# GREEN HRM AND GREEN INNOVATION: CAN GREEN TRANSFORMATIONAL LEADERSHIP MODERATE: CASE OF PHARMACEUTICAL FIRMS IN AUSTRALIA

#### Umair Ahmeda, Soleman Mozammelb, Fazluz Zamanc

<sup>a</sup>Business Administration Department, Arab Open University, Bahrain ORCID: https://orcid.org/0000-0001-9130-5210 umairahm@gmail.com

Business Administration Department, Arab Open University, Bahrain ORCID: https://orcid.org/0000-0002-4904-6945 soleman.mozammel@aou.org.bh

<sup>e</sup>Sessional Faculty, Central Queensland University, Australia & Federation University, Australia ORCID: https://orcid.org/0000-0003-2948-1373 fazluzzaman@gmail.com

#### Abstract:

Following the footsteps of resource-based view theory, the present study attempted to examine green HRM and its impact on green innovation followed by the interplay of green transformational leadership. The study collected triadic data by using survey questionnaire from 185 pharmaceutical firms in Australia. Through using structural equation modeling technique, bootstrap procedures were applied to assess the hypothesized relationships. Results from the data analysis suggest that green HRM prospects of green ability and motivation have significant relationship with green innovation. Accordingly, the results also indicated significant relationship between green transformational leadership and green innovation. Notably, the study advanced literature in the area by confirming the moderating potential of green transformational leadership on green ability-green innovation and green motivation-green motivation relationship. Overall, the present research has advanced understanding of green GRM and green leadership to utilize personnel prospects to further green innovation effectively.

**Keywords:** Green hrm, green ability, green motivation, green transformational leadership, green innovation.

#### INTRODUCTION:

Innovation is the talk of the town across scholarly and corporate discussions. Organizations have understood and realized that businesses could no longer survive and sustain in the competitive world without focusing on the idea of innovation to bring effectiveness and efficiency in the business activities (Tan & Nasurdin, 2011). Importantly, the global climatic conditions and scarcity of natural resources have made organizations not just to become merely innovative but to become environmentally responsible (Petts, 1998). In other words, organizations are required to focus on green innovation (Song & Yu, 2018). However, what could potentially be done to infuse green innovation and green innovative behaviours across the organization is a tricky question to respond (Janszen & Janszen, 2000). Scholars have outlined that employees can make a significant impact in facilitating organizations to be innovative (Kang & Lee, 2017) whereby, leadership also has a significant role to play in this regard (Zheng et al., 2019). In particular, transformational leaders have been termed more significant and effective in attaining organizational ends as they engage in inspiring individuals rather than forcing (Choi, Kim, Ullah & Kang, 2016). Hence, one can assert that green transformational leadership will be more effective in furthering behaviours that

would cause green innovation (Khalili, 2016).

Accordingly, to boost employee behaviours and outcomes, HRM factors are also reported to play a considerable role (e.g., Alfes, Shantz, Truss & Soane, 2013), and scholars have

indicated that some organizations fail to become innovative because of the lack of ability and motivation among the employees in doing so (Singh et al., 2020) and hence, the same could be perceived when it comes to green prospects respectively. Henceforth, the present study attempted to examine some crucial relationships how green HRM factors can influence on green innovation and how leadership can interplay with relationships to buffer green innovation.

### LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT:

#### **Green HRM and Green Innovation:**

Green HRM emerged as a result of rise in the 'green movement 'which caters to four basic principles that include sustainability, environmentalism, non-violence, and social justice (Mozammel, 2019; Sharma & Gupta, 2015). Green prospects are generally gaining much appreciation (e.g., Tahir et al., 2019; Ahmed et al., 2019; Umrani et al., 2020; AlZgool et al., 2020). Green HRM primarily caters to a major internal set of activities whereby the personnel authorities work alongside top management to bring peoplerelated processes and practices that are environment-friendly (Zoogaĥ, 2011). Hence, it could be said that green HRM showcases environmental protection and concerns of the business. Scholarly studies have reported significance of HRM in general (Ahmed & Ogalo, 2019) and also stated the promising role of green HRM on innovation in production (e.g., Singh et al., 2020; Wei et al., 2011). Here, a lot of debates have been underlined from the literature that suggests that amongst all HR factors, the prime element in

this prospect is that organizations to take efforts in hiring the right people with right environmental values, through following green procedures and once those employees join, are given green training to enhance green skills and given opportunity to apply their green skills (green ability). Following this, once the employees deploy green skills and knowledge at work, the second important HRM practice is to ensure it records their environmental practices, appraises their performance accordingly, and rewards them for acquiring certain green behaviours (green motivation) (Singh et al., 2020). Hence the present study tested the following:

H1: Green ability will be positively related with green innovation.

