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PERCEIVED ORGANIZATIONAL SUPPORT AND TURNOVER INTENTION AMONG KNOWLEDGE WORKERS IN A CHINESE PRIVATE TRAINING INSTITUTION: THE MEDIATING ROLE OF AFFECTIVE ORGANIZATIONAL COMMITMENT

Abstract: This study examines whether perceived organizational support is associated with turnover intention among knowledge workers of a private education and training institution in Xi'an, China, and whether affective organizational commitment carries part of this association. Questionnaire data from 85 teachers and trainers, curriculum developers and teaching managers were combined with six semi-structured interviews and a review of internal documents. Perceived organizational support was measured with an eight-item short form of the Survey of Perceived Organizational Support, affective commitment with a six-item scale and turnover intention with four items. Controlling for gender, age, education, tenure and position, perceived organizational support was negatively associated with turnover intention ($\beta = -.40$, $p < .001$) and positively associated with affective commitment ($\beta = .50$, $p < .001$); affective commitment was negatively associated with turnover intention when support was controlled ($\beta = -.34$, $p = .004$). The indirect association through affective commitment was $B = -.19$ (standardized $-.17$; 95% percentile bootstrap CI [$-.31$; $-.05$], 5,000 resamples), or about 43% of the total association. The remaining direct association was small and only marginally significant ($\beta = -.23$, $p = .049$), so the pattern is consistent with partial mediation but does not establish it firmly. Because the data are cross-sectional self-reports from one organization, the findings describe associations compatible with the support–commitment mechanism, not causal effects or reductions in actual turnover. Five practice domains measured as descriptive indices are used to derive retention recommendations for the institution.

Keywords: perceived organizational support, affective organizational commitment, turnover intention, knowledge workers, private training institutions, mediation analysis.

Introduction

Knowledge-intensive organizations create value through employees who apply specialized knowledge and professional judgment to non-routine tasks [1]. In private education and training institutions these employees – teachers and trainers, curriculum developers and teaching managers – design and deliver the service itself. A voluntary exit therefore interrupts teaching, delays program development and removes tacit knowledge that is difficult to replace

[2, 3]. Private providers usually have flat structures and limited budgets, so they cannot rely on pay competition alone and need to understand how everyday management is perceived by staff.

Organizational Support Theory offers a suitable lens. Perceived organizational support is employees' general belief that the organization values their contributions and cares about their well-being [4, 5]. Meta-analytic evidence links it with stronger affective commitment and weaker withdrawal [6, 7], and affective commitment has been proposed as a mechanism through which support is associated with lower intention to leave [8]. Recent studies replicate parts of this chain among IT consultants [9], Chinese corporate employees [10], Portuguese employees [11] and teachers in Chinese public and private institutions [12–14]. However, small private training providers in China remain under-represented, and studies that combine the support–commitment–intention model with a diagnostic assessment of concrete managerial practices are rare.

The aim of this study is to test, in one private training institution in Xi'an, whether perceived organizational support is associated with turnover intention directly and indirectly through affective organizational commitment, and to use five practice domains – organizational care, leadership support, career development, training and development, and compensation and benefits – as descriptive indicators for management recommendations. The contribution is a contextual empirical test of an established model and an applied diagnostic instrument for the case organization; it is not claimed to reveal a new universal retention mechanism, and the results are not generalized to all private education providers in China or Kazakhstan.

Theoretical background and hypotheses

Perceived organizational support (POS) reflects how employees interpret organizational actions rather than the amount of resources formally provided [4, 5]. Social Exchange Theory explains its consequences: valued support creates a felt obligation to reciprocate with constructive attitudes and continued membership [15]. Affective organizational commitment (AOC) is the emotional attachment to, identification with and involvement in the organization; it is the component of the three-component model that reflects a desire, rather than a cost or an obligation, to remain [16, 17]. Only this component was measured in the present study, so normative and continuance commitment are outside its scope. Turnover intention (TI) is a conscious plan to leave the employing organization; it is the most proximal attitudinal antecedent of voluntary quitting but is not equivalent to actual turnover [18–20].

