



The Effect of Job Rotation on Employee Performance: The mediating role of HR strategy and training in the petrochemical industry

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Abstract

Purpose - This study investigates the impact of job rotation on employee performance and explores the mediating role of HR strategy and training effectiveness on this relationship, within the petrochemical industry, which represents a highly specialist and hazardous industrial context.

Methodology - Data was collected through a questionnaire which was distributed among the experts working in an Iranian petrochemical organization. Previously validated scales were utilized to measure job rotation, employee performance, HR strategy, and training effectiveness, and partial least squares structural equation modeling was utilized for hypothesis testing.

Findings - The research findings indicated that job rotation had a negative effect on employee performance. Whilst training effectiveness and HR strategy positively mediated the relationship between job rotation and employee performance. This highlights the importance of ensuring effective training and a HR strategy to support job rotation of skilled and specialist employees.

Practical Implications - Managers of employees in specialist and hazardous industries, such as petrochemical workers, interested in job rotation to support employee career development, should be mindful of potential negative implications on employee performance. To support and improve employee performance, job rotation should be considered alongside HR strategy and training.

Originality - Previous research has largely focused on the value of job rotation to develop managers' organizational understanding and to reduce injury within blue collar work, which has led to a paucity of research into job rotation within highly skilled and specialist industrial roles. It is highlighted within the literature that it remains unclear what supports effective job rotation. This study addresses this lacuna by investigating how job rotation affects employee performance in a highly skilled and specialized industry and how strategy and training effectiveness mediate this effect.

Keywords

Job Rotation, Human Resources, Employee Performance, Training, Iran, Petrochemical Industry

Introduction

Job rotation has been recognized as a career and talent development practice, which can support organizations to remain competitive (Mujtaba et al., 2022). Job rotation requires workers to switch workstations or jobs at set intervals (Middleworth, 2015). The job rotation practice emerged in the 1980s and 1990s with the aim of increasing the employees' performance and flexibility (Cristini and Pozzoli, 2010). Job rotation has been posited as supporting corporations to adapt to changes, as flexible workers can buffer unpredictable links in production systems (Kher et al., 1999). For employees, workplace rotation can boost workplace satisfaction (Gu et al., 2022) and help people gain new skills (Al-Romeedy, 2019), providing a pathway for career growth (Finlayson, 2021). The effect of job rotation depends on the job role and tasks with higher risk can reduce the efficiency of rotation (Mehdizadeh et al., 2020). While the popularity of job rotation has declined, it remains popular in hazardous and intensive industries to balance challenging and physical demands to reduce repetitive injuries and fatigue (Asawarungsaengkul and Nanthavanij, 2008; Mehdizadeh et al., 2020).

Whilst most of the research into the consequences of job rotation has posited and affirmed positive outcomes in terms of career development, job involvement and organizational commitment (Foroutan et al., 2021), it has been highlighted that the factors which can support positive outcomes and the potential negative consequences of job rotation remain under researched (Foroutan et al., 2021). Lee and Lee (2018) suggest employees who prefer and require specialization in their roles might see job rotations as an obstacle for their development; however, there remains a dearth of research into job rotation in highly specialist, skilled and potentially hazardous industries, since existing research has focused on job rotation within managerial roles to add breadth of understanding of job roles in an organization (Wallo et al., 2022) or blue-collar roles to reduce injury (Middleworth, 2015). This research addresses this gap and furthers understanding of the impact of job rotation within a highly specialist and hazardous industrial context, by researching job rotation within a polyurethane manufacturer. This research investigates the impact of job rotation on employee performance and explores the mediating role of human resource (HR) strategy and the effectiveness of training in the petrochemical industry. This addresses the questions:

How does job rotation impact employee performance in the petrochemical industry?

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3 Does HR strategy and effective training mediate the relationship between job rotation and
4 employee performance in the petrochemical industry?
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8 This paper next reviews the literature on the concepts of job rotation, employee performance, HR
9 strategy, and training effectiveness to develop hypotheses and present a conceptual model.
10 Following this, contextualization of the industry and region being researched is presented along
11 with the methodology adopted within this research. Then the data analysis process is explained
12 along with the results of the hypothesis testing. The results of the research are then unpacked within
13 the discussion, along with the presentation of managerial and training implications and the
14 identification of limitations and potential venues for future research. Finally, the paper ends with
15 a conclusion, which summarizes key findings and contributions of the research.
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24 **Literature Review**

25 Job Rotation

26 Job rotation has been posited as an effective career development method (Kong et al., 2020) and
27 an effective tool for developing employees through exposure to diverse roles and responsibilities
28 within the same organization (Al-Zoubi et al., 2022). It can reduce workload strain and rejuvenate
29 employees with new challenges (Mehdizadeh et al., 2020), leading to increased motivation and
30 output (Jorgensen et al., 2005). Most of the research on the consequences of job rotation in
31 organizations has confirmed the positive outcomes of this occupational development technique,
32 including the increase of job involvement level and organizational commitment, occupational
33 learning, employees' motivation, job satisfaction, skill development, continuous improvement,
34 increase of knowledge, and the development of professional skills (Al-Romeedy, 2019; Foroutan
35 et al., 2021). However, there are some negative consequences of job rotation, as some research has
36 found evidence that new tasks may cause stress and dissatisfaction (Earney and Martins, 2009). In
37 addition, research has found that different tasks and duties due to job rotation can negatively affect
38 effectiveness of occupational development, efficiency, morale, autonomy, job performance, and
39 work and organizational engagement (Lee and Lee, 2018, Rai and Maheshwari, 2021). Moreover,
40 job rotation can lead to disruption of organizational workflow, poor person-job fit, inability to
41 adapt to equipment, overlap of knowledge, increase of errors, increase of training and education
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3 costs, expectations of greater remuneration, work-life conflict, increase of burnout, and increased
4 stress (Rai and Maheshwari, 2021).