**H2:** Green motivation will be positively related with green innovation

#### **Green Transformational Leadership:**

Transformational leaders have been found significant in inspiring people that ignites passion for doing more than the mere job description. Transformational leaders help shape desired behaviours through exemplary guidance and support (Hawkins, 2017). leaders with transformation style have been termed significant for both in-role and extra-role behaviours and outcomes (Ng, 2017). This is because transformational leaders work to stimulate energy among employees by inspiring them. Such leaders behave with an exemplary approach which motivates people to follow them and act accordingly (Çekmecelioğlu & Özbağ, 2016). studies have indicated towards significant results of transformational leadership (e.g., Atmojo, 2015), and the same goes for green behaviours and outcomes (Mittal & Dhar, 2016). These studies have concluded that when a leader focuses with a green approach and persona, it can harness green culture and behaviours among employees. In addition to that, green transformation leadership can also help buffer the utilization of green prospects to further green outcomes such as green innovation (e.g., Singh et al., 2020; Chen, Chang & Wu, 2012) this hence led us to assume that green transformational leadership may also help boost the capitalization of green HRM resources to further green innovation. Therefore, we tested the following:

**H3:** Green transformation leadership will be positively related with green innovation

**H4:** Green transformation leadership will moderate the relationship between green ability and green innovation

**H5:** Green transformation leadership will moderate the relationship between green motivation and green innovation. **Sampling:** 

The study sampled pharmaceutical firms in Australia. A total of 185 business entities were targeted. Following the footsteps of Singh, Del Giudice, Chierici, and Graziano (2020), one of the co-authors visited the firms to distribute and collect the questionnaires. Therein, the Chief operating officers and Chief technical officers were taken to respond to questions about green transformational leadership and HR managers and production managers for green HRM and green innovation factors respectively. In total, 185 triads of respondents were taken in the present study.

6-item scale by Chen and Chang (2013) was adapted to examine green transformational leadership. Accordingly, Renwick, Redman, and Maguire (2013) was considered for green HRM whereby, green motivation and green ability were considered. Lastly, innovation, the present study focused on the green production innovation whereby, Chen, Lai & Wen (2006) 's four-item scale was adapted. 7-point Likert scale was used where the respondents rated between strongly disagree (1) to strongly agree (7).

#### **DATA ANALYSIS:**

Structural equation modeling using smart PLS 2.0 M3 was used to analyze the data (Ringle et al., 2005). This technique has been actively used for studies across the globe (e.g., Kura et al., 2019; Pahi, Hamid & Khalid, 2016). The study followed the two-stage process whereby, the most was in connection to its internal consistency reliability, discriminant and convergent validity following the recommendation of Henseler, Ringle, and Sinkovics (2009) at the first place. In the second stage, the significance of the path coefficients was evaluated

#### **Measurement Model:**

Pertaining to the assessment of the psychometric properties of the model, the study examined the outer loadings for each of the items to confirm individual item reliability (Hair et al., 2016). According to prominent scholars (Leal-Rodriguez, Eldridge, Roldon, Leal-Millan & Ortega-Gutierrez, 2015 and Suarez, Calvo-Mora & Roldon, 2016), loading equal or greater than 0.70 are considered more reliable and thus, expresses data quality. Table 1 and Figure 1 shows that all item loadings met the recommended threshold except one item from green transformational leadership, which was omitted. Accordingly, composite reliability scores were examined for each of the constructs to ensure the internal consistency reliability of the model. The recommended threshold for CR scores is 0.70 and above. Table 1 shows that all the constructs achieved scores higher than the suggested threshold hence achieving significant internal consistency reliability. In parallel, convergent validity was also examined by assessing the AVE scores for which the suggested threshold is 0.50 and above. The study also achieves considerable convergent validity, as indicated in table 1, whereby, AVE scores met the recommended threshold

Scholars have recommended the confirmation of discriminant validity for the holistic assessment of the psychometric properties of the conceptual model. Therein, Fornell and Larcker (1981) have suggested that the AVE scores for each construct should be greater than 0.50 following to which, there should be an assessment done in terms of the square root of these scores against the reflective loadings of other constructs in the cross-loadings table. Here, the square root scores should result in greater value in comparison. Table 2, in this regard

indicates that the model has attained significant discriminant validity as well, thus, fulfilling the assessment criterion of the measurement model stage. The scores have ranged between 0.8133 and 0.8279.