Employees who feel valued are more likely to incorporate membership into their social identity, and longitudinal evidence indicates that POS precedes increases in affective commitment [8]. Committed employees in turn wish to maintain membership, which is reflected in lower intention to leave [17, 21]. Support may also be related to TI through routes other than commitment, such as lower strain or a direct sense of reciprocity [6], so a residual direct association is plausible. The study therefore estimates one linear model with X = POS, M = AOC, Y = TI and control variables Z:

$$M = i_M + aX + \gamma Z + \varepsilon_M; \quad Y = i_Y + c'X + bM + \delta Z + \varepsilon_Y; \quad c = c' + ab$$

The decomposition holds for linear models estimated on the same sample with the same controls and no interactions. The hypotheses refer to statistical associations:

H1. POS is negatively associated with TI (total association c).

H2. POS is positively associated with AOC (path a).

H3. AOC is negatively associated with TI when POS is controlled (path b).

H4. POS is indirectly associated with TI through AOC ($ab \neq 0$).

Conditions such as the fairness and sincerity of support, career stage, external alternatives, professional identity and job embeddedness [22] may moderate these relationships, but they were not measured and are treated as directions for future research.

Methods

Setting, participants and procedure

The setting is Xi'an Lianhu High-tech Talent Education and Training Center (Shaanxi Province, China). The target population comprised 104 knowledge workers; administrative and support staff were excluded. Eight employees took part in a pilot of the questionnaire and were therefore not invited to the main survey, and the remaining 96 were invited, which is better described as an attempt at full coverage of available knowledge workers than as a complete census. Ninety questionnaires were returned (93.8% of those invited). Five were received after the closing date of 24 July 2026 and were excluded before analysis; the returned questionnaires contained no missing item responses. The analytic sample is therefore N = 85 (88.5% of those invited, 81.7% of the population). Because the survey was anonymous, the reasons for the six non-responses are unknown and non-respondents could not be compared with respondents, so non-response bias cannot be ruled out.

Of the respondents, 69.4% were women; 54.1% were aged 26–35; 72.9% held a bachelor's degree; 22.4% had worked at the Center for less than one year, 24.7% for one to less than three years, 32.9% for three to five years inclusive and 20.0% for more than five years; 69.4% were teachers or trainers, 14.1% curriculum developers and 16.5% teaching managers.

The questionnaire was administered electronically from 13 to 24 July 2026. Six semi-structured interviews (35–45 minutes) were held from 20 to 25 July 2026, partly overlapping with the last days of the survey. The interview guide was derived from the conceptual model and from observations made during the author's internship in the Human Resources Department (6–26 July 2026); interviewees were selected purposively to represent the main positions and different tenure groups, not on the basis of the final survey results. The final quantitative analysis was carried out after the survey closed, and the two strands were integrated at the interpretation stage. The design is therefore described as a mixed-methods design with partially overlapping data collection rather than a strictly sequential explanatory design. Four interviewees were knowledge workers (two teachers, one curriculum developer, one teaching manager); the human-resources specialist and the head of the Training Business Unit served as key informants and are not part of the survey population. Interviews were recorded in written notes in Chinese and translated by the author; quotations are therefore paraphrased rather than verbatim transcripts. Internal documents (organizational chart, personnel-file templates, onboarding and training records, appraisal forms) were reviewed with management permission.

Ethics. The first page of the questionnaire explained the purpose, voluntary participation, the right to withdraw before submission and anonymity (no names, telephone or staff numbers, no IP recording, no management access to individual answers, storage by the researcher for no more than three years and aggregate reporting only); respondents confirmed consent before starting. The Center's management approved the survey and access to internal materials, and interviewees gave oral consent.

Measures

All items used a five-point scale (1 – strongly disagree, 5 – strongly agree). The instruments were translated into Chinese and back-translated by two bilingual colleagues [23] and checked in the pilot. POS was measured with the eight-item short form of the Survey of

Perceived Organizational Support [4, 5] (reverse-coded items B2, B3, B5, B7). AOC was measured with the six-item affective commitment scale of Meyer, Allen and Smith [24] (reverse-coded C3, C4, C5). TI was measured with four items adapted from Mobley, Horner and Hollingsworth [25] and Farh et al. [26] (reverse-coded D4, "I intend to stay at this Center for a long time"). Reverse-coded responses were transformed as 6 − response, and scale scores are item means; a score was to be computed only when at least 80% of a scale's items were answered, a rule that was not needed because no responses were missing. Fifteen author-developed items (three per domain) assessed organizational care, leadership support, career development, training and development, and compensation and benefits. Their internal consistency was modest (α = .57–.73), so they are used only as preliminary descriptive indices and not as predictors.