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6 Nevertheless, job rotation can increase the problem-solving skills of employees because
7 employees need to understand and deal with a new job, a new department, new employees, and
8 new work processes that can bring many problems (Al-Zoubi et al., 2022). Lack of these skills can
9 adversely affect the organization. In high-risk and potentially hazardous industries and job roles,
10 job rotation could be advantageous for both employees and employers, as it would allow the
11 employee respite from the role and the employer the opportunity to develop other employees' skills
12 and knowledge in an essential role (Schmidt et al., 2021). **Whilst job rotation has been posited as
13 having both positive and negative impacts, its potential to develop employees and increase their
14 motivation and output (Jorgensen et al., 2005), could be expected to have a positive impact on
15 their performance.** Therefore, the following hypothesis is proposed:
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24 H1 Job rotation positively influences employee performance.
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27 Human Resources Strategy 28

29 HR strategy can be seen as a tool which leads to firm level competitive advantage by creating
30 employee-based resources across the organization that are rare and valuable, which can help to
31 improve HR and organizational performance (Collins, 2021). Human resources policies that are
32 the basis of human resources strategy should develop and enhance an employee's sense of
33 empowerment, through creating an atmosphere to develop skills and behaviors (Soleimani et al.,
34 2023). The success of an organization depends on its employees, therefore it is important that HR
35 policies work to achieve the desired HR strategy, by transferring effective messaging between the
36 employer and employees (Collins, 2021). Analyzing employee performance can lead to a HR
37 strategy that is related to HR needs, which should be guided by the needs of the company.
38 Therefore, the strategic HR strategy should be developed to achieve competitive advantage. HR
39 strategy is important because it provides HR direction for other functional areas (Aiko, 2021). The
40 relationship between HR strategy and job rotation has not been studied in previous research,
41 however as job rotation has commonly been posited as effective within HR literature, it is
42 hypothesized that:
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53 H2: Job rotation positively influences HR strategy.
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3 HR practices and strategy need to be carefully considered to support employee performance, as
4 HR strategies which are perceived to support and enhance skills and opportunity, can improve job
5 performance. But conversely, HR practice and strategies which are not perceived to support and
6 enhance skills and opportunity can have a negative effect on wellbeing and job performance
7 (Khoreva and Wechtler, 2018). Therefore, job rotations which offer the opportunity for employees
8 to develop skills and open opportunity, could be seen as offering a positive HR strategy. Job
9 rotations have been posited as having the potential to improve employee performance through
10 increased employee satisfaction (Campion et al., 1994) and enhances employees' learning and
11 human capital accumulation (Al-Romeedy, 2019). Rotation exposes managers to different
12 experiences supporting professional development and can be a mechanism to reduce employees'
13 fatigue and increase engagement in their job. Therefore, it is suggested that job rotation affects
14 employees' performance, and it can help employers to create better relationships and achieve
15 effective outcomes (Al-Zoubi et al., 2022). Therefore, it is proposed that:

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26 H3: Job rotation mediated by HR strategy positively influences employee performance.

27 28 29 Training

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31 Training is a focused and time-framed activity that helps build greater interpersonal and
32 organizational skills and changes behaviors that improve individual, team, and HR and
33 organizational performance. It's involves improving the skills that are necessary to achieve
34 organizational goals (Mehreen and Ali, 2022). Organisations should train employees to develop
35 and promote them to attract and retain a good workforce (Arasanmi and Krishna, 2019). Whilst
36 numerous studies have been conducted on how job rotation and training affect performance (e.g.,
37 Chakraborty and Biswas, 2020), there is a paucity of research as to how job rotation influences
38 training effectiveness. As job rotation offers the opportunity for employees to engage and
39 experience other job roles, this has the potential to open employees' horizons and offer a bridge
40 for new knowledge. Therefore, it is hypothesized that:

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48 H4: Job rotation positively affects training effectiveness.

