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Does payment reward moderate the relationship between three-shift work and turnover intention of nurses in South Korea?

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Abstract

Purpose – Three-shift work is essential for providing 24-hour nursing care. Driven largely by high turnover rates, increasing payment reward has been proposed as potential motivator for nurses. Based on the job demands-resources model (JD-R model), this paper investigates whether three-shift work increases nurses' turnover intention, and if payment reward moderates this relationship.

Design/methodology/approach – Data were collected from a 2022 survey of nurses at a large hospital in South Korea. An ordinary least squares (OLS) regression model was used to test the hypotheses.

Findings – The results indicate that nurses working three shifts report a higher intention to leave their jobs. However, payment reward does not significantly moderate the relationship between three-shift work and turnover intention. This suggests that financial compensation alone is not sufficient for retaining nurses who work three-shift rotations. While three-shift nurses are essential for continuous medical services, they are vulnerable to physical, mental, and social problems caused by their work schedules.

Originality/value – Although additional financial incentives are often suggested to mitigate these issues, this article concludes that other programs beyond payment reward have to be considered to motivate and retain three-shift nurses.

Keywords Payment reward, Three-shift work, Turnover intention, Job demands-resources model (JD-R model)

Paper type Research article

Introduction

There is a widespread nursing shortage, which is primarily attributable to the high turnover rate in the profession. An insufficient supply of nurses can result in diminished healthcare quality (Stalpers *et al.*, 2015). Since the COVID-19 pandemic, in some countries the shortage of nurses has become a serious problem in terms of maintaining quarantine systems within society. Hence, in recent years, an adequate supply of nurses has been of great concern to employers in the healthcare industry, because nurses must be readily available to ensure the quality and continuity of care. To respond to this situation, various work types, including shift work, have been adopted to maintain a certain level of healthcare services. Shift work, primarily comprised of three-shift rotations, is structured to provide 24-hour services.

Despite a range of proposed solutions to this labor shortage, three-shift work is difficult to staff, in terms of both quantity and quality of the labor supply. Specifically, it has negative physical and psychological effects on employees (Iskra-Golec *et al.*, 2017). The irregular work schedule makes it difficult to maintain work-life balance, regular sleep patterns, and mood stability (Roman *et al.*, 2023). Under this condition, three-shift workers often consider quitting

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their jobs (Bae, 2023; Blytt *et al.*, 2022). Therefore, employers in the healthcare industry must find ways to solve these problems associated with three-shift rotations. One of the possible solutions to help lower turnover intention among three-shift nurses is payment reward. If shift workers receive higher salaries or other bonuses, even though they face difficult working conditions, then they may be less inclined to quit their jobs.

However, whether payment reward is effective in retaining workers, particularly three-shift nurses, remains unresolved. Some studies argue that payment reward has no effect (Wong *et al.*, 2024) or that intrinsic motivators are more effective at alleviating burnout among nurses (Kohnen *et al.*, 2023). While there is an extensive body of literature that explores the relationships between shift work, financial reward, and job satisfaction, few studies empirically investigate the moderating effects of payment reward on these relationships. Specifically, heavy work demands faced by shift-work nurses and reward as a motivator of three-shift workers are not examined. Therefore, this research investigates whether nurses facing high work demands on three-shift rotation are more willing to leave. Additionally, this research examines whether payment reward has a moderating effect on the retention of three-shift nurses in the context of high job demands using the job demands-resources model (JD-R model). According to the JD-R model, the issue of the effectiveness of payment reward as a job resource may yield valuable implications in terms of employees' willingness to answer the question of whether monetary motivation is essential for shift workers in the healthcare industry.

In order to accomplish the task at hand, this study first offers a literature review of the JD-R model, as well as payment reward, three-shift work, and turnover intention, in the section that immediately follows. Based on these studies, this research then develops hypotheses surrounding the relationships between three-shift work and turnover intention and payment reward and turnover intention, as well as the moderating effect of payment reward on these relationships. The next section introduces the data and analytical methodology. Subsequently, the results section of this study empirically tests the hypotheses and reports the results. Finally, the study reveals the findings from the models and discusses both the conclusions drawn from the present research and the overall implications of this study.