Measurements:

Table 1 Loading, Average Variance Extracted, Composite Reliability and R-Square

Construct	Loading	AVE	Composite Reliability	$\mathbb{R}^2$
Green Motivation		0.685428	0.91578	
	0.839332			
	0.868144			
	0.848758			
	0.816793			
	0.762525			

Green Ability		0.675845	0.925838	
	0.758058			
	0.805062			
	0.859642			
	0.843926			
	0.861151			
	0.799699			
Green Product Innovation		0.672612	0.8911	0.404205
	0.75259			
	0.781659			
	0.886884			
	0.852351			
Green Transformational Leadership		0.661493	0.907014	
	0.769941			
	0.801622			
	0.844353			
	0.85793			
	0.789354			

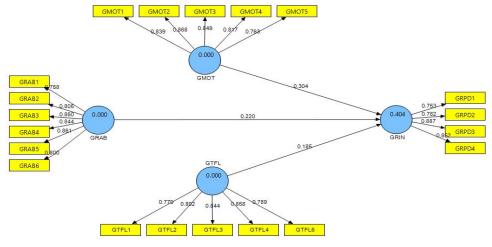


Figure 1: Measurement Model

Table 2: Discriminant Validity

Construct	GMOT	GRAB	GRIN	GTFL
GMOT	0.8279			
GRAB	0.7570	0.8220		
GRIN	0.5900	0.5748	0.8201	
GTFL	0.6406	0.6682	0.5277	0.8133

Note: BOLD values are the square root of each construct.

#### STRUCTURAL MODEL ASSESSMENT:

Upon the confirmation of the measurement model, the present study moved to the next stage of analysis whereby, the PLS path model was confirmed. Following the assertions of Haier et al. (2016), the present study tested the direct and moderating links as hypothesized in the study. Through applying bootstrapping procedures with 5000 bootstraps on the sample of 281 cases, figure 2 and table 3 shows that green ability resulted in a significant positive relationship

with green innovation ( $\beta$ = 0.236; t=2.933) hence accepting hypothesis 1. Accordingly, the present study also confirmed the second hypothesized relationship between green motivation and green innovation ( $\beta$ = 0.241; t= 3.300). In parallel, green transformational leadership also posed a significant positive impact on green innovation ( $\beta$ = 0.198; t=3.289), thus confirming hypothesis 3. Notably, the green transformational leadership also moderated green motivation-green innovation ( $\beta$ = 0.274; 3.285) and green ability-green innovation ( $\beta$ = 0.151; t= 1.647) relationships consequently, confirming hypothesis 4 and 5.

Table 3: Hypothesis Results

_ = ****					
Hypothesis	Beta	Std Error	t-value		
GMOT -> GRIN	0.241	0.073	3.300		
GTFL -> GRIN	0.198	0.060	3.289		
GRAB -> GRIN	0.236	0.080	2.933		
GRAB * GTFL -> GRIN	0.151	0.091	1.647		
GMOT * GTFL -> GRIN	0.274	0.083	3.285		