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51 Potnuru et al. (2021) found that employee training programs supported the development of
52 employee competencies, which in turn enhanced performance and organizational effectiveness.
53 Similarly, Chakraborty and Biswas (2020) suggest that training plays a crucial role in job and
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3 company performance. Therefore, it is suggested that job rotation supported by effective training
4 can lead to positive employee performance. This is hypothesized as follows:

5 H5: Job rotation mediated by training effectiveness positively influences employee performance.
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10 The conceptual model and hypotheses tested in the research are shown in Figure 1.
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13 *Insert figure 1*
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16 Industrial Context

17 Polyurethane production falls within the petrochemical industry and is highly specialized with
18 limited producers worldwide. It has high environmental and safety risks associated with its
19 production (Dernehl, 1966), and therefore the training, development, and retention of employees
20 is important. This leads to the need for a clear HR strategy, to ensure effective and safe operation
21 production. Understanding job rotation and employee performance in hazardous jobs is crucial to
22 safety and sustainability, and exploring the Middle Eastern petrochemical industry is especially
23 valuable given its large footprint and rapid growth (Verbeek and Mah, 2020). The localization of
24 polyurethane production in the Middle East provides a unique context and backdrop, where
25 informal networks are prevalent and play an important role in society (Horak et al., 2023). It is
26 important to consider the influence of informal connections in Iranian society, often referred to as
27 ‘party bazi’ (Malekzadeh, 2016). The ‘epicenter’ of such informal networks can be HR
28 departments (Alsarhan et al., 2021) and therefore it is useful to consider how such relationships
29 influence HR operations and outcomes (Alsarhan and Al-Twal, 2023).
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43 **Methodology**

44 The research population included 247 professionals from a prominent Iranian petrochemical
45 business. This company has rotated 15% of its expert team in the last five years. This study defines
46 expert as a BA degree holder with 10 years of corporate experience. Using stratified random
47 sampling and the Cochran formula, 150 experts received questionnaires. The respondents
48 included 129 men, 21 women, 57 BAs, and 93 MAs. The age profile of respondents was 25–35
49 (33), 36–45 (94), 46–55 (18), and 5 over 56. 29 employees had 5–10 years of service, 98 had 11–
50 20 years, and 23 had 21–30 years. The questionnaire consisted of 48 questions; the first part
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3 included demographic questions, while the second part included questions on a five-point Likert
4 scale relating to the four concepts of job rotation, employee performance, HR strategy, and training
5 effectiveness. The four concepts were measured using previously validated scales. Job rotation
6 was assessed using Ho et al.'s (2006) 11-item instrument. Human resources performance was
7 assessed by Choi and Rainey's (2010) 8-item instrument, and HR strategy was measured using
8 Chang and Huang's (2005) 14-item instrument. Finally, Choo and Bowley's (2008) 16-item
9 instrument assessed training effectiveness.
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17 **Data Analysis and Results**

18 *A Kolmogorov-Smirnov test was used to check the normality of the data distribution. This test*
19 *demonstrated a non-normal distribution of the data, due to significance level of less than 0.05 in*
20 *all the variables, leading to structural equation modeling and partial least square (PLS) being*
21 *adopted to test the hypotheses.*
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27 The Fit of Research Measurement Models

28 Although the scales were previously validated, preliminary and validity testing was conducted to
29 confirm the validity of the scales in Iran. The questionnaire data was factor analysed to determine
30 item factor loadings. To support a clean factor structure, elements with factor loadings <0.4 were
31 deleted per literature guidelines (Hulland, 1999). This eliminated 15 items.
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36 Structure reliability and validity were examined to evaluate measurement models. Reliability was
37 assessed through composite reliability and Cronbach's alpha values, presented in table 1. The
38 composite reliability and Cronbach's alpha values for each variable demonstrate strong evidence
39 of internal consistency and reliability of the measures (Bland and Altman, 1997). Validity was
40 checked using convergent and divergent criteria. Convergent validity was assessed by calculating
41 the average variance extracted (AVE), which provided a score >.5, demonstrating convergent
42 validity (Cool et al., 1989). Divergent validity was assessed by comparing the square root of each
43 variable's AVE with the correlation between the constructs. The square root of each variable was
44 higher than the variable correlation coefficient, which provides acceptable evidence of divergent
45 validity (Fornell and Larcker, 1981).
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Fitting Structural Models

To evaluate the fit of the structural model, R^2 and Q^2 criteria were used, and the values are reported in Table 2. The three values of 0.19, 0.33 and 0.67 for R^2 indicate weak, medium and strong fit of the structural part of the model, respectively and the value of Q^2 should also be positive (Davari and Rezazadeh, 2014) According to Table 2, Q^2 values are positive for all endogenous constructs. R^2 values for employee performance and HR strategy are moderate and it is weak for training effectiveness. The goodness-of-fit (GoF) criterion was used to evaluate model fit. The GoF score for the model produced was 0.4, indicating a strong fit.

Insert table 2

Hypotheses Testing

After ensuring the appropriateness of the presented model, research hypotheses were examined and tested. If the values of the significant numbers of t exceed 1.96, the path coefficients were significant, and the hypotheses of the research were confirmed. Figures 2 and 3 respectively show the results related to the path coefficients between the variables and their corresponding significant numbers.