Literature review

Job demands-resources model

The job demands-resources (JD-R) model can be applied to inform our understanding of workplace characteristics that can result in enhanced employee job performance through job well-being (Demerouti *et al.*, 2001). The JD-R model assumes that the risk of job strain is maximized when job demands are high and job resources are limited (Demerouti *et al.*, 2001). Job demands are "physical, psychological, social or organizational characteristics of the job that require physical and/or psychological effort" (Molino *et al.*, 2016, pp. 401-402). Job resources are defined as "physical, psychological, social, or organizational job aspects that may be functional in achieving work-related goals" (Molino *et al.*, 2016, p. 402). These can include career opportunities or job security, interpersonal relationships, performance feedback, and autonomy (Bakker and Demerouti, 2007). Job resources may induce employee engagement and heighten job performance (Schaufeli and Taris, 2014). In addition, the recent JD-R model suggests that in the interaction between job demands and resources, job resources mitigate the negative impacts of job demands on employee well-being (Bakker *et al.*, 2005; Bakker and Demerouti, 2017). In other words, burnout among workers attributable to prolonged job demands can be decreased by perceived job resources.

Job demands: three-shift work

Many industries require shift work, including two or three-shift work rotations, which represents a form of hourly work, a portion of which is scheduled outside standard daytime

work hours. Specifically, the three-shift format is believed to have negative effects on some employees (Mills and Täht, 2010). The negative effects of working in three shifts range from physical and psychological in nature and also extend to social and organizational dimensions. In particular, Fido and Ghali (2008) identified negative effects associated with the night shift (third shift). Chang and Chang (2019) posited that female shift workers report worsened sleep quality when compared to others in terms of unusual sleep-wake cycles. Additionally, some shift workers are vulnerable to constant fatigue (Barker and Nussbaum, 2011; James *et al.*, 2017). They also report higher rates of cancer, cardiovascular disease, and diabetes (Gan *et al.*, 2014; Yousef *et al.*, 2020).

Three-shift work can also cause problems with work-life balance and relationships among coworkers (Kim *et al.*, 2018). Shift workers often have greater difficulty fulfilling their family and community roles (Iskra-Golec *et al.*, 2017). The negative effects of shift work can result in poor professional development and peer cohesion among shift workers. Three-shift workers also experience heightened emotional exhaustion and burnout when compared with workers on the day shift (Yamaguchi *et al.*, 2023). Therefore, three-shift work plays a critical role in creating a high level of job demands pursuant to the JD-R model. Under the context that job demands are high, shift workers tend to be less motivated to retain their jobs (Bae, 2023; Blytt *et al.*, 2022; Chang and Wang, 2022). Based on the extant literature, the following hypothesis is proposed.

H1. Three-shift work is positively related to turnover intention among nurses in an advanced hospital in South Korea.

Job resources: payment reward

Based on the JD-R model, job resources are comprised of physical, psychological, social, and organizational aspects that lead to the achievement of work goals (Bakker and Demerouti, 2017) and include diverse psychological motivators. Intrinsic motivation as a job resource is attributable to internal reward such as "a sense of achievement, responsibility, personal growth, recognition, and work itself" (Kumari *et al.*, 2021, p. 404). In contrast, extrinsic motivation is attributable to factors such as career development, promotion, and increased pay (Mazllami, 2020). If employees are well compensated, they feel valued by the organization and more satisfied with their jobs (Jeni *et al.*, 2020). Likewise, nurses who are well paid tend to be more satisfied with their jobs and are less likely to quit (Abhicharttibutra *et al.*, 2023; Briganti *et al.*, 2023; Lim *et al.*, 2024). Thus, payment reward can be considered an effective retention approach for nurses. In addition, job resources can have a moderating effect by buffering the negative impacts of work demands, such as burnout and stress (Bakker and Demerouti, 2017; van den Tooren and de Jonge, 2010). Some studies suggest that payment satisfaction decreases turnover intention caused by high job demands (Wong *et al.*, 2024). Job resources might alter the perception of job demands, enabling workers to better manage these demands. Workers with job resources also have less job stress because it is generally restricted to corresponding job demands. Based on the extant literature, this study presents the following hypotheses.

H2. Payment reward is negatively related to turnover intention for nurses in an advanced hospital in South Korea.

H3. Payment reward moderates the relationship between three-shift work and turnover intention for nurses in an advanced hospital in South Korea.