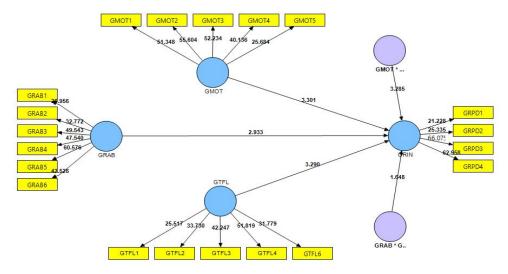


Figure 2: Structural Model

#### **DISCUSSION AND IMPLICATIONS:**

The present study has worked to empirically test noteworthy relationships to help understand innovation and green HR enthusiasts. Based on the explanations of past studies (Singh et al., 2020; Ng, 2017), green HR prospects can enhance green behaviour. Keeping these arguments in view, the current study tested and found a promising role of green motivation towards harnessing green innovation. This, hence asserts that when an organization offers performance appraisal that caters to appreciation of green efforts, includes progress on environmental activities, rewards environmental management in and outside the business, and rewards employees for acquiring environmental competencies, it significantly enhances their green innovation. Accordingly, when an organization hires people with environmental concerns, focuses on green staffing processes, provides mandatory environmental training, and provides a conducive work environment to practice green knowledge and skills learned from training, it also results in enhancing green innovation. In other words, these efforts improve employees' contribution in terms of efforts to produce less pollution, consume less energy and resources in their work and take initiatives to design environmentally friendly products that are easy to recycle simultaneously. The study has advanced literature on the topic (e.g., Singh et al., 2019; Dranev et al., 2018). These results hence imply that organizations should invest in green HR practices to benefit in the shape of environmental management and product innovation with efficient usage of resources (Singh, Del Giudice, Chierici, & Graziano, 2020).

Likewise, green transformational leaders can also help boost green innovation since they inspire individuals with their green environmental plans, provide clear environmental vision, and makes employees passionate about environmental goals and, above all, encourages employees to think and share green ideas and practices. This forwards alignment to the empirical assertions of Chen and Chen (2013) and Zhou, Zhang, Lyu & Zhang (2018). The results, therefore, imply similar to general significance of transformation leadership towards notable employee behaviours and outcomes (e.g., Ng, 2017; Jiang, Zhao & Ni, 2017), when leaders inspire with green behaviours, it also boosts employees to behave accordingly thus resulting in green innovation. Henceforth, there are brighter opportunities for transformational style leaders to become effective in green simultaneously.

Notably, the present study found a major scholarly gap and

therefore attempted to test the moderation of green transformation leadership on the green HRM factors and green innovation. The study reported significant moderation of green transformation leadership on green motivation and green ability's relationship with green innovation. Hence, it suggests that when organizations have leaders who inspire green initiatives, goals, vision, and facilities employees accordingly, it results in employees becoming more capable of capitalizing on the green motivation and green ability acquiring at the workplace to enhance green innovation. The authors could not trace any studies outlining the moderating potential of green transformational leadership. Hence, the present study forwards notable results for leadership and environmental enthusiasts. Transformational leaders have a great deal of potential to influence individuals and in shaping the desired behaviours (Hackett et al., 2018). This implies for organizations to consider developing green competence across the top leadership to infuse green behaviours among the employees.

The present study has forwarded several implications for practice. The findings suggest organizations to strive for green innovation through developing green HR practices. Herein, a lot has to do with organizational policies (Ahmad, 2015) and the development of green culture in totality (Wehr, 2011) to develop a sense of green innovation across the business. On the practical note, the findings also imply pharmaceutical firms to consider looking into practices that could help them boost and/or strengthen these relationships. Strategically, development of supportive culture (Gürlek & Tuna, 2018) in this regard would be much needed to ensure the maintenance of green HR, green leadership, and green innovation to sustain. This would also be essential for them to remain competitive in the long run.

### LIMITATIONS AND SCOPE FOR FURTHER STUDIES:

Several points for scholars to consider in the future can be underlined. At first, the present study was conducted in the pharmaceutical sector in Australia. This, hence limits the generalization of the results. Therefore, future studies are suggested to consider looking into other regions and/or other sectors such as service businesses and so on. In parallel, the study sampled managerial staff members for the predictor variables and chief operating officers for the green transformational leadership variable. Future studies may consider broadening the sample and target population to bring in views of non-managerial employees as well. The

study also suggests considering testing the mediating effect of green transformational leadership, and others may also consider investigating the vitality of other leadership styles across diverse business sectors.