Insert figure 2

Insert figure 3

The coefficient of the path between job rotation and employee performance is -0.195 and the t value related to this path is 2.885. This indicates that whilst there is a direct relationship between job rotation and employee performance, job rotation negatively impacts employee performance. Job rotation explains 19% of the negative change in employee performance. The path coefficient between job rotation on human resources strategy is 0.474 and its corresponding t value, 6.44, has been calculated and it shows a direct and significant positive effect of job rotation on HR strategy. The path coefficient between job rotation on training effectiveness is 0.417 and its corresponding t value, 5.37, has been calculated. This shows a direct and significant positive effect of job rotation

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3 on training effectiveness. The summary of the results related to the hypothesis testing can be seen
4 in Table 3.
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8 *Insert table 3*
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10 11 Effect of Mediating Variables

12 To investigate the effect of the mediating variables, direct, indirect, and total job rotation effects
13 on employee performance and their significance are reported in Table 4. According to Table 4, the
14 direct ($t=2.88, -0.195$) and total effects of job rotation ($t=2.56, 0.294$) on human resources
15 performance are significant. Also, considering the significance of the indirect effect of job rotation
16 on employee performance through HR strategy ($t = 3.06, 0.206$) and the significance of the indirect
17 effect of job rotation on employee performance through training effectiveness ($t = 4.27, 0.19$), the
18 mediating effect of these two variables is confirmed. In this way, job rotation has a positive and
19 indirect effect on employee performance through HR strategy and training effectiveness.
20 Therefore, the third and fifth hypotheses are proven.
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31 *4 table Insert*
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34 **Discussion**

35 This study explored how job rotation impacts employee performance and the mediating effect of
36 HR strategy and training effectiveness, in an Iranian petrochemical company, representing a
37 dangerous and specialized industry that requires highly competent workers. The first hypothesis
38 referred to the effect of job rotation on employee performance. The research reveals that job
39 rotation reduces employee performance. Demonstrating that job rotation in highly skilled,
40 dangerous industries can adversely impact employee performance. This finding expands on
41 previous research by addressing an understudied industrial context and aligns with the suggestion
42 from Mehdizadeh et al. (2020), that job rotation might not always be appropriate in roles with
43 higher risks. As in such instances job rotation might generate stress and burnout due to the
44 expectation of new tasks (Earney and Martinz, 2009; Lee and Lee, 2018), which might be more
45 problematic in industrial and hazardous contexts. The employees within this research work in a
46 high-risk, potentially dangerous job, and may not welcome job rotation as this could affect their
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3 performance and subsequent safety, supporting Lee and Lee's (2018) claim that job rotations may
4 be seen as an obstacle by employees who require specialization in their role. **It is also possible in**
5 **contexts where informal networks play an important role in HR decisions such as in the Middle**
6 **East (Alsarhan et al., 2021), that those selected for a job rotation might feel out of favor if they are**
7 **not seeking a new challenge.** To ensure future performance, organizations must transfer tacit
8 knowledge (Schmidt et al., 2021), which is particularly important for the petrochemical sector as
9 it relies on knowledge for safe and successful operation, yet job responsibilities are so specialized
10 that training takes a long time and obtaining trained workers is difficult. This makes for a delicate
11 balance between ensuring employee performance and learning and sharing tacit knowledge. The
12 second hypothesis studied the effect of job rotation on HR strategy, the results indicated that job
13 rotation positively affects HR strategy. The relationship between HR strategy and job rotation has
14 not been studied in previous research, but the relationship between HR strategy and employees'
15 movement has been found to be connected (Aiko, 2021). The fourth hypothesis examined the
16 effect of job rotation on training effectiveness; the results indicate that job rotation positively
17 affects training effectiveness in the organization. This finding suggests that job rotation can lead
18 to effective training by offering employees the potential to open horizons and further knowledge
19 and skills through engaging in new job roles.

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22 The hypotheses (3 and 5) which investigated the mediating variables (HR strategy and training
23 effectiveness), showed that the mediating variables positively affect the employees' performance.
24 Literature shows, effective training and HR strategy and development are aligned with
25 occupational development and increases personal incentive, and that effective training can increase
26 job satisfaction and reduce turnover (Saira et al., 2021). Potnuru et al. (2021) suggested that good
27 HR practices should lead to employee training that improves employees' skills and therefore
28 improves job performance and organizational effectiveness. Our work builds on these previous
29 findings which explore outcomes of HR and training, by demonstrating that job rotation mediated
30 by training effectiveness and HR strategy leads to positive employee performance. These findings
31 highlight the need to ensure that training effectiveness and HR strategy are supported in the job
32 rotation process because these act as mediating variables in ensuring job rotation leads to positive
33 employee performance. Effective job rotation and training can be enhanced by ensuring that those
34 being rotated work within experienced and supportive units and that job rotation should be
35 emphasized as a development tool, alongside effective training (Núñez-Cacho Utrilla et al., 2022).
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3 Such support and training can help improve knowledge sharing and develop role clarity, which
4 can improve employee performance (Templer et al., 2020).
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8 Managerial and Training Implications 9

10 Managers who line manage high-risk technical workers, such as those in the petrochemical
11 industry, who are exploring job rotation strategies should do carefully to avoid detrimental
12 performance effects. Managers should carefully monitor employee performance and
13 incorporate performance evaluation into the job rotation process. Job rotation should be linked to
14 effective HR strategy and training to ensure that those rotating jobs can perform in their new role.
15 Managers and previous role holders should support staff both before and during the rotation
16 (handover phase) to avoid overburdening them and support them to learn the job. Job rotation can
17 be a valuable leadership development tool (Kubátová and Kročil, 2022), but it must be carefully
18 planned in specialized and hazardous industries to align with HR strategy and training, preventing
19 employee performance decline and potential danger. Employees who are forced into job rotations
20 which they are not interested in, may achieve limited development and learning, as emotions play
21 an important role in learning and cognitive skill development (Loon and Bell, 2018).
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32 Limitations and Future Research 33

