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Corruption-risk interdependencies between managerial roles and business partners and their implications for competitiveness

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Abstract

This study investigates how corruption-risk architectures inside firms and across their partner networks create implicit channels that affect organizational competitiveness. We develop two ISO 37001–consistent indicators, the job position corruption risk number (JPCRN) and the business associate corruption risk number (BACRN), and examine their linear dependencies in Slovak 18 ISO 37001–certified organizations. Our cross-sectional design uses organization-provided 1–5 risk ratings for decision-making managerial roles and for business associates with annual contracts >€100,000, from which we compute COUNTJP, COUNTRJP, %RJP_JP, AVG_JPCRN, COUNTBA, and AVG_BACRN. Dependencies are tested with Spearman correlations, complemented by size-stratified representativeness checks (χ^2). Results show strong positive association between total managerial roles and the count of medium/high-risk roles ($r = 0.93$), negative association between managerial size and the share of risky roles ($r = -0.76$), no material link between headcount and average internal risk ($r = 0.106$), modest co-movement between average internal and associate risks ($r = 0.20$) and independence between managerial size and partner breadth ($r = -0.014$). It implies that competitiveness is threatened by the accumulation of risky approval nodes in larger structures and by concentration of pivotal risk in lean structures, while inside-outside co-movement calls for mirrored controls at the firm-partner boundary. The contribution is twofold: we provide auditable, ISO-aligned indicators that organizations can adopt, and we supply evidence on interdependencies that translate into actionable control priorities without modeling performance directly.

Keywords: *business associates, competitiveness, corruption risks, managerial roles, ISO 37001, performance evaluation.*

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1 INTRODUCTION

Corruption and bribery risks are not only legal and ethical concerns; they also act as frictions in competition. They raise transaction and monitoring costs, distort supplier and partner selection, slow decision cycles, and create reputational shocks that affect tender eligibility, financing conditions, and stakeholder trust. For organizations competing in regulated markets and complex supply networks, anti-bribery governance therefore functions as a competitiveness capability rather than a purely compliance-oriented activity.

Prior research has made substantial progress in explaining how corruption relates to economic performance and market functioning, but much of the evidence remains macro-level (countries, sectors, or public procurement systems) or focuses on program adoption and disclosure rather than on measurable, organization-level risk architectures. In parallel, applied work on corruption analytics has increasingly emphasized measurable "risk nodes" and red-flag

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structures, especially in procurement and third-party relationships. What is still scarce, however, is firm-level evidence that simultaneously quantifies (a) internal exposure concentrated in decision-making roles and (b) external exposure concentrated in business associates**,** and then tests whether these two exposure structures co-move inside the same organization.

This gap is practically important because ISO 37001 explicitly requires organizations to assess bribery risks in relation to relevant roles and business associates, but does not prescribe a quantitative method for doing so. As a result, organizations often rely on internally defined and non-comparable assessments, limiting benchmarking, research reproducibility, and the ability to translate risk assessment into consistent performance evaluation and management review. ISO 37001 also assigns clear responsibilities for the anti-bribery compliance function and for ensuring the system's conformity and performance reporting, reinforcing the need for auditable measurement and traceable indicators.

Against this background, this paper develops and applies two ISO 37001–consistent, auditable indicators of corruption exposure, one for managerial job positions (JPCRN) and one for business associates (BACRN), and estimates their monotonic associations within and across these two domains in ISO 37001–certified organizations. Using a cross-sectional dataset from 18 certified organizations in the Slovak Republic, we compute organization-level aggregates (counts, shares, and averages) and test whether the internal risk architecture is associated with (a) the number and share of risk-exposed managerial roles and (b) the breadth and average riskiness of the business-associate portfolio. Our contribution is methodological (transparent indicators aligned with ISO logic) and empirical (evidence on structural interdependencies that inform control priorities even when competitiveness outcomes are not modeled directly).

The remainder of the paper is structured as follows. Section 2 synthesizes prior work on corruption risk, ISO 37001 governance, and competitiveness implications, and derives a firm-level research gap. Section 3 describes the research design, sampling logic, and indicator construction for JPCRN and BACRN, and states the hypotheses. Section 4 reports descriptive results and correlation tests with appropriate small-sample interpretation. Section 5 discusses the findings in relation to international evidence and outlines implications for anti-bribery management and competitiveness. Section 6 concludes and identifies limitations and future research directions.

