utilized to measure the items in the third and fourth sections of the questionnaire.

During the sampling process, a time interval approach was employed. Data were collected in two time periods, from March to April 2023, with a one-month interval between each questionnaire distribution. This approach aims to reduce potential data errors resulting from a too-short sampling duration. A total of 222 questionnaires were distributed, and after excluding invalid responses during data cleaning, 211 valid questionnaires were collected, resulting in an effective response rate of 95%.

2.2. Variable Measurement

Overtime Behavior: In this study, overtime is defined as working hours extended beyond the national and statutory working hours on normal working days, weekends, or public holidays. Following the measurement method used by scholars such as Wang Zijian et al. (2021) ^[11], employees self-report their average weekly overtime hours in the past month. The question is designed as "In the past month, on average, how many hours did you work overtime per week? (Including overtime at the company and at home)" to obtain overtime data.

Knowledge Sharing: Knowledge sharing in this study is defined as the process where knowledge sharers transmit their experiences, skills, or knowledge to others, which can be reproduced in its original or innovative form. The study measures knowledge sharing from the perspectives of willingness and ability, following the approach proposed by Chow & Chan (2008) ^[12]. It includes nine items in total, distributed across the willingness and ability dimensions. Representative items for willingness include "I am willing to share my knowledge and experience with others," and for ability, a representative item is "I can quickly find the special skills needed to perform my work."

Innovative Behavior: Drawing on the definition by Liu Yun and Shi Jintao (2009) ^[13], innovative behavior refers to the emergence and implementation of new ideas and creative processes during the work process. The study categorizes employees' innovative behavior into exploratory innovation and exploitative innovation, with a total of eleven items across the two dimensions. A representative item for exploratory innovation is "I will break away from conventional thinking to seek new technological

ideas," and for exploitative innovation, a representative item is "I will improve product quality and reduce costs."

3. Empirical analysis

3.1. Reliability and Validity Testing

3.1.1. Reliability Testing

As shown in Table 1, the reliability coefficient for the knowledge sharing scale is 0.895, and for the innovative behavior scale, it is 0.914. The scales utilized in this study demonstrate good reliability.

Table 1: Reliability Testing

Scale	Number	Cronbach's α
Knowledge Sharing	9	0.895
Innovative Behavior	11	0.914

3.1.2. Validity Testing

As shown in Table 2, the KMO values for the Knowledge Sharing Scale and Innovative Behavior Scale are 0.892 and 0.924, respectively, both exceeding 0.8. Additionally, the significance of the Bartlett's sphericity tests for both scales is less than 0.05. The scales used in this study demonstrate good validity.

Table 2: Validity Testing

Scale	KMO	Bartlett's Sphericity	Degrees of Freedom	Sig.
Knowledge Sharing	0.892	958.686	36	0.000
Innovative Behavior	0.924	1197.722	55	0.000

3.2. Descriptive and Correlational Analysis

3.2.1. Descriptive Statistics

The descriptive statistics for each variable are presented in Table 3, with the mean value for overtime behavior being 5.11. The average values for knowledge sharing and innovative behavior are both greater than 3, indicating that the knowledge sharing and innovative behavior of knowledge workers at Company A are at a relatively high level.

Table 3: Descriptive Statistics

Variable	Variable Assignment	Min	Max	Mean	Std.
Overtime Behavior	—	0	12	5.11	2.671
Knowledge Sharing	Likert 5	1	5	3.808	0.642
Innovative Behavior	Likert 5	1.2	5	3.809	0.639

3.2.2. Correlation Analysis

As shown in Table 4, there is a significant positive correlation among all variables. The results of the correlation analysis lay the foundation for subsequent regression analysis.

Table 4: Correlation Analysis

Variable	Overtime Behavior	Knowledge Sharing Willingness	Knowledge Sharing Ability	Exploitative Innovation	Exploratory Innovation
Overtime Behavior	1				
Knowledge Sharing Willingness	0.233*	1			
Knowledge Sharing Ability	0.243*	0.701**	1		
Exploitative Innovation	0.317**	0.684**	0.827**	1	
Exploratory Innovation	0.269*	0.625**	0.783**	0.882**	1

Note: *. Significance at the 0.05 level (two-tailed); **. Significance at the 0.01 level (two-tailed).

3.3. Regression Analysis

This section utilizes SPSS 25.0 to examine the direct impact of overtime behavior on innovative behavior and the mediating effect of knowledge sharing between overtime behavior and innovative behavior. Building upon the introduction of control variables, the independent variable "overtime behavior" is added. Using the hierarchical regression analysis method, this study assesses whether the

hypotheses hold true.