34 Job rotation may affect employee performance in similar, specialist, hazardous, and intense
35 industries. Future research may determine the generalizability of these findings. As this research
36 was conducted in Iran, which has a relatively unique context given the economic situation and the
37 imposition of sanctions (Saadat et al., 2021), future research could also test the geographical and
38 contextual generalizability of the findings, as job rotations may affect employee performance and
39 be viewed differently in other contexts with different power-distance dynamics. **The findings
40 might be more generalizable to contexts where informal networks play an important part within
41 HR departments (Alsarhan et al., 2021).** This study only examined one organization, but future
42 research could generalize the findings across the sector into similar industries. Rather than
43 examining long-term causes, this study took a snapshot. Researching the emergence and
44 development longitudinally of factors which influence job rotation and considering the mediating
45 influence of factors such as burnout, work-family conflict and individual-organization fit, could
46 extend our knowledge. **It should be noted that whilst validity testing was conducted to confirm the**
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3 validity of the scales used in this research, the scales adopted were not originally developed for
4 the industrial or geographic context of this research. Future research could explore how concepts
5 such as employee performance, HR strategy, training and job rotation are potentially different and
6 can be effectively measured in hazardous industries and the Middle East. Finally, whilst the sample
7 was representative of professionals within the Iranian petrochemical industry, it might not be
8 indicative of the demographics in other specialist and hazardous industries and geographical
9 regions. Therefore, future research could explore other specialist and hazardous industries and
10 geographical regions where the demographics within that industry might be different.
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19 **Conclusion**

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21 This research addresses the dearth of research into factors which influence the outcomes of job
22 rotation and the potential negative consequences and the 'dark side' of job rotation (Foroutan et
23 al., 2021), and how job rotation influences outcomes in high-risk and potentially hazardous
24 industries where employees are required to undertake highly defined and specialist roles (Lee and
25 Lee, 2018). It is crucial to understand the impact of job rotation and what drives employee
26 performance in such hazardous job roles to ensure safety and sustainability. The results of this
27 research indicate that job rotation affects employee performance, but the effect was negative and
28 adverse. The research found this could be overcome with the use of effective training and positive
29 HR strategy, acting as mediating variables, positively affecting employee performance. This
30 highlights the importance of job qualification standards being satisfied, psychological evaluations
31 being properly reviewed, and personnel and positions being a good fit for those undertaking a
32 rotation.
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41 Job rotation offers benefits that can include helping to create career trajectories, improving
42 knowledge management, succession, and specialization. However, this research suggests that it
43 should be carefully managed, particularly in hazardous industries like the petrochemical industry,
44 where human capital is crucial to production efficiency.
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Industrial and Commercial Training