The primary objective of this paper is to develop and apply ISO 37001–consistent indicators of corruption exposure in managerial roles and business associates and to rigorously estimate their linear dependencies in ISO 37001–certified organizations, thereby identifying structural interdependencies across the firm–partner boundary that constitute implicit channels affecting organizational competitiveness. Existing studies listed in the references largely examine corruption and competitiveness at macro or sector levels, or focus on the adoption of anti-bribery programs, but they rarely test firm-level interdependencies between internal roles and external partners using standardized, auditable indicators. ISO 37001 obliges organizations to identify and categorize bribery risks for positions and business associates, yet it does not prescribe how to quantify them; consequently, empirical evidence on comparable, organization-level metrics is scarce.

Our study addresses this research gap by operationalizing two explicit ISO-aligned indices – JPCRN (managerial job-position corruption risk number) and BACRN (business-associate corruption risk number), with transparent, weighted criteria and thresholds, and by testing linear

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dependencies among JPCRN variables and between JPCRN and BACRN in ISO 37001–certified firms. This yields reproducible evidence on how risk concentrations (e.g., number of managerial job positions that are exposed to middle and high corruption risks, ratio between managerial job positions that are exposed to middle or high corruption risks and all managerial job positions) and averages (average job position corruption risk number, average business associate corruption risk number) co-move across the firm–partner boundary. The managerial risk indicators used in this study build on the JPCRN framework and organizational-level variables previously proposed and empirically tested by Závadský et al. (2025).

While we do not estimate competitiveness outcomes directly, the documented interdependencies provide an implicit pathway to competitiveness (costs, delays, eligibility, reputation). For example, we show that more managerial roles correlate with more risk-exposed roles ($r\approx0.93$), smaller managerial structures have a higher share of risk-exposed roles ($r\approx-0.76$), and managerial and business associate risk averages are positively related ($r\approx0.20$). Each pattern indicates channels through which risk architecture can propagate performance frictions. The necessity of the research follows the research gap, which also comes from the fact that organizations are required by ISO 37001 to assess these risks. Our research brings consistent measures (JPCRN/BACRN) and evidence on their interrelationships, enabling managers to prioritize controls where risks cluster and to align internal and third-party oversight. This moves the literature beyond generic "corruption–performance" associations to actionable, ISO-grounded metrics that organizations can implement immediately and benchmark over time. Moreover, all ISO management system standards (MSS) include clause 9: performance evaluation, mandating organizations to monitor, measure, analyze, and evaluate performance with appropriate indicators and to review them in management review. Thus, even 37001 alike expect auditable KPIs that link risk controls to outcomes. By quantifying role- and business associate-level corruption exposure with standardized indicators, our study operationalizes the performance-evaluation requirement, provides a basis for internal targets and external assurance, and integrates anti-bribery risk management into the broader competitiveness dashboard used across ISO 37001-certified organizations. While competitiveness was not directly tested, the identified interdependencies indicate meaningful competitive implications. Our study used a cross-sectional design on ISO 37001-certified organizations (n=18; June–Oct 2023). We verified sample representativeness by Pearson's χ^2 goodness-of-fit test by firm size. Inclusion criteria limited positions to decision-making managerial roles and business associates to contracts of>€100k/year. We operationalized risk via ISO-aligned indices: JPCRN (7 weighted decision criteria) and BACRN (5 weighted criteria), producing role-/associate-level scores and organization-level aggregates (COUNTJP, COUNTRJP, %RJP_JP, AVG_JPCRN, COUNTBA, AVG_BACRN). We computed descriptive statistics and visualized relationships, then tested linear dependencies with Spearman's rank correlation (non-parametric), accepting/rejecting hypotheses H1–H5 accordingly; independence hypotheses were examined via near-zero correlations. This approach quantifies interdependencies between internal roles and external partners without modeling competitiveness directly, but with clear implications for performance evaluation under ISO 37001.

2 CORRUPTION RISK, ISO 37001, AND COMPETITIVENESS: LITERATURE REVIEW AND RESEARCH GAP

Effective corruption risk management is a prerequisite for sustainable competitiveness. Corruption elevates transaction costs, distorts partner selection, delays market access, and

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damages reputation – mechanisms that weaken firms' price–quality positioning and innovation capacity. ISO 37001 provides a standardized, auditable framework to identify, assess, and treat bribery risks in both managerial job positions and business associates, embedding risk evaluation within management review and performance indicators (clause 9). Building on this logic, our theoretical background integrates three streams: 1) standards-based governance and measurement (ISO 37001 and indicator design), 2) links between corruption exposure and competitive performance, and 3) role- and third-party–level risk nodes that transmit losses across the firm–partner boundary. We operationalize this through ISO-consistent indicators for positions and associates, enabling comparable assessments, targeted controls, and benchmarking.