Controls were gender (0 – male, 1 – female), age (four ordered categories), education (three ordered categories), tenure (four ordered categories: less than one year; one to less than three years; three to five years inclusive; more than five years) and position (1 – teacher or trainer, 0 – curriculum developer or teaching manager). Developers and managers were combined because both perform non-classroom knowledge work and the groups are small (12 and 14). Ordinal coding assumes equal spacing between categories; a sensitivity analysis with indicator coding of all categorical controls is reported.

Analysis

Analyses were carried out in Python 3 (pandas, statsmodels, factor_analyzer) following the logic of PROCESS Model 4 [27]; the anonymized data set, codebook, analysis script, equivalent SPSS/PROCESS syntax and full output are available from the author. Measurement was examined with a confirmatory factor analysis (maximum likelihood) of the 18 core items, an exploratory principal-axis factoring with oblique (oblimin) rotation, Horn's parallel analysis [28], Cronbach's α, composite reliability (CR), average variance extracted (AVE), the Fornell–Larcker criterion [29] and the heterotrait–monotrait ratio (HTMT) [30]. Paths a, b, c and c′ were estimated by ordinary least squares with all five controls; unstandardized (B) and standardized (β) coefficients are reported separately. The indirect association ab was tested with 5,000 percentile bootstrap resamples (random seed 20261012); the completely standardized indirect association ($ab \cdot SD_X/SD_Y$) was re-estimated in every resample to obtain its own interval. Linearity (RESET), heteroscedasticity (Breusch–Pagan), normality of residuals and influential observations (Cook's distance) were checked, and HC3 robust standard errors were used as an additional check. Team membership was not recorded, so clustering of employees within teams could not be modelled.

Results

Measurement

The three-factor CFA fitted acceptably ($\chi^2 = 162.59$, df = 132, p = .036; CFI = .947; TLI = .938; RMSEA = .053; SRMR = .072) and much better than a one-factor model ($\chi^2 = 307.24$, df = 135; CFI = .699; RMSEA = .123; $\Delta\chi^2 = 144.66$, Δdf = 3) or two-factor models merging POS with AOC (CFI = .815) or AOC with TI (CFI = .848). In the exploratory analysis (KMO = .859; Bartlett's $\chi^2 = 666.54$, df = 153, p < .001), every item loaded on its intended factor (.54–.89) with cross-loadings no higher than .31; parallel analysis clearly supported two factors and placed the third at the threshold (eigenvalue 1.63 vs. a 95th-percentile random value of 1.68 and a mean of 1.57), so the theoretically specified three-factor solution was retained. Reliability was satisfactory (Table 1). AVE was slightly below .50 for POS and AOC, but CR exceeded .80, the

square root of AVE (.677, .676, .734) exceeded the latent correlations (POS–AOC .576; POS–TI −.455; AOC–TI −.565), and all HTMT values were below .60; these are limited, not exhaustive, indications of discriminant validity. Item C1 (“happy to spend the rest of my career with this Center”) and D4 (“intend to stay for a long time”) are conceptually close but correlated only r = .28 and loaded on separate factors.

Table 1 – Measurement instruments and reliability (N = 85)

Construct (source)	Items (reverse)	α	CR	AVE	CFA loadings	M (SD)
Perceived organizational support [4, 5]	8 (B2, B3, B5, B7)	.871	.871	.459	.63–.76	3.37 (0.84)
Affective organizational commitment [24]	6 (C3, C4, C5)	.832	.834	.457	.60–.74	3.48 (0.82)
Turnover intention [25, 26]	4 (D4)	.820	.824	.539	.70–.80	2.59 (0.92)

Source – compiled by the author based on survey data; standardized loadings from the three-factor CFA.

Common method variance is a plausible threat because all variables were self-reported by the same respondents at one time point in the same format. Procedural remedies were anonymity, separation of the scales and mixed item wording [31, 32]. The first unrotated factor accounted for 36.7% of the item variance and the one-factor model fitted poorly, but these diagnostics cannot rule out common-source bias, which remains a limitation.