#### **REFERENCES:**

- 1. Ahmad, S. (2015). Green human resource management: Policies and practices. *Cogent business & management*, 2(1), 1030817.
- Ahmed, A., & Ogalo, H. S. (2019). From HRM to E-HRM: Contemporary Developments from Scholarly Work. Annals of Contemporary Developments in Management & HR (ACDMHR), 1(1), 1-15.
- Ahmed, U., AlZgool, M. R. H., & Shah, S. M. M. (2019). The impact of green human resource practices on environmental sustainability. *Polish Journal of Management Studies*, 20.
- AlZgool, M. R. H., Shah, S. M. M., & Ahmed, U. (2020). Impact of Energy consumption and Economic Growth on Environmental Performance: Implications for Green Policy Practitioners. *International Journal of Energy Economics and Policy*, 10(5), 655-662.
- Alfes, K., Shantz, A. D., Truss, C., & Soane, E. C. (2013). The link between perceived human resource management practices, engagement and employee behaviour: a moderated mediation model. *The International Journal of Human Resource Management*, 24(2), 330-351.
- 6. Atmojo, M. (2015). The influence of transformational leadership on job satisfaction, organizational commitment, and employee performance. *International research journal of business studies*, 5(2).
- Çekmecelioğlu, H. G., & Özbağ, G. K. (2016). Leadership and creativity: The impact of transformational leadership on individual creativity. *Procedia-Social and Behavioral Sciences*, 235, 243-249.
- Chen, Y. S., & Chang, C. H. (2013). The determinants of green product development performance: Green dynamic capabilities, green transformational leadership, and green creativity. *Journal of Business Ethics*, 116(1), 107-119.
- Chen, Y. S., & Chang, C. H. (2013). The determinants of green product development performance: Green dynamic capabilities, green transformational leadership, and green creativity. *Journal of Business Ethics*, 116(1), 107-119.
- Chen, Y. S., Chang, C. H., & Wu, F. S. (2012). Origins of green innovations: the differences between proactive and reactive green innovations. *Management Decision*.
- Chen, Y. S., Lai, S. B., & Wen, C. T. (2006). The influence of green innovation performance on corporate advantage in Taiwan. *Journal of Business Ethics*, 67(4), 331-339.
- 12. Choi, S. B., Kim, K., Ullah, S. E., & Kang, S. W. (2016). How transformational leadership facilitates innovative behavior of Korean workers. *Personnel Review*.
- Dranev, Y., Izosimova, A., Meissner, D., 2018. Organizational ambidexterity and performance: assessment approaches and empirical evidence. *J. Knowl. Economy* 1–16. <a href="https://doi.org/10.1007/s13132-018-0560-y">https://doi.org/10.1007/s13132-018-0560-y</a>.
- 14. Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50.
- Gürlek, M., & Tuna, M. (2018). Reinforcing competitive advantage through green organizational culture and green innovation. *The Service Industries Journal*, 38(7-8), 467-491.
- Hackett, R. D., Wang, A. C., Chen, Z., Cheng, B. S., & Farh, J. L. (2018). Transformational Leadership and Organisational Citizenship Behaviour: A Moderated

- Mediation Model of Leader-Member-Exchange and Subordinates' Gender. *Applied Psychology*, 67(4), 617-644.
- 17. Hair Jr, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016). A primer on partial least squares structural equation modeling (PLS-SEM). Sage publications.
- Hawkins, P. (2017). Leadership team coaching: Developing collective transformational leadership. Kogan Page Publishers.
- Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009).
  The use of partial least squares path modeling in international marketing *New Challenges to International Marketing* (pp. 277-319): Emerald Group Publishing Limited.
- 20. Janszen, F., & Janszen, F. (2000). The Age of Innovation: making business creativity a competence, not a coincidence. London: Financial Times Prentice Hall.
- Jiang, W., Zhao, X., & Ni, J. (2017). The impact of transformational leadership on employee sustainable performance: The mediating role of organizational citizenship behavior. Sustainability, 9(9), 1567.
- Kang, M., & Lee, M. J. (2017). Absorptive capacity, knowledge sharing, and innovative behaviour of R&D employees. *Technology Analysis & Strategic Management*, 29(2), 219-232.
- 23. Khalili, A. (2016). Linking transformational leadership, creativity, innovation, and innovation-supportive climate. *Management Decision*.
- Kura, K. M., Shamsudin, F. M., Umrani, W. A., & Salleh, N. M. (2019). Linking Human Resource Development Practices to Counterproductive Work Behaviour: Does Employee Engagement Matter. *Journal of African Business*, 20(4), 472-488.
- Leal-Rodríguez, A. L., Eldridge, S., Roldán, J. L., Leal-Millán, A. G., & Ortega-Gutiérrez, J. (2015).
  Organizational unlearning, innovation outcomes, and performance: The moderating effect of firm size. *Journal of Business Research*, 68(4), 803-809.
- Mittal, S., & Dhar, R. L. (2016). Effect of green transformational leadership on green creativity: A study of tourist hotels. *Tourism Management*, 57, 118-127.
- 27. Mozammel, S. (2019). Understanding Post-Training Factors and Job Performance Relationship: Review of Literature for Transfer of Training Enthusiasts. *Annals of Contemporary Developments in Management & HR (ACDMHR), Print ISSN*, 2632-7686.
- 28. Ng, T. W. (2017). Transformational leadership and performance outcomes: Analyses of multiple mediation pathways. *The Leadership Quarterly*, 28(3), 385-417.
- Ng, T. W. (2017). Transformational leadership and performance outcomes: Analyses of multiple mediation pathways. *The Leadership Quarterly*, 28(3), 385-417.
- 30. Pahi, M. H., Hamid, K. A., & Khalid, N. (2016). Save talent of banking sector of Pakistan: Mediating job satisfaction between job stress and employee turnover intention. *International Review of Management and Marketing*, 6(3), 617-624.
- 31. Petts, J. (1998). Environmental responsiveness, individuals and organizational learning: SME experience. *Journal of Environmental Planning and Management*, 41(6), 711-730.
- 32. Renwick, D. W., Redman, T., & Maguire, S. (2013). Green human resource management: A review and research agenda. *International Journal of Management Reviews*, 15(1), 1-14.
- 33. Ringle, C. M., Wende, S., & Will, S. (2005). *SmartPLS 2.0 beta*. University of Hamburg, Germany. [Electronic version]. Available at: from: https://www.smartpls.com/#downloads