2.1 Standards-based governance and measurement

A large strand of research stresses standardized, auditable anti-bribery systems. Méan and Gehring (2018) position ISO 37001 as a globally accepted framework that structures risk assessment, controls, and independent assurance. Methodologically, indicator construction has advanced through bespoke indices and analytics: Van der Wal et al. (2016) present methods for assessing corruption risks in terms of their perception and strategies; Veselovská et al. (2020) introduce a bribery risk index (BRI); Cardoni et al. (2020) link continuous auditing and data mining to strategic risk control; Fazekas et al. (2016) and Decarolis and Giorgiantonio (2022) derive objective risk indicators from procurement data; Alani and Mahjoob (2021) use bow-tie analysis; Lisciandra et al. (2022) deploy data-envelopment analysis, and Makhdalena et al. (2021) stress the need for consistent metrics for disclosing anti-corruption programs. Legislative and firm-level prevention complements systems approaches (Markscheffel & Plouffe, 2021; Kotchegura, 2018). This literature establishes how to design controls and how to quantify exposure – principles ISO 37001 operationalizes within organizations.

2.2 Corruption, markets, and competitiveness

Corruption reshapes incentives, prices, and entry barriers, with measurable impacts on performance and growth. Macro–meso studies show how corruption distorts public procurement (Davis et al., 2024; Aponte, 2019; Wachs et al., 2021; Pinchuk et al., 2022), damages entrepreneurship and innovation (Wittberg et al., 2024; Audretsch et al., 2022; Calin, 2022), and reduces competitiveness (Spyromitros & Panagiotidis, 2022; Ivanyna et al., 2016). Hazy et al. (2023) theorize systemic emergence of corruption from uncertainty exploitation, motivating policy/managerial interventions. Sector studies – energy, water, logistics – underline context-specific risk channels and the value of transparent, data-driven oversight (Rimsaite, 2019; Bellaubi & Visscher, 2016; Qazi et al., 2022). The broader context of economic activities and how corruption risks affect them is pointed out by Vitvitskyi et al. (2022). Together, these works link lower corruption exposure with stronger competitive positioning via lower transaction costs, better access to tenders/finance, and reputational capital.

2.3 Corporate governance, transparency, and ethics

Firm-level integrity systems interact with disclosure and ethics. Krishnamurti et al. (2018) find that CSR and strong institutions mitigate corruption risks; Healy and Serafeim (2016) connect anti-corruption disclosures with enforcement and future events. Marzouki et al. (2024) demonstrate that business ethics strengthen the link between ESG reporting and lower corruption risk. Stakeholder engagement improves public-sector A/C system adoption

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(Monteduro et al., 2020). Codes of conduct align anti-corruption language with firm-specific risk (Bogachek, Gietzmann, & Grossetti, 2023). Psychological and legal perspectives add complementary levers (Hnylytska et al., 2018; Pogozhina & Sergeeva, 2021; Pogozhina & Sergeeva, 2022). The synthesis: governance quality, transparent metrics, and ethics are mutually reinforcing determinants of lower risk and competitive resilience.

2.4 Supply chains and business associates, and market penalties

Corruption risk is not contained within firm boundaries. In supply chains, market penalties are severe when misconduct arises upstream (Kim & Wagner, 2020; Liu et al, 2019). Data-driven public procurement monitoring identifies network structures conducive to risk (Fazekas & Kocsis, 2020; Díaz et al., 2022), while decision-support systems and integrated datasets strengthen detection (Velasco et al., 2020; Vasconcelos & Cavique, 2022). Private-sector mappings and comprehensive programs stress multi-stakeholder cooperation (Biderbost et al., 2019; Prozumentov et al., 2019; Soloviev & Khurshudyan, 2020). Spillovers across sectors and partners amplify exposure (Budak et al., 2023), and even in low-corruption settings, procurement risks can distort profitability (Wittberg & Fazekas, 2023). For multinationals, perceived host-country corruption shapes subsidiary structures and strategy (Sartor & Beamish, 2020). Implication: third-party governance is a primary vector through which corruption risk affects competitive outcomes.