Descriptive statistics and correlations

Mean POS was slightly above the scale midpoint (Table 2). Fourteen respondents (16.5%) had a TI score of 3.5 or higher; this cut-off is the author’s operational criterion for an elevated intention (an average above the neutral point, toward agreement) and describes responses, not the probability that a given employee will leave. POS correlated positively with AOC and negatively with TI, and AOC correlated negatively with TI. TI did not differ by tenure ($F(3, 81) = 0.36$, $p = .784$) or position ($F(2, 82) = 0.47$, $p = .628$); these descriptive comparisons are not tests of moderation.

Table 2 – Means, standard deviations and correlations (N = 85)

Variable	M	SD	1	2	3	4	5	6	7
1. Gender	0.69	0.46							
2. Age	2.40	0.83	.07						
3. Education	1.94	0.52	.02	.03					
4. Tenure	2.51	1.05	−.02	.62***	.08				
5. Teacher	0.69	0.46	.06	−.17	.12	−.24*			
6. POS	3.37	0.84	−.02	−.05	−.10	−.02	−.08		
7. AOC	3.48	0.82	.12	−.09	.02	−.17	−.09	.51***	
8. TI	2.59	0.92	−.09	.03	−.08	.11	.11	−.39***	−.49***

Source – compiled by the author based on survey data. Gender: 1 – female; teacher: 1 – teacher or trainer; age, education and tenure: ordinal codes. * $p < .05$, *** $p < .001$.

Hypothesis tests

Table 3 reports the paths. Controlling for the five covariates, POS was negatively associated with TI (c; $\Delta R^2 = .156$, $p < .001$), supporting H1, and positively associated with AOC (a; $\Delta R^2 = .249$, $p < .001$), supporting H2. When POS and AOC were entered together, AOC remained negatively associated with TI (b), supporting H3, and the full model explained 29.2% of the variance in TI (adjusted $R^2 = .228$; ΔR^2 for AOC over the POS model = .081). No control variable was significant in any model, and the maximum VIF was 1.77.

Table 3 – Regression paths and indirect association (N = 85)

Path	B	SE	β	95% CI for B	p
a: POS → AOC	.487	.092	.504	[.305; .669]	< .001
c: POS → TI (total)	−.435	.111	−.399	[−.656; −.215]	< .001
b: AOC → TI | POS	−.388	.131	−.344	[−.648; −.128]	.004
c′: POS → TI | AOC (direct)	−.246	.123	−.226	[−.492; −.001]	.049
ab: indirect	−.189	.075[b]	−.173[c]	[−.345; −.055][b]	–

Source – compiled by the author based on survey data. All models include gender, age, education, tenure and position (R^2: AOC model .313; TI total model .211; TI full model .292). [b] Bootstrap SE and 95% percentile bootstrap CI, 5,000 resamples, seed 20261012. [c] Completely standardized indirect association, 95% bootstrap CI [−.306; −.052]. B – unstandardized, β – standardized coefficient.

The indirect association through AOC was negative and its bootstrap interval excluded zero, supporting H4 (Table 3, Figure 1). It amounted to 43.4% of the total association; this share describes the decomposition of the regression coefficient and does not mean that turnover or the number of exits would fall by 43%, nor that 43% of the variance in TI is explained. The direct association c′ was small and only marginally significant: its OLS interval barely excluded zero, the HC3 test ($p = .031$) and the bootstrap interval for the standardized direct path ([−.412; −.022]) excluded zero, but p rose to .051 with indicator-coded controls and to .054 after removing four observations with Cook's distance above 4/N. The pattern is therefore consistent with partial mediation, but the evidence for a residual direct association is weak. The indirect association was stable across these checks (B = −.18 with indicator-coded controls). The residual diagnostics showed no violation of linearity (RESET $p = .351$), homoscedasticity (Breusch–Pagan $p = .271$) or normality (Shapiro–Wilk $p = .453$).