- 34. Sharma, R., & Gupta, N. (2015, January). Green HRM: an innovative approach to environmental sustainability. In *Proceeding of the Twelfth AIMS International Conference on Management* (pp. 2-5).
- Singh, S. K., Del Giudice, M., Chierici, R., & Graziano, D. (2020). Green innovation and environmental performance: The role of green transformational leadership and green human resource management. Technological Forecasting and Social Change, 150, 119762.
- 36. Singh, S.K., Mittal, S., Sengupta, A., Pradhan, R.K., 2019. A dual-pathway model of knowledge exchange: linking human and psychosocial capital with prosocial knowledge effectiveness. *J. Knowl. Manage*. https://doi.org/10.1108/JKM-08-2018-0504.
- 37. Song, W., & Yu, H. (2018). Green innovation strategy and green innovation: The roles of green creativity and green organizational identity. *Corporate Social Responsibility and Environmental Management*, 25(2), 135-150.
- 38. Suarez, E., Calvo-Mora, A., & Roldán, J. L. (2016). The role of strategic planning in excellence management systems. *European Journal of Operational Research*, 248(2), 532-542.
- 39. Suarez, E., Calvo-Mora, A., & Roldán, J. L. (2016). The role of strategic planning in excellence management systems. *European Journal of Operational Research*, 248(2), 532-542.
- Tahir, R., Athar, M. R., Faisal, F., Shahani, N.N., & Solangi, B. (2019). Green organizational culture: A review of literature and future research agenda. Annals of Contemporary Developments in Management & HR (ACDMHR), 1(1), 23-38.
- 41. Tan, C. L., & Nasurdin, A. M. (2011). Human resource management practices and organizational innovation: assessing the mediating role of knowledge management effectiveness. *Electronic Journal of Knowledge Management*, 9(2), 155.
- Umrani, W. A., Channa, N. A., Yousaf, A., Ahmed, U., Pahi, M. H., & Ramayah, T. (2020). Greening the workforce to achieve environmental performance in hotel industry: A serial mediation model. *Journal of Hospitality and Tourism Management*, 44, 50-60.
- 43. Wehr, K. (Ed.). (2011). Green culture: An A-to-Z guide (Vol. 11). Sage.
- 44. Wei, L. Q., Liu, J., & Herndon, N. C. (2011). SHRM and product innovation: Testing the moderating effects of organizational culture and structure in Chinese firms. *The International Journal of Human Resource Management*, 22(01), 19-33.
- 45. Zheng, J., Wu, G., Xie, H., & Li, H. (2019). Leadership, organizational culture, and innovative behavior in construction projects. *International Journal of Managing Projects in Business*.
- 46. Zhou, S., Zhang, D., Lyu, C., & Zhang, H. (2018). Does seeing "mind acts upon mind" affect green psychological climate and green product development performance? The role of matching between green transformational leadership and individual green values. Sustainability, 10(9), 3206.
- **47.** Zoogah, D. B. (2011). The dynamics of Green HRM behaviors: A cognitive social information processing approach. *German Journal of Human Resource Management*, 25(2), 117-139.