2.5 Managerial job positions as internal risk nodes

Within firms, corruption risk is concentrated in roles that involve decision-making authority, resource allocation, and boundary-spanning contacts. Empirical work on firm-level determinants (Krishnamurti et al., 2019; La Rosa et al., 2022; Lopatta et al., 2017) links governance quality and financial constraints to corruption exposure. Merit-based bureaucracies and integrity systems reduce risks in administrative processes (Sharma et al., 2019; Charron et al., 2017; Yanishevska et al., 2023). This stream motivates role-specific metrics for monitoring and control – precisely where ISO 37001 requires organizations to identify, assess, and treat bribery risks in job positions.

2.6 From constructs to operational indicators: JPCRN and BACRN

The literature provides concepts and tools, but organizational practice needs auditable, comparable indicators for 1) managerial job positions and 2) business associates. Building on ISO 37001's requirements and prior index-based approaches (e.g., BRI; procurement red flags), our study adopts two explicit, ISO-consistent constructs: job position corruption risk number (JPCRN) and business associate corruption risk number (BACRN). These quantify exposure at the node level and aggregate to interpretable organizational metrics (counts, shares, averages) suitable for performance evaluation and management review.

2.7 Directed pathway to competitiveness and the research gap

Prior research convincingly links corruption to performance and outlines sophisticated detection tools. However, three gaps persist at the firm level:

– Limited evidence on interdependencies between internal managerial roles and external business associates measured with standardized, ISO-aligned indicators within certified organizations.

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- Sparse analysis translates such interdependencies into implicit channels to competitiveness (costs, cycle time, market access, reputation) without requiring direct performance modeling.
- Under-specified guidance for integrating role-level and third-party metrics into the ISO management system.

Our contribution addresses these gaps by operationalizing JPCRN and BACRN, testing linear dependencies among managerial variables and across the firm–partner boundary, and interpreting the resulting architecture as actionable input for ISO 37001 programs and for competitiveness-oriented performance management.

3 RESEARCH METHODOLOGY

3.1 Research objectives and hypotheses: ISO 37001–aligned indicators, linear dependencies, and competitiveness

The main objective of the study is to develop and apply ISO 37001–consistent indicators of corruption exposure in managerial roles and business associates and to rigorously estimate their linear dependencies in ISO 37001–certified organizations, thereby identifying structural interdependencies across the firm–partner boundary that constitute implicit channels affecting organizational competitiveness.

The decomposition of the main objective into partial objectives follows the architecture of ISO 37001 risk assessment and control design. ISO 37001 requires organizations to assess bribery risks associated with both internal roles and external business associates, and to ensure that an adequately resourced compliance function oversees design, implementation, conformity, and performance reporting of the anti-bribery management system. Operationally, this logic implies (a) measurable indicators for role-level and third-party exposure, (b) analysis of how exposure concentrates or dilutes as organizational structures scale, and (c) evaluation of whether internal and external exposure domains are coupled or separable for control purposes. The four partial objectives and five hypotheses therefore translate the ISO governance logic into testable, organization-level propositions using auditable indicators. There are four partial objectives derived from the main objective:

- The construction of corruption exposure indicators follows the ISO 37001-oriented methodology proposed by Závadský et al. (2025), who introduced quantitative measures such as COUNTJP, COUNTRJP, %RJP_JP and AVG_JPCRN for evaluating corruption-prone managerial positions. The present study extends this framework by incorporating business associate indicators (COUNTBA, BACRN and AVG_BACRN). COUNTJP is number of managerial job positions in the selected organization, COUNTRJP is number of managerial job positions which are exposed to middle and high corruption risks with JPCRN > 2.99, AVG_JPCRN is average job position corruption risk number calculated from all JPCRN in the sample of organizations, %RJP_JP is ratio between managerial job positions that are exposed to middle or high corruption risks with JPCRN > 2.99 and all managerial job positions in the explored organization, COUNTBA is number of business associates with a yearly contract of more than 100,000 euros in the selected organization and AVG_BACRN is average business associate corruption risk number calculated from all BACRN in the sample of organizations.

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- Intra-managerial dependencies: estimate linear relationships within the managerial risk structure (H1–H3), specifically COUNTJP→COUNTRJP, COUNTJP→%RJP_JP, and COUNTJP→AVG_JPCRN, to identify concentration/dilution patterns of risk.
- Cross-boundary relations & independence: test linear association/independence between internal and external risk indicators (H4, H5: AVG_JPCRN ⊥ AVG_BACRN; COUNTJP ⊥ COUNTBA) to determine whether risk systems co-move or can be managed as separate levers.
- Performance-evaluation translation: interpret the empirical patterns as implicit channels to competitiveness and convert findings into ISO MSS clause 9–aligned guidance.