Figures and Tables

Figures

Figure 1: Conceptual model and hypotheses

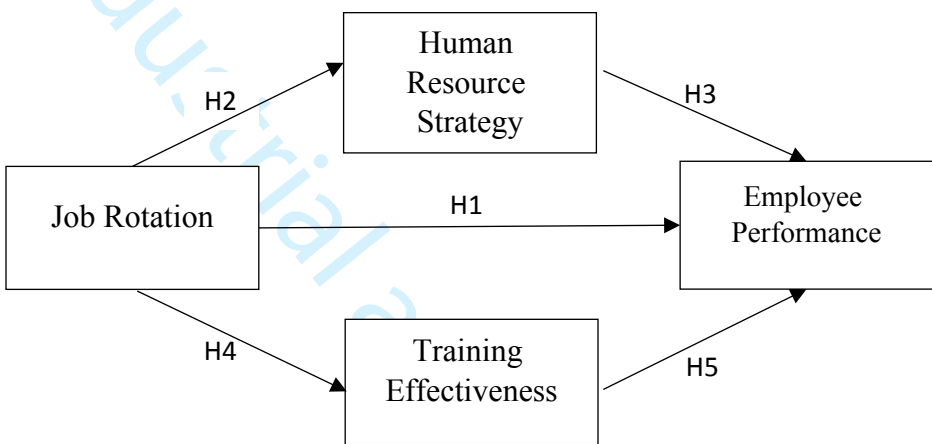


Figure 2: Structural equation model with path coefficients

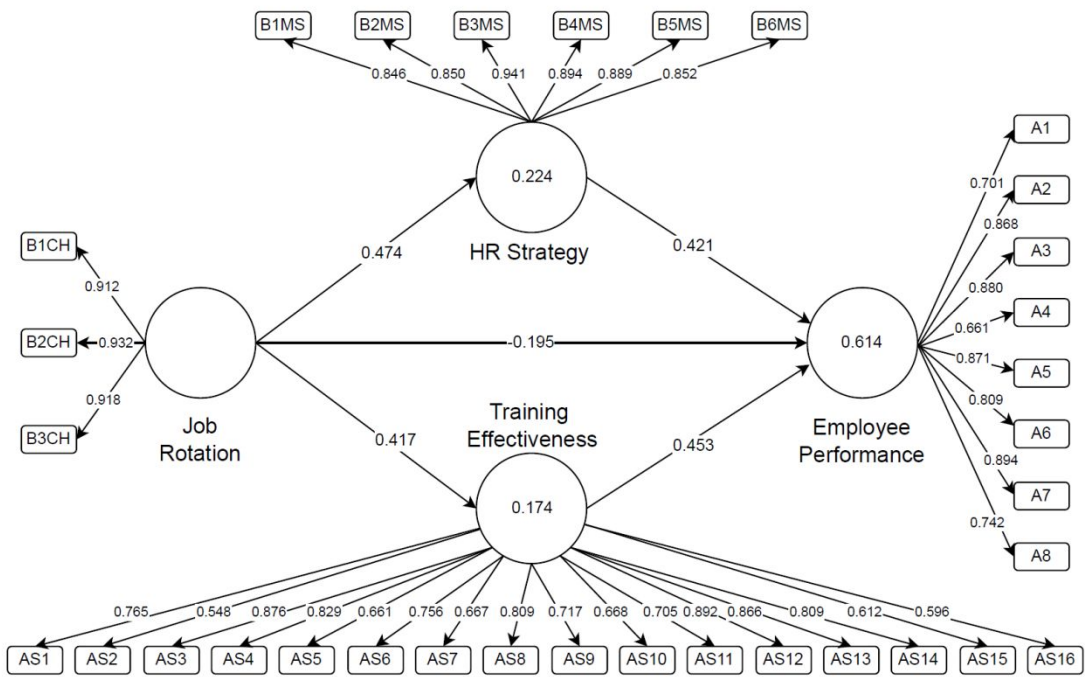
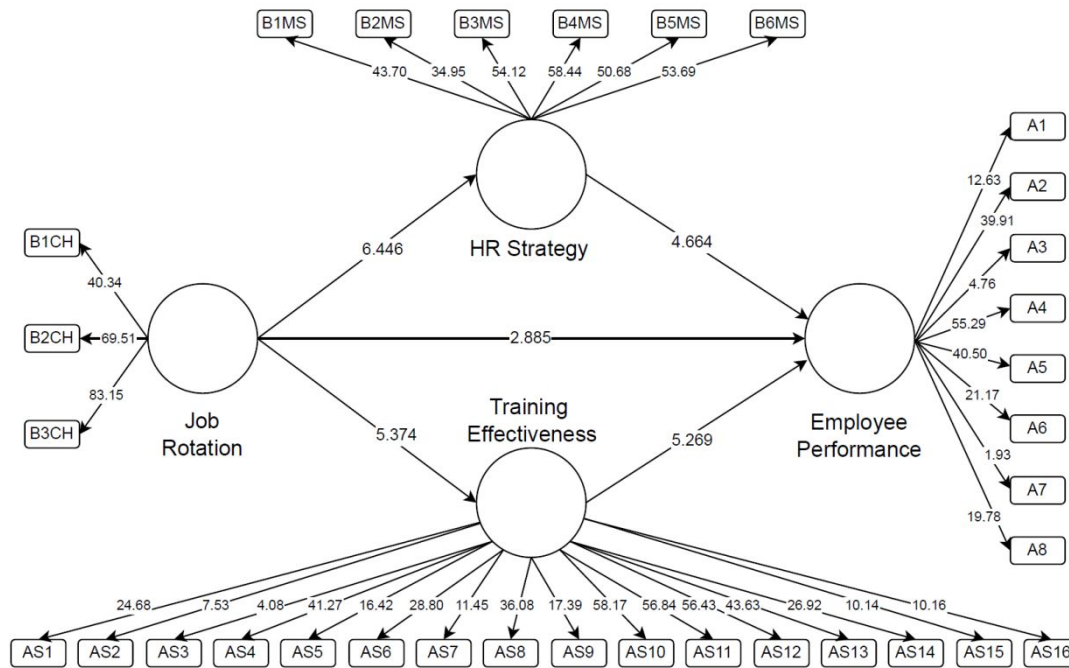


Figure 3: Structural equation model with significant t values



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5 Table 1: Cronbach's alpha report, composite reliability, and convergent validity of research
6 constructs
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9 Variables	10 Dimensions	11 The number	12 Cronbach's	13 Composite	14 AVE
		15 of	16 Alpha	17 Reliability	
		18 Statements			
19 Job rotation	20 Paying attention to	21 4	22 0.910	23 0.943	24 0.848
	25 comments and interests				
	26 Paying attention to	27 4			
	28 education				
	29 Paying attention to the	30 3			
	31 physical and scientific				
	32 requirements of the job				
33 HR strategy	34 HR training and	35 2	36 0.94	37 0.953	38 0.773
	39 development				
	40 Recruit carefully	41 2			
	42 Effective	43 2			
	44 communication with				
	45 employees				
	46 Management	47 2			
	48 development				
	49 Flexible work	50 2			
	51 schedules				
	52 Equal employment	53 2			
	54 opportunities				
55 Employee	56 -	57 8	58 0.766	59 0.827	60 0.578
performance					
Training	-	16	0.93	0.942	0.512
effectiveness					