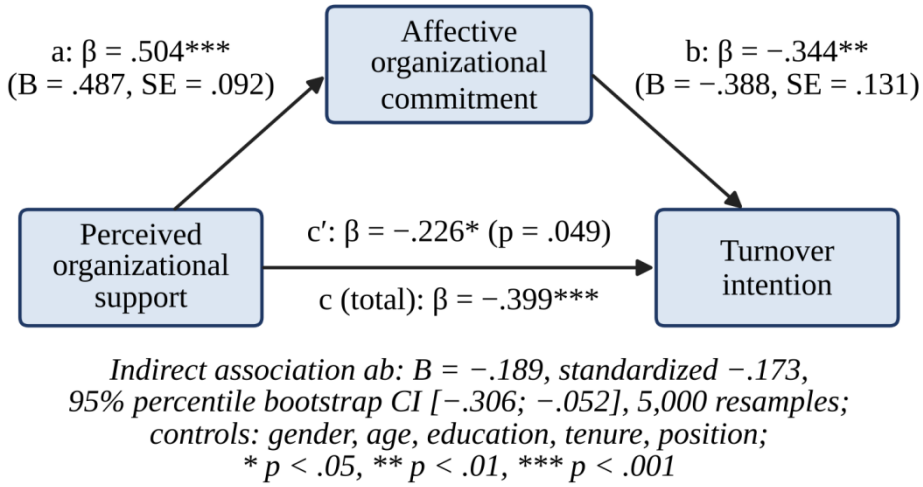


Figure 1 – Estimated model with paths a, b, c′ and c (standardized coefficients, N = 85)
Source – compiled by the author based on survey data.

Practice domains and interview findings

All five practice domains were rated close to the midpoint (Table 4), and their means differed by little more than a tenth of a point. Their correlations with POS were moderate; the confidence intervals overlap widely, so the data do not show that any domain is more important than another. Interviews added context that the indices cannot provide: participants described support through concrete episodes – promotion criteria that are not written down, course-development work that is barely visible in appraisal, training focused on procedures, and help that depends on the individual supervisor – and linked these episodes to whether they felt "noticed" and attached to the Center. Document review was consistent with these accounts: no written promotion criteria, appraisal forms centred on task completion and teaching hours, and no records of development plans or exit reasons.

Table 4 – Practice domains as descriptive indices (N = 85)

Domain (items)	M (SD)	α	Agree, %	Disagree, %	r with POS [95% CI]
Career development (E1–E3)	3.23 (0.88)	.57	27.1	10.6	.54 [.37; .67]
Training and development (E4–E6)	3.25 (0.91)	.64	31.8	12.9	.52 [.34; .66]
Compensation and benefits (E7–E9)	3.15 (0.93)	.73	27.1	16.5	.43 [.24; .59]
Leadership support (E10–E12)	3.15 (0.93)	.68	25.9	17.6	.53 [.35; .67]
Organizational care (E13–E15)	3.18 (0.99)	.73	24.7	18.8	.44 [.25; .60]

Source – compiled by the author based on survey data. Agree – domain mean ≥ 4; disagree – domain mean ≤ 2. All correlations p < .001.

Discussion

The results replicate, in a small Chinese private training institution, the pattern predicted by Organizational Support Theory: knowledge workers who perceive more support report stronger affective commitment and weaker intention to leave, and part of the association between support and intention runs statistically through commitment. The size of the indirect association is comparable to findings among Spanish IT consultants, where organizational commitment also carried part of the link between support and turnover intention [9], and the positive POS–commitment association agrees with recent evidence from Portuguese employees [11]. Studies of Chinese employees and teachers have identified other mediators – psychological ownership [10], psychological capital [12, 14], or perceived support and job satisfaction as mediators between pay equity and turnover intention among preschool teachers [13]. These studies use different configurations of variables and are not direct replications of the present model, but together they suggest that affective attachment is one of several parallel channels; this is consistent with the weak residual direct association found here.

Alternative interpretations must be kept in view. With cross-sectional data the ordering POS → AOC → TI is assumed, not observed: employees who already intend to leave may evaluate support less favourably, and cross-sectional mediation estimates can be biased relative to longitudinal processes [33]. Shared method variance may inflate all three correlations, and unmeasured factors such as workload, labour-market alternatives or supervisor relations could influence all three variables. The results should therefore be read as an indirect association that is compatible with the proposed mechanism rather than as evidence of a causal effect.

The absence of differences by tenure contrasts with the common assumption that early-career staff are the main risk group. In this sample turnover intention was distributed across all tenure groups, which suggests that retention measures at the Center should not be confined to newcomers.

Practical implications

For the case organization the findings support managing retention as a coherent support system rather than as isolated incentives, with an explicit aim of strengthening attachment and not only working conditions. Because no practice domain stands out statistically, priorities should be set jointly from the survey indices, interviews and documents. The recurring problems identified in these sources – unwritten promotion criteria, appraisal that ignores course development, procedural training and supervisor-dependent support – point to written professional career ladders, recognition of curriculum and mentoring work in appraisal, developmental training linked to those ladders, and standard one-to-one feedback routines. These are recommendations derived from a diagnosis; their effect on turnover intention or actual exits has not been tested and should be evaluated after implementation, preferably with repeated anonymous surveys reported at group level and with voluntary-turnover records.