Four partial research objectives led us to formulate five research hypotheses. There is a competitiveness-focused interpretation of each hypothesis, showing how higher or lower values would affect organizational competitiveness (costs, speed, quality, access to markets, reputation), within the ISO 37001 context:

- H1: The number of managerial job positions (COUNTJP) has a positive linear dependence on managerial job positions that are exposed to middle and high corruption risks (COUNTRJP) in the sample of organizations certified according to the ISO 37001 standard.

  [H1: COUNTJP → COUNTRJP (positive linear dependence) – as the total number of managerial positions (COUNTJP) rises, the count of positions exposed to middle/high corruption risk (COUNTRJP) also rises].

  Competitiveness impact:

  Higher COUNTJP (→ higher COUNTRJP): more risk-exposed approvals and boundary roles increase opportunities for rent-seeking, bid manipulation, and leakage – raising procurement costs, slowing decisions, and elevating compliance overhead. Net effect: lower competitiveness unless controls scale proportionally. Lower COUNTJP (→ lower COUNTRJP): fewer potential high-risk nodes reduce monitoring burden and transaction frictions, improving cost efficiency and speed – higher competitiveness.

- H2: The number of managerial job positions (COUNTJP) has a positive linear dependence on the ratio between managerial job positions that are exposed to middle or high corruption risks and all managerial job positions (%RJP_JP) in the sample of organizations certified according to the ISO 37001 standard.

  [H2: COUNTJP → %RJP_JP (positive linear dependence) – as COUNTJP grows, the share of risky managerial roles (%RJP_JP) tends to increase].

  Competitiveness impact:

  Higher %RJP_JP: risk becomes normalized across management layers, raising the probability of systemic control override, supplier favoritism, and sanction exposure – hurting reputation, tender eligibility, and financing terms – competitiveness declines. Lower %RJP_JP: risk is concentrated in a smaller slice of roles, enabling targeted mitigation and cleaner governance signals to markets – competitiveness improves.

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– H3: Number of managerial job positions (COUNTJP) has a negative linear dependence on the average job position corruption risk number (AVG_JPCRN) in the sample of organizations certified according to the ISO 37001 standard.

  [H3: COUNTJP → AVG_JPCRN (negative linear dependence) – as COUNTJP increases, the average job-position corruption risk number (AVG_JPCRN) decreases (risk per role dilutes)].

  Competitiveness impact:

  Higher COUNTJP with lower AVG_JPCRN: risk is spread thin across more roles, which can reduce the average exposure per role and soften expected loss per decision – potential competitiveness gain through resilience – if monitoring remains effective. Lower COUNTJP with higher AVG_JPCRN: fewer but more pivotal high-risk roles create single points of failure; breaches here cause outsized cost/reputation shocks – competitiveness at greater risk unless controls are exceptionally strong on those nodes.

– H4: The average job position corruption risk number (AVG_JPCRN) is an independent variable from the average business associate corruption risk number (AVG_BACRN) in the sample of organizations certified according to the ISO 37001 standard.

  [H4: AVG_JPCRN ⊥ AVG_BACRN (independence) – the average internal managerial risk (AVG_JPCRN) is statistically independent from the average business-associate risk (AVG_BACRN)].

  Competitiveness impact:

  Independence holds: firms can tune internal controls (segregation of duties, approval thresholds) and external controls (due diligence, third-party audits) as separate levers. This modularity reduces coordination complexity and cost, supporting competitiveness. If violated in practice (for managers to watch): coupled spikes would amplify losses across the boundary, eroding margins, and eligibility – competitiveness would fall.

– H5: The number of managerial job positions (COUNTJP) is an independent variable from the number of business associates (COUNTBA) in the sample of organizations certified according to the ISO 37001 standard.

  [H5: COUNTJP ⊥ COUNTBA (independence) – the number of managerial positions (COUNTJP) is independent from the number of business associates (COUNTBA)].

  Competitiveness impact:

  Independence holds: scaling the partner base (to gain price/innovation advantages) does not require proportional growth in management headcount. With ISO 37001 controls, this yields economies of scale in governance – higher competitiveness (lower unit compliance cost, faster sourcing). If, de facto, dependence emerges: partner expansion would force managerial sprawl, inflating overhead and risk touchpoints – competitiveness would weaken via higher costs and slower cycle times.

https://doi.org/10.7441/joc.2026.03.02

3.2 Operationalizing ISO 37001: construction of JPCRN and BACRN corruption-risk indices for job positions and business associates

The ISO 37001 standard does not specify how to calculate the level of corruption risk in relation to job positions or business partners. The standard always requires risk categorization in relation to all positions and business associates, both of which are exposed to more than a low bribery risk. Since the standard does not require a specific method or index, for the validity and consistency of the research, we proposed the JPCRN and BACRN indicators.