Table 2: The values of R² and Q² of the endogenous structures of the model

Endogenous Structures of the Model	R ²	Q ²	Communalities
HR strategy	0.224	0.158	0.597
Training effectiveness	0.174	0.07	0.262
Employee performance	0.614	0.256	0.334
Job rotation	-	-	0.719

Table 3: Path coefficients, significance values and direct hypothesis test results

Hypotheses	Path Coefficient	Sig.	Hypothesis Outcome
H1 Job rotation positively influences employee performance	-0.195	2.88	Disproven
H2 Job rotation positively influences HR strategy	0.474	6.44	Proven
H4 Job rotation positively affects training effectiveness	0.417	5.37	Proven

Table 4: Direct, indirect and total job rotation effects on employee performance

Independent Variable	Dependent Variable	Effect		
Job rotation	Employee performance	Direct	Indirect	Total
		-0.195	(H3) Mediator: HR strategy	0.294
		t= 2.88	t = 3.306 and 0.206	t = 2.56
			(H5) Mediator: Training effectiveness	
			t = 4.27 and 0.19	

Revisions to ICT-10-2023-0074 ‘The Effect of Job Rotation on Employee Performance: The mediating role of HR strategy and training in the petrochemical industry’. Submitted to Industrial and Commercial Training

We would like to thank the editor and reviewers for supporting us to further develop our paper. We found all the comments provided valuable for developing our paper to improve its value and contribution. From the reviews it became clear that we could provide more detail about the Middle Eastern context of the work and the influence that informal networks play. Adding this has helped to further contextualise our work, unpack the findings, and more effectively explain the potential generalisability of the research. Additionally, both reviewers identified that the narrative in the literature review was not particularly clear, so this has been revised to discuss the role that job rotation has on HR strategy as both a direct and indirect effect in the same section, before doing the same with training. This has reduced the number of sections in the literature review and made it less choppy. The introduction has also been reduced to focus on the most important underpinning literature.

Below is a summary of the amendments which have been made to address all the reviewers' comments. Additionally, new text has been highlighted in red so it can be easily identified in the manuscript.

Many thanks once again.

Reviewer 1 Comments

No	Reviewer Comment	Author Response
1	The paper makes a valuable contribution to the field of HR and the work is commendable. It has great potential; with some revisions and attending to the above it can make a contribution to the field.	We were delighted to hear that you believe the work offers a valuable contribution and we are grateful for your comments which we believe have helped to improve the paper. Thank you for your help, direction and help in further refining and developing the paper.
2	The provided literature is up-to-date and relevant but the authors can benefit from checking more historical literature to ensure a better grounding of the researched concepts. This will help the authors cite the most relevant and renowned articles on HR strategy and job rotation. Authors are invited to consult prior literature to describe the historical progress of the concepts.	Thank you for this suggestion. The focused nature of the journal and the requirement for articles to be between 3500 and 5500 words (including references and tables), does not allow for us to go too far back into the historical literature. This is why we have focused on the most up-to-date and contemporary literature. We hope that readers who are interested in exploring the concepts discussed at a deeper level will be able to explore the specific seminal literature elsewhere.
3	It is recommended to start the literature with an overview of HR strategy, then	We agree the previous narrative was not always clear. As suggested by reviewer 2 (comment 6), we have reduced the number

	zoom into Job rotation and performance management.	of sections. This has allowed us to unpack HR strategy and training in more detail, by consider their direct and indirect roles within the same section.
4	Additionally, it is important for the authors to provide additional clarifications on how the utilized statistical Kolmogorov–Smirnov test can adequately assess the research gap and how the four concepts were interrelated and researched.	The Kolmogorov–Smirnov test was only used to check the normality of the data distribution rather than conduct the hypothesis testing. Due to the Kolmogorov–Smirnov test identifying a non-normal distribution of the data, partial least square (PLS) structural equation modelling was adopted to test the hypotheses. This has been clarified in the first paragraph of the ‘Data Analysis and Results’ section.
5	Additionally, the researchers are invited to explain how the utilized scales might have some cultural limitations.	Thank you for highlighting this point. You are correct in that whilst the scales used were assessed for validity through validity testing, they were not originally developed for the context of this research, which represents a potential limitation. This has been explained and unpacked in the ‘Limitations and Future Research’ section of the paper.
6	The results present a new and unique conclusion regarding the "dark side" of job rotations. Thus, the authors are encouraged to present their findings and discuss them in accordance with the four concepts they designed: job rotation, employee performance, HR strategy, Training effectiveness.	We believe the investigation of the hypotheses help to unearth the dark side of job rotation in potential hazardous and specialised industries. Table 4 presents the answers to each of the hypothesis. The ‘Managerial Implications’ section has been moved up within the ‘Discussion’ section. This allows the concepts investigated to be discussed and unpacked both theoretically and practically in the same section, allowing greater discussion.
7	Several grammatical and punctuation errors were identified. Thus, a thorough proofread is recommended to correct these issues and enhance the overall writing quality.	As suggested, we have undertaken a detailed proofread to correct grammatical issues and improve the readability of the paper.