Limitations and conclusion

The study has five main limitations: a single organization and a modest sample; a cross-sectional design; reliance on self-reports from one source; measurement limitations (AVE slightly below .50 for two scales, author-developed practice indices with modest reliability, ordinal coding of controls); and the use of turnover intention instead of actual turnover. Future research should use several organizations, longitudinal or time-lagged designs, administrative turnover records and explicit tests of the moderators mentioned above.

Within these limits, the study shows that among knowledge workers of a private training institution higher perceived organizational support was associated with lower turnover intention, and that this association was partly indirect through affective organizational commitment while a weak direct association remained. The cross-sectional design does not allow this result to be interpreted as a proven causal mechanism or as evidence that actual turnover would fall.

References:

1. Drucker P.F. Management Challenges for the 21st Century. New York: Harper Business, 1999. 207 p.

2. Horwitz F.M., Heng C.T., Quazi H.A. Finders, keepers? Attracting, motivating and retaining knowledge workers // Human Resource Management Journal. 2003. Vol. 13, No. 4. P. 23–44.

3. Ingersoll R.M. Teacher turnover and teacher shortages: An organizational analysis // American Educational Research Journal. 2001. Vol. 38, No. 3. P. 499–534.

4. Eisenberger R., Huntington R., Hutchison S., Sowa D. Perceived organizational support // Journal of Applied Psychology. 1986. Vol. 71, No. 3. P. 500–507.

5. Rhoades L., Eisenberger R. Perceived organizational support: A review of the literature // Journal of Applied Psychology. 2002. Vol. 87, No. 4. P. 698–714.

6. Kurtessis J.N., Eisenberger R., Ford M.T., Buffardi L.C., Stewart K.A., Adis C.S. Perceived organizational support: A meta-analytic evaluation of Organizational Support Theory // Journal of Management. 2017. Vol. 43, No. 6. P. 1854–1884.

7. Allen D.G., Shore L.M., Griffeth R.W. The role of perceived organizational support and supportive human resource practices in the turnover process // Journal of Management. 2003. Vol. 29, No. 1. P. 99–118.

8. Rhoades L., Eisenberger R., Armeli S. Affective commitment to the organization: The contribution of perceived organizational support // Journal of Applied Psychology. 2001. Vol. 86, No. 5. P. 825–836.

9. Suárez-Albanchez J., Gutierrez-Broncano S., Jimenez-Estevez P., Blazquez-Resino J.J. Organizational support and turnover intention in the Spanish IT consultancy sector: Role of organizational commitment // Cogent Social Sciences. 2022. Vol. 8, No. 1. Art. 2051790. DOI: 10.1080/23311886.2022.2051790.

10. Jing J., Yan J. Study on the effect of employees' perceived organizational support, psychological ownership, and turnover intention: A case of China's employee // International Journal of Environmental Research and Public Health. 2022. Vol. 19, No. 10. Art. 6016. DOI: 10.3390/ijerph19106016.

11. Silva R., Dias Á., Pereira L., da Costa R.L., Gonçalves R. Exploring the direct and indirect influence of perceived organizational support on affective organizational commitment // Social Sciences. 2022. Vol. 11, No. 9. Art. 406. DOI: 10.3390/socsci11090406.

12. Zhu K., Wang X., Jiang M. The impact of organizational commitment on turnover intention of substitute teachers in public primary schools: Taking psychological capital as a mediator // Frontiers in Psychology. 2022. Vol. 13. Art. 1008142. DOI: 10.3389/fpsyg.2022.1008142.

13. Liu Y., Yu Y., Zeng X., Li Y. Linking preschool teachers' pay equity and turnover intention in Chinese public kindergartens: The mediating role of perceived organizational

support and job satisfaction // Sustainability. 2023. Vol. 15, No. 17. Art. 13258. DOI: 10.3390/su151713258.

14. Ma Y., Toh P.S., Xu Y. The influence of employee engagement and perceived organizational support on turnover intention in Guangxi private colleges and universities // International Journal of Academic Research in Business and Social Sciences. 2024. Vol. 14, No. 9. P. 564–573. DOI: 10.6007/IJARBSS/v14-i9/22250.