Data and methodology

Data and measurement

To investigate the relationship between three-shift work and turnover intention and the effect of payment reward on the relationship, this study collected data from a survey administered in

October 2022. The institutional review board (IRB) number is HC22QISI0077. The questionnaire was administered to nurses in an advanced hospital in South Korea, and survey participants were randomly selected. The survey measured turnover intention, three-shift work, payment reward, and other control variables. Based on the survey data of participating nurses, an ordinary least squares (OLS) regression model was used in this research to test the hypotheses.

Dependent variable

The dependent variable, turnover intention, is created based upon responses to four statements: (1) "I want to work in another hospital;" (2) "If I move to another hospital, the working conditions will be better than this hospital;" (3) "If I could choose a hospital at which to work, I wouldn't choose this one;" (4) "If conditions in this hospital get worse, I am willing to leave." The responses range from 1, representing "very dissatisfied," to 5, meaning "very satisfied." To confirm turnover intention, this study uses a factor analysis with VARIMAX rotation. This research also used 0.4 as a threshold cut-off value for factor loading. The initial eigenvalue is 1.530, and the Cronbach's alpha value for turnover intention is 0.817. Generally, the Cronbach's alpha is believed to be reliable if the value is over 0.8. In this research, the reliability of this factor analysis meets the minimum requirement.

Independent variable

Payment reward is included as an independent variable. Nurses' perceptions of payment reward is again assessed using a Likert-scale analysis and is measured by responses to the following statements: (1) "My salary is appropriate to my job performance"; (2) "I receive a suitable salary compared to other nurses who perform similar work"; (3) "I am appropriately rewarded based on my level of responsibility"; (4) "I am appropriately rewarded based on my level of work experience"; (5) "I am appropriately rewarded based on the efforts that I put into my job"; (6) "I am properly rewarded based on my level of achievement"; (7) "My salary satisfies my material desires"; (8) "My job duties satisfy my psychological desires". The responses range from 1 ("strongly disagree") to 5 ("strongly agree"). This research also performs factor analysis using VARIMAX rotation. The initial eigenvalue is 5.803, and the Cronbach's alpha is 0.884.

Control variables

For control variables, this study includes gender, age, work department, work type, marital status, education, and job rank. The gender variable is set at 1 if a nurse is female and 0 otherwise. Age is included as a series of dummy variables. Each variable consists of several subgroups: age ranges are 20 to 29, 30 to 39, 40 to 49, and others. The other control variables – work department, job position, marital status, education, and work type – are set in the model. First, work department can be divided into three subcategories: general ward, intensive care, and emergency room, while setting others as a base group. The job position variable includes a series of dichotomous variables representing senior, unit manager (UM), and others.

Work type is set as a series of dichotomous variables and consists of two-shift, three-shift, and others. Three-shift work is used to control the model as a set of control variables, and to simultaneously investigate the effect of three-shift work on turnover intention. In terms of social factors, marital status is a dummy variable representing 1 if a nurse is married and 0 otherwise. Finally, this research identifies participants' education by including a series of dichotomous variables: college, graduate school, and others. Survey questions on both payment reward and turnover intention and the results of factor analysis are shown in Table 1. The basic descriptive statistics are described in Table 2.

Table 1. Factor Analysis Results

Variables	Factor Loading
Dependent Variable: Job Satisfaction	
(1) When I am busy, my colleagues are willing to help me.	0.733
(2) I can do my duty better if I have less burden.	0.721
(3) I am required to deal with a lot of paper works.	0.523
Initial Eigenvalue	1.303
Cronbach's Alpha	0.733
Dependent Variable: Leave Intention	
(1) I want to work another hospital.	0.757
(2) If I move to another hospital, the working condition will be better than that in this hospital.	0.751
(3) If I can choose another hospital for work, I won't choose this one as a workplace.	0.747
(4) If conditions in this hospital get worse, I am willing to leave.	0.629
Initial Eigenvalue	1.530
Cronbach Alpha	0.817
Independent Variable: Payment Reward	
(1) My salary is appropriate to my job performance.	0.931
(2) I receive suitable salary compared to other nurses who do a similar job to mine.	0.928
(3) I am appropriately rewarded based on my level of responsibility.	0.923
(4) I am properly rewarded for my level of work experience.	0.913
(5) I am appropriately rewarded based on the efforts that I put into my job.	0.859
(6) I am properly rewarded based on my level of achievement.	0.849
(7) My salary satisfies my material desires.	0.837
(8) My job duties satisfy my psychological desires.	0.825
Initial Eigenvalue	6.251
Cronbach's Alpha	0.960