Reviewer 2 Comments

No	Reviewer Comment	Author Response
1	Thank you very much for giving me the opportunity to read this interesting paper, which I enjoyed reading it a lot.	We are delighted to hear that you enjoyed reading the paper and are grateful for your comments which we believe helped to refine

		and sharpen the paper to increase its value and contribution.
2	I strongly recommend to provide more justifications for the gap that your paper aims to fill. Also, to translate this gap into clear and feasible RQ(s)	Thank you for highlighting the value in presenting RQs within the introduction. The introduction has been revised to be more succinct in presenting the research gap and also presenting RQs, which are then further broken down into hypotheses within the literature review.
3	I strongly recommend that you move these lines from the introduction section to the method part when you define your context. Polyurethane production falls within valuable given its large footprint and rapid growth (Verbeek and Mah, 2020).	Thank you for this suggestion. On reflection we agree that the introduction is too cramped with too many concepts and topics discussed. In line with comment 7 we have added a sub section titled 'Industrial Context' at the end of the literature review. This subsection provides both context about the industry and geographic region.
4	Add the flow (structure) of your paper at the end of this section, and before starting with the literature review part.	A paragraph explaining the flow of the paper has been added at the end of the introduction. This helps to signpost what is coming for the reader.
5	How you came out to suggest H1 is not really clear, you should clarify more the interrelations between the Job rotation and employee performance in the workplace.	Thank you for highlighting that the discussion around the relationship between job rotation and employee performance was not effectively concluded. The rationale and logic behind the proposal for H1 has been added.
6	It's not clear what is exactly your theoretical foundation in this paper. Therefore, I recommend that you include only two main sections in the literature review. One for Job rotation and another one for HR strategies.	On review we agree the logic and narrative behind the literature review was not clear. As suggested the job performance section has been removed, as the link between job rotation and performance is already presented to underpin H1 (see comment above [5]). Additionally, the ordering of the sections in the literature review have been adjusted to ensure a clearer narrative and building of the hypothesis. To achieve this rather than discussing the direct link between HR strategy and training and then going back through the same arguments to discuss the role of HR strategy and training as mediators, HR strategy is discussed as both a direct relationship and mediator before discussing training as both a direct relationship and mediator.

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5	7	Since, you have a specific context for this study, you should include more studies about the context and region alongside in the literature review.
6		We agree the context of the study is important to be explained and unpacked, as the context of the study i.e., the Iranian Petrochemical industry makes the study unique. As suggested in comment 3, the discussion of the petrochemical industry has been brought down from the introduction and further discussion about the region has been added to create a new 'Industrial Context' section at the end of the literature review. This helps to contextualise this specific research. Plus, it has the added benefit of making the introduction less cluttered, which allows easier identification of the research gap and contribution.
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23	8	It is indispensable to point out to the role and the impact of the contextual and cultural factors in Iran, on top of which and perhaps the most important one are the different constructs of informality, or so called the informal network that prevails in Iran (i.e. party-bazi). Since in this part of the world these constructs of informality play an important role in HR practices.
24		We agree the contextual considerations of the region where this research was conducted are very important to highlight and consider. We have covered the role that these informal networks play in HR in the 'Industrial Context' section which has been added. Within this section we have unpacked the importance and significance of informal networks and party bazi.
25		Thank you for the suggested reading, it has been helpful to support the development of the context.
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38	9	Since in this part of the world these constructs of informality play an important role in HR practices. Consequently, I invite you to highlight this important factor and compare its role in Iran with the neighbor Arab countries (i.e. the gulf and Levant), in which the informality and informal network (i.e. wasta) cannot be ignored.
39		The suggested reading provided has been used to develop the context of the research in the 'Industrial Context' section, see the comment above (comment 8). The influence of informal networks has also been added to the discussion to frame the results and to support the discussion of the potential generalisation of the results.
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49	10	You need to define the context of your study, as well as the importance of conducting this study in that particular context.
50		In line with comments 3 and 7 we have created a new subsection at the end of the literature review, just before the methodology, to provide context to the reader about the industry and region being studied.
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57	11	How these Demographic characteristics of the participants reflect on the results of your paper?
58		You are correct that whilst the demographics of the sample are representative of the context being researched, they are likely to not be representative of other contexts.
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		Therefore, this has been explained as a limitation and opportunity for future research within the 'Limitations and Future Research' section.
13	I strongly recommend removing the sections for practical implications & limitations from the conclusion section. My suggestion is to put them before the conclusion section.	We agree moving these sub sections before the 'Conclusion' improves the readability of the paper. This allows the concepts investigated to be discussed and unpacked both theoretically and practically in the same section, allowing greater discussion.
14	A professional proof reading might be used in the future draft of your paper.	As suggested, we have undertaken a detailed proofread to correct grammatical issues and improve the readability of the paper.
15	Many thanks again for this great paper, and I wish the author(s) the best of luck in working on this project.	Thank you for your time reviewing the paper. We are grateful for your suggestions which we believe have improved the quality, contribution, and clarity of the paper.

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