According to Model 1 in Table 5, the regression coefficient of overtime behavior for exploitative innovation is significant ($\beta=0.026$, $P<0.05$). To further explore whether there is a non-linear relationship between overtime behavior and exploitative innovation, this study conducted centralization processing on overtime behavior and added the squared term of overtime behavior to the regression equation. As shown in Model 2, the squared term of overtime behavior has a significant negative impact on exploitative innovation ($\beta=-0.002$, $P<0.05$). Therefore, there is a significant inverted U-shaped effect of overtime behavior on exploitative innovation.

According to Model 7 in Table 5, the regression coefficient of overtime behavior for exploratory innovation is significant ($\beta=0.028$, $P<0.05$). Furthermore, adding the squared term of overtime behavior to the regression equation in Model 8, the results show that the squared term of overtime behavior does not have a significant impact on exploratory innovation.

Additionally, this study constructed Model 3 and Model 4. The results indicate that both the regression coefficients for knowledge sharing willingness and knowledge sharing ability on exploitative innovation are positive and significant ($\beta=0.686$, $P<0.01$; $\beta=0.814$, $P<0.01$), demonstrating a significant positive impact of both knowledge sharing willingness and knowledge sharing ability on exploitative innovation. Furthermore, Models 9 and 10 were developed. The results reveal that the regression coefficient for knowledge sharing willingness on exploratory innovation is positive and significant ($\beta=0.728$, $P<0.01$). However, there is no significant impact of knowledge sharing ability on exploratory innovation.

For testing the mediating effect, this study adopted the mediation effect testing method proposed by Baron & Kenny (1986). Since the relationship between the independent variable and the dependent variable has been examined in the previous sections, specifically the inverted U-shaped impact of overtime behavior on exploitative innovation, the next step is to test the relationship between the independent variable and the mediating variable, which in this study involves examining the influence of overtime behavior on knowledge sharing. Successively, the squared term of overtime behavior and overtime behavior itself were added to the equation, constructing Models 13 to 16 in Table 6. The results indicate that the squared term of overtime behavior has a significant negative impact on knowledge sharing ability ($\beta=-0.002$, $p<0.1$). Therefore, there is a significant inverted U-shaped effect of overtime behavior on knowledge sharing ability. However, the impact of the squared term of overtime behavior on knowledge sharing willingness is not significant.

Table 5: Results of Main and Mediating Effects Regression Analysis

Variable	Exploitative Innovation						Exploratory Innovation					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Age	-0.071 (0.123)	-0.086 (0.120)	0.069 (0.083)	0.109* (0.062)	0.063 (0.081)	0.105* (0.062)	-0.102 (0.139)	-0.115 (0.137)	0.046 (0.100)	0.091 (0.080)	0.044 (0.100)	0.092 (0.081)
Work Experience	0.021 (0.092)	0.068 (0.093)	-0.011 (0.060)	-0.004 (0.045)	-0.001 (0.062)	-0.001 (0.047)	0.067 (0.104)	0.109 (0.106)	0.034 (0.073)	0.040 (0.058)	0.036 (0.076)	0.035 (0.061)
Job Sequence	-0.024 (0.030)	-0.033 (0.029)	0.014 (0.020)	-0.015 (0.015)	0.007 (0.020)	-0.018 (0.015)	-0.030 (0.034)	-0.038 (0.034)	0.010 (0.024)	-0.021 (0.019)	0.004 (0.025)	-0.022 (0.019)
Professional Title Grade	0.110 (0.106)	0.099 (0.103)	0.157 (0.070)	-0.030 (0.053)	0.147 (0.069)	-0.029 (0.053)	0.124 (0.119)	0.11 (0.118)	0.173** (0.085)	-0.027 (0.068)	0.165* (0.084)	-0.026 (0.069)
Position Grade	0.043 (0.121)	0.027 (0.118)	-0.023** (0.079)	-0.015 (0.059)	-0.012* (0.078)	-0.009 (0.060)	0.100 (0.015)	0.086 (0.135)	0.030 (0.096)	0.038 (0.076)	0.045 (0.097)	0.047 (0.078)
Overtime Behavior	0.026** (0.013)	0.069*** (0.025)			0.037** (0.017)	0.017 (0.013)	0.028* (0.015)	0.067** (0.028)			0.033 (0.020)	0.010 (0.017)
Square of Overtime Behavior		-0.002** (0.001)			-0.001* (0.001)	0.000 (0.001)		-0.002 (0.001)			-0.001 (0.001)	0.000 (0.001)
Knowledge Sharing Willingness			0.686*** (0.069)		0.653*** (0.069)				0.728*** (0.084)		0.697** (0.085)	
Knowledge Sharing Ability				0.814*** (0.053)		0.793*** (0.056)				0.873 (0.069)		0.858*** (0.073)
F	1.238	1.697	17.571	41.038	14.421	30.895	1.638	1.808	14.540	30.038	11.417	22.187
Adjusted R ²	0.019	0.061	0.570	0.762	0.589	0.761	0.049	0.070	0.520	0.669	0.526	0.693