Sources: By authors

Table 2. Descriptive Statistics

Variables	Mean	Std. Dev.	Min	Max	Unit
Leave Intention	0.00	1.00	-2.94	2.55	Factor score
Job Satisfaction	0.00	1.00	-3.55	2.23	Factor score
Payment Reward	0.00	1.00	-1.87	2.93	Factor score
Female	0.97	0.18	0	1	Female=1, Male=0
Ages 20-29	0.48	0.50	0	1	Ages 20 to 29=1
Ages 30-39	0.19	0.38	0	1	Ages 30 to 39=1
Age 40-49	0.11	0.31	0	1	Ages 40 to 49=1
General Ward	0.54	0.50	0	1	Working in General Ward=1
Intensive Care	0.13	0.34	0	1	Working in Intensive Care=1
Emergency Room	0.00	0.00	0	1	Working in Emergency Room=1
Two Shifts	0.07	0.25	0	1	Two Shifts=1
Three Shifts	0.67	0.47	0	1	Three Shifts=1
Married	0.35	0.48	0	1	Married=1
College	0.79	0.41	0	1	College Graduate=1
Graduate	0.11	0.31	0	1	Graduate=1
Senior	0.20	0.40	0	1	Position as Senior Level=1
UM	0.14	0.34	0	1	Position as Unit Manager (UM)=1

Note: n=367

Source: By authors

Model specifications

Based on the dependent, independent, and control variables, this study tests its hypotheses using an OLS regression model. To investigate the relationship between three-shift work and turnover intention and the moderating effect of payment reward on the relationship, a three-part regression model is introduced. The first step, which addresses "the basic model", includes only the basic effects of control variables. In the basic model, three-shift work is used as both one of the dichotomous variables controlling work type and one of the control variables representing various work types. Then, to examine the relationship between payment reward and turnover intention, the second step includes payment reward in the model and is aptly titled "the payment reward model." Finally, "the interaction model" adds the interaction term between three-shift work and payment reward, with both three-shift work and payment reward respectively included as independent variables in the model. The interaction model tests the effectiveness of each independent variable and the moderating effects of payment reward on the relationship. The basic equation form of the interaction model is listed below:

$$\begin{aligned} Turnover\ Intention = {} & \alpha + \beta_1 Three\ shifts + \beta_2 Payment\ Reward + \beta_3 Age \\ & + \beta_4 Work\ Department + \beta_5 Work\ Type + \beta_6 Marital\ Status \\ & + \beta_7 Education + \beta_8 Job\ Rank + \beta_9 Interaction\ term + \varepsilon \end{aligned}$$

Results and findings

The results of the three models ("the basic model", "the payment reward model", and "the interaction model") are shown in Tables 3 and 4. First, Table 3 provides the results of F-tests and the changes of the *R*-squared value in each of the three models. The results of the F-tests reveal that all three of the models can explain turnover intention and are statistically significant at the level of 1 percent. The F-value of the basic model is 6.391, and this is statistically significant at the 1 percent level. The payment reward model has a statistically significant F-value, and it increases the *R*-squared value by 0.051. Finally, the F-value of the interaction model is 7.399, with 1 percent statistical significance.

Table 4 outlines the results of the three OLS regression models. The results of the basic model indicate that nurses in their 20s and 40s are more likely to leave their workplace than nurses in the base group, and they are statistically significant at the levels of 1 and 10 percent, respectively. While nurses in their 20s and 40s are more willing to leave their workplace, those in their 30s are less likely to have turnover intention, and the result is statistically significant at the 5 percent level. Turning to variables indicating work department, the emergency room variable has a positive relationship with turnover intention, and the result is statistically significant at the 5 percent level. In terms of work type, one of the more important independent and control variables, the three-shift work variable, is positively related to turnover intention, and the result is statistically significant at the 5 percent level.