15. Blau P.M. Exchange and Power in Social Life. New York: John Wiley & Sons, 1964. 352 p.

16. Meyer J.P., Allen N.J. A three-component conceptualization of organizational commitment // Human Resource Management Review. 1991. Vol. 1, No. 1. P. 61–89.

17. Meyer J.P., Stanley D.J., Herscovitch L., Topolnytsky L. Affective, continuance, and normative commitment to the organization: A meta-analysis of antecedents, correlates, and consequences // Journal of Vocational Behavior. 2002. Vol. 61, No. 1. P. 20–52.

18. Mobley W.H. Intermediate linkages in the relationship between job satisfaction and employee turnover // Journal of Applied Psychology. 1977. Vol. 62, No. 2. P. 237–240.

19. Griffeth R.W., Hom P.W., Gaertner S. A meta-analysis of antecedents and correlates of employee turnover // Journal of Management. 2000. Vol. 26, No. 3. P. 463–488.

20. Hom P.W., Lee T.W., Shaw J.D., Hausknecht J.P. One hundred years of employee turnover theory and research // Journal of Applied Psychology. 2017. Vol. 102, No. 3. P. 530–545.

21. Tett R.P., Meyer J.P. Job satisfaction, organizational commitment, turnover intention, and turnover: Path analyses based on meta-analytic findings // Personnel Psychology. 1993. Vol. 46, No. 2. P. 259–293.

22. Mitchell T.R., Holtom B.C., Lee T.W., Sablynski C.J., Erez M. Why people stay: Using job embeddedness to predict voluntary turnover // Academy of Management Journal. 2001. Vol. 44, No. 6. P. 1102–1121.

23. Brislin R.W. Back-translation for cross-cultural research // Journal of Cross-Cultural Psychology. 1970. Vol. 1, No. 3. P. 185–216.

24. Meyer J.P., Allen N.J., Smith C.A. Commitment to organizations and occupations: Extension and test of a three-component conceptualization // Journal of Applied Psychology. 1993. Vol. 78, No. 4. P. 538–551.

25. Mobley W.H., Horner S.O., Hollingsworth A.T. An evaluation of precursors of hospital employee turnover // Journal of Applied Psychology. 1978. Vol. 63, No. 4. P. 408–414.

26. Farh J.L., Tsui A.S., Xin K., Cheng B.S. The influence of relational demography and guanxi: The Chinese case // Organization Science. 1998. Vol. 9, No. 4. P. 471–488.

27. Hayes A.F. Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach. 3rd ed. New York: Guilford Press, 2022. 732 p.

28. Horn J.L. A rationale and test for the number of factors in factor analysis // Psychometrika. 1965. Vol. 30, No. 2. P. 179–185.

29. Fornell C., Larcker D.F. Evaluating structural equation models with unobservable variables and measurement error // Journal of Marketing Research. 1981. Vol. 18, No. 1. P. 39–50.

30. Henseler J., Ringle C.M., Sarstedt M. A new criterion for assessing discriminant validity in variance-based structural equation modeling // Journal of the Academy of Marketing Science. 2015. Vol. 43, No. 1. P. 115–135.

31. Podsakoff P.M., MacKenzie S.B., Lee J.-Y., Podsakoff N.P. Common method biases in behavioral research: A critical review of the literature and recommended remedies // Journal of Applied Psychology. 2003. Vol. 88, No. 5. P. 879–903.

32. Podsakoff P.M., MacKenzie S.B., Podsakoff N.P. Sources of method bias in social science research and recommendations on how to control it // Annual Review of Psychology. 2012. Vol. 63. P. 539–569.

33. Maxwell S.E., Cole D.A. Bias in cross-sectional analyses of longitudinal mediation // Psychological Methods. 2007. Vol. 12, No. 1. P. 23–44.

МАЗМҰНЫ – СОДЕРЖАНИЕ – CONTENT

ӘЛЕУМЕТТІК-ЭКОНОМИКАЛЫҚ ЖӘНЕ ҚҰҚЫҚ ҒЫЛЫМДАРЫ - СОЦИАЛЬНО-ЭКОНОМИЧЕСКИЕ И ЮРИДИЧЕСКИЕ НАУКИ - SOCIO-ECONOMIC AND LEGAL SCIENCES

Төлегенов Тимур Сейфуллаулы
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