Next, a regression model will be established with overtime behavior as the independent variable, knowledge sharing willingness as the mediating variable, and exploitative innovation as the dependent variable. As indicated by Model 5 in Table 5, with both overtime behavior and the squared term of overtime behavior included in the equation, the regression coefficient of knowledge sharing willingness is significant. Moreover, the absolute value of the coefficient for the squared term of overtime behavior is smaller than the coefficient in Model 2, suggesting that knowledge sharing willingness partially

mediates the relationship between overtime behavior and exploitative innovation. Similarly, Model 6 in Table 5 reveals that the regression coefficient of knowledge sharing ability is significant, but the coefficient for the squared term of overtime behavior is not significant. This indicates that knowledge sharing ability fully mediates the relationship between overtime behavior and exploitative innovation. Now, turning to a regression model with overtime behavior as the independent variable, knowledge sharing willingness and knowledge sharing ability as mediating variables, and exploratory innovation as the dependent variable. Models 11 and 12 in Table 5 show that the regression coefficients of knowledge sharing willingness and knowledge sharing ability are both significant ($\beta=0.697$, $P<0.01$; $\beta=0.858$, $P<0.01$), while the coefficients for the squared term of overtime behavior are not significant. This suggests that knowledge sharing ability and knowledge sharing willingness fully mediate the relationship between overtime behavior and exploratory innovation.

Table 6: Regression Analysis of Overtime Behavior on Various Dimensions of Knowledge Sharing

Variable	Knowledge Sharing Willingness		Knowledge Sharing Ability	
	Model 13	Model 14	Model 15	Model 16
Age	-0.219 (0.139)	-0.229 (0.139)	-0.227 (0.133)	-0.241* (0.132)
Work Experience	0.074 (0.105)	0.105 (0.108)	0.042 (0.100)	0.087 (0.102)
Job Sequence	-0.054 (0.034)	-0.060* (0.034)	-0.010 (0.032)	-0.019 (0.032)
Professional Title Grade	-0.066 (0.120)	-0.074 (0.119)	0.173 (0.115)	0.162 (0.113)
Position Grade	0.069 (0.137)	0.059 (0.137)	0.060 (0.131)	0.045 (0.129)
Overtime Behavior	0.020 (0.015)	0.049* (0.028)	0.025* (0.014)	0.066** (0.027)
Square of Overtime Behavior		-0.001 (0.001)		-0.002* (0.001)
F	1.130	1.174	1.630	1.901
Adjusted R ²	0.010	0.016	0.048	0.078

Note: *, **, *** respectively indicate significance at the 0.1, 0.05, and 0.01 levels; values in parentheses are standard errors.

4. Conclusion and Recommendations

4.1. Conclusion

This study, focusing on knowledge workers at Company A, draws the following conclusions through empirical analysis:

1) Overtime behavior has an inverted U-shaped impact on exploitative innovation among knowledge workers at Company A. Knowledge sharing willingness positively influences the innovation behavior of knowledge workers, while knowledge sharing capability has a positive impact on exploitative innovation.

2) Overtime behavior has an inverted U-shaped impact on the knowledge sharing capability of knowledge workers at Company A.

3) Knowledge sharing acts as an intermediary in the relationship between overtime behavior and innovation behavior among knowledge workers at Company A.

4.2. Recommendations

Based on the research findings, this paper proposes strategies for fostering innovative behavior among knowledge workers in Company A.

Firstly, in optimizing the overtime policy, tailored policies should be formulated for employees with different overtime motivations and durations to provide a more comfortable working environment. Given the prevalent overtime practices among knowledge workers in Company A, it is recommended to establish a differentiated overtime policy through a humane approach to enhance employee well-being.

Secondly, concerning adaptive training, targeted training should be conducted for employees with different overtime motivations, with a focus on improving their work efficiency. Detailed surveys on the types of tasks handled during overtime by knowledge workers in Company A can inform the design

of corresponding training programs for different job categories, effectively reducing overtime duration. The research results indicate that willingness and ability to share knowledge have a significant positive impact on employee innovative behavior; therefore, adaptive training contributes to promoting the innovation process and ending overtime sooner.

Lastly, in creating a shared organizational learning culture, activities such as workshops and knowledge-sharing competitions should be organized to strengthen employees' willingness to share knowledge and enhance their knowledge-sharing abilities. Company A can foster a shared organizational learning culture by establishing a formal structure, cultivating employees' willingness and abilities to share knowledge. Regularly organizing events such as workshops can increase opportunities for employee communication, encouraging them to freely discuss the knowledge and ideas they possess. Simultaneously, hosting knowledge-sharing competitions with reward mechanisms can boost employees' motivation to share knowledge, achieving better knowledge-sharing outcomes. The analysis results and recommendations will provide a theoretical basis and improvement measures for enhancing innovative behavior among knowledge workers in Company A, enabling the company to better adapt to societal and technological development trends, and enhancing the sustainability of its development.

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