The second model, the payment reward model, includes payment reward as an independent variable. To test the moderating effect of payment reward, the payment reward variable is

Table 3. Summary of Model Fit (Leave Intention)

Model	F	R^2	Change in R^2
1	6.391***	0.201	
2	7.903***	0.252	0.051
3	7.399***	0.252	0.000

Note: ***, **, and * indicates significance at the level of 1%, 5%, and 10%, respectively.

Source: By authors

Table 4. Regression Results of Basic and Payment Reward Model (Dependent Variable: Leave Intention)

Variables	Basic Coefficient	Std. Err.	Payment Reward Coefficient	Std. Err.
Female	0.257	0.286	0.250	0.278
Ages 20-29	1.048***	0.349	1.030***	0.339
Ages 30-39	-0.090**	0.040	-0.078**	0.039
Age 40-49	0.479*	0.261	0.489*	0.253
General Ward	-0.102	0.187	-0.159	0.182
Intensive Care	-0.066	0.222	-0.159	0.217
Emergency Room	0.545**	0.244	0.541**	0.241
Two Shifts	0.146	0.231	0.094	0.226
Three Shifts	0.367**	0.163	0.329**	0.161
Married	0.068	0.146	0.091	0.143
College	-0.115	0.175	-0.122	0.170
Graduate	0.160	0.254	0.149	0.247
Senior	0.019	0.156	-0.008	0.154
UM	-0.385	0.281	-0.346	0.274
Payment Reward (PR)			-0.236***	0.049
PR×Three Shifts				
R^2	0.201		0.252	

Note: ***, **, and * indicate significance at the level of 1%, 5%, and 10%, respectively.

Source: By authors

included in the model. The model indicated that payment reward has a negative relationship with turnover intention, and the result is statistically significant at the 1 percent level. The results of the control variables are similar to the basic model. Regarding control variables, nurses in their 20s and 40s are more likely to leave their workplace compared to the base group. These results are also statistically significant at the level of 1 and 10 percent, respectively. However, nurses in their 30s have less turnover intention, and this finding is statistically significant. In terms of work department, the emergency room variable has a positive relationship with turnover intention. Finally, the three-shift work variable is also positively related to turnover intention, with a result similar to that found in the basic model. The result is also statistically significant at the 1 percent level. The results from the basic model and the payment reward model are listed in Table 4.

The third model, the interaction model, simultaneously sets the interaction term between three-shift work and payment reward in the model. Payment reward is negatively related to turnover intention, which mirrors the same result as the payment reward model, and the result is statistically significant at the 1 percent level. Similarly, three-shift work is negatively related to turnover intention, and it, too, is statistically significant. However, this study did not find any statistically significant relationship with the interaction term between payment reward and three-shift work, even though it is positively related to turnover intention. This can lead to findings that payment reward alone is not a sufficiently positive motivator for nurses working on three shifts. Consistent with the results from the basic model and the payment reward model, nurses aged 20 to 29 and 40 to 49 are positively related to turnover intention, while nurses in their 30s are less likely to leave their workplace. Regarding work department, the emergency room variable has a positive impact on turnover intention. Finally, three-shift work increases turnover intention. Regarding the multicollinearity issue, the extant literature has generally revealed that the model does not have multicollinearity problems if the VIF value is less than 10 (Wooldridge, 2012). According to the VIF values of the model, no multicollinearity issues were found in the model. The OLS regression results from the interaction model and the VIF values for testing multicollinearity are reported in Table 5.

Table 5. Regression Results of Interaction Model (Dependent Variable: Leave Intention)

Variables	Interaction Coefficient	Std. Err.	Confidence Interval (95%) Lower	Upper	VIF
Female	0.255	0.279	-0.294	0.804	1.058
Ages 20-29	1.035***	0.340	0.366	1.704	3.521
Ages 30-39	-0.078**	0.039	-0.154	-0.002	10.281
Age 40-49	0.496*	0.254	-0.005	0.996	2.999
General Ward	-0.162	0.183	-0.521	0.197	3.871
Intensive Care	-0.160	0.217	-0.588	0.267	2.598
Emergency Room	0.537**	0.242	0.062	1.013	2.049
Two Shifts	0.083	0.228	-0.367	0.532	1.547
Three Shifts	0.324**	0.162	0.006	0.642	2.701
Married	0.090	0.143	-0.191	0.371	2.179
College	-0.124	0.170	-0.458	0.211	2.198
Graduate	0.152	0.248	-0.335	0.639	2.846
Senior	-0.005	0.154	-0.309	0.298	1.789
UM	-0.344	0.274	-0.883	0.195	4.199
Payment Reward (PR)	-0.263***	0.087	-0.435	-0.091	3.572
PR×Three Shifts	0.038	0.104	-0.166	0.242	3.316
R^2	0.252				

Note: ***, **, and * indicate significance at the level of 1%, 5%, and 10%, respectively.

Source: By authors

Discussion and conclusion

This research searches for the missing link in the effects of three-shift work on turnover intention, as well as the moderating effect of payment reward on the relationship between three-shift work and turnover intention. Based on the results from the three models, this study found that three-shift nursing work is positively related to turnover intention, while payment reward has a negative relationship on turnover intention. Similar to the results of previous research, the study confirms that three-shift work can lead to high turnover rate because of physical, mental, and social problems for nurses working in three-shift rotations (Iskra-Golec *et al.*, 2017; Yamaguchi *et al.*, 2023). In addition, payment reward, one of the extrinsic motivators, does not have a positive influence on the relationship of turnover intention among three-shift nurses. Even though payment reward is generally associated with reducing turnover intention, this can lead to the conclusion that managers in a hospital cannot motivate nurses working in three-shift rotations by providing them with added payment as a reward.

Payment reward itself negatively affects turnover intention for nurses in an advanced hospital in South Korea, at which nurses can get paid more to retain their jobs. Some literature has found that payment reward can be an extrinsic motivating factor, affecting nurses as a hygiene factor and lowering their dissatisfaction (Ghazi *et al.*, 2013; Zeng *et al.*, 2022). However, regarding the moderating effect of the reward for three-shift nurses, this research cannot find any statistically significant evidence that payment reward positively motivates nurses working in three shifts to decrease their turnover intention. In other words, three-shift nurses might not be motivated to retain their jobs because of financial reward. This finding can be explained by two factors. First, three-shift nurses suffer from poorer working and social conditions, such as chronic fatigue and conflicts in their personal lives, such as caring for children (Bujacz *et al.*, 2021; Kim *et al.*, 2018). These pressures can override financial reward for three-shift nurses. Second, three-shift nurses might be better motivated by intrinsic motivators rather than financial reward. Kohnen *et al.* (2023) argue that nurses who experience highly demanding work environments are more often generally motivated by intrinsic motivators such as "feedback, autonomy, and opportunities for growth and development" (p.9).

The results have several implications. First, managers, who must maintain 24-hour medical services for patients, should identify non-monetary strategies to retain nurses. In recent history, the healthcare industry has suffered from a widespread nursing shortage (Kingma, 2001). Specifically, nurses are likely willing to avoid working in three shifts to maintain medical service for 24 hours because three-shift work can cause them to be vulnerable to physical, mental, and social problems resulting from such work schedules. To address these problems, managers should consider several methods that optimize scheduling to better protect nurses from associated harms and expand daycare programs for children. If nurses are not motivated by extrinsic motivators such as payment reward, managers should find a way to motivate nurses other than payment reward, such as intrinsic values (e.g., a sense of achievement, responsibility, and personal growth).

In addition, payment reward itself should be settled beyond argument in terms of whether it is worthwhile as a motivational tool in the public sector. According to the literature review, it is obvious that payment reward is a motivational tool (Zeng *et al.*, 2022). However, in the public sector, there is disagreement about whether payment reward as an extrinsic motivational factor works as a kind of hygiene factor and a motivational tool to decrease turnover intention (Ghazi *et al.*, 2013; Jeni *et al.*, 2020). Therefore, this research points to the conclusion that managers in the public sector must find solutions that are different from those in the private sector in order to retain employees. The implication that public managers should find another way to motivate nurses working in three shifts may provide strong motivation for future researchers to find innovative solutions to motivate employees who fall within a specific work type.

Even though this article has several valuable implications, the analysis has limitations. To generalize the findings, future studies need to improve the models by applying them to other cases. This study administered a survey to nurses from an advanced hospital in South Korea. To generalize the findings, future research must employ a richer set of respondents. Relatedly, more extensive questionnaires are necessary to cover all the complex facets of this issue. However, despite its limitations, the findings from this study can contribute to the empirical literature on research surrounding how to motivate employees.

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