The JPCRN was calculated using the multi-criteria framework proposed by Závadský et al. (2025), who operationalized corruption exposure through seven weighted decision-making criteria. The JPCRN index includes seven decision-making criteria (D_i) with the following weights (W_i): D1 (0.15): decides on the allocation of financial resources; D2 (0.15): decides on the imposition of sanctions and/or fines; D3 (0.3): decides on the allocation of licenses, concessions, and permits; D4 (0.2): approves contracts and orders; D5 (0.1): performs control of the fulfillment of contractual conditions when using funds from the European Union or other funds; D6 (0.05): comes into contact with non-public information, the leakage of which could have an economic impact; and D7 (0.05): prepares documentation for imposing sanctions and/or fines. For each defined criterion, the impact of the exposure of the respective job position to corruption risk is determined. The value of the impact of corruption risk according to the given criterion is determined quantitatively as follows:

- The criterion has only a negligible impact on the given job position | 1;
- The criterion has a non-negligible impact on the given job position | 2;
- The criterion has a concerning impact on the given job position | 3;
- The criterion has a very concerning impact on the given job position | 4;
- The criterion has a critical/crisis impact on the given job position | 5.

The JPCRN is calculated as the sum of the multiples of the impact and the weight of the given criterion as follows:

$$JPCRN = \sum_{i=1}^{n} Di \; x \; Wi \qquad (1)$$

where D_i is the i-th criterion from the set of all criteria; n = 7; $D_i \in [1; 5]$ and W_i is the weight of the i-th criterion, with the sum of the weights of all criteria being 1. It applies that if JPCRN assumes a value of 1 to 2.99, it indicates a job position exposed to low corruption risk, if it assumes a value of 3 to 3.99, it indicates a medium-risk job position, and if it assumes a value of 4 to 5, it indicates a high-risk job position.

The BACRN quantifies the bribery and corruption exposure associated with an organization's external business relationships. The indicator operationalizes the ISO 37001 requirement to assess bribery risks related to business associates by translating qualitative risk attributes into a structured, auditable numerical index. BACRN is constructed as a weighted composite of five criteria capturing key dimensions of corruption exposure in external relationships: (D1) decision-making authority of the business associate in transactions with the organization, (D2) financial materiality of the relationship, (D3) degree of interaction with public officials, (D4) geographic and sectoral risk context, and (D5) transparency and control characteristics of the relationship. Each criterion is evaluated on a five-point ordinal scale (1 = very low risk; 5 =

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very high risk) based on documented assessments conducted within the organization's anti-bribery management system. Formally, BACRN is computed as:

$$BACRN_i = \sum_{k=1}^{5} w_k \cdot D_{ik}, \quad (2)$$

where D_{ik}denotes the score of criterion $k$for business associate i, and $w_k$represents the corresponding normalized weight, with $\sum_{k=1}^{5} w_k = 1$. By construction, BACRN values lie within the closed interval ⟨1, 5⟩. Higher values indicate greater corruption risk associated with a given business associate.

For each organization, two aggregate indicators are derived: (i) the count of business associates with medium or high BACRN values (BACRN ≥ 3), capturing the breadth of external exposure, and (ii) the average BACRN across all assessed associates, reflecting the overall risk intensity of the external relationship portfolio. These aggregates are consistent with ISO 37001's emphasis on both the identification of significant risk exposures and the ongoing monitoring of the effectiveness of anti-bribery controls.

3.3 Data collection and sample representativeness

Our empirical study targeted organizations certified to ISO 37001. The standard obliges organizations to identify and assess bribery risks for both managerial job positions and business associates, providing a consistent basis for measurement. As of June 2023, publicly available sources listed 193 ISO 37001–certified organizations (study population). The research was conducted from June to October 2023. In cooperation with the Institute of Management Systems, Faculty of Economics, Matej Bel University, we applied purposive sampling with two inclusion criteria: 1) valid ISO 37001 certification and 2) availability of position-level and associate-level risk assessments. To ensure anonymity, participating firms were coded O1–O18 (n = 18). We classified firms by size to reflect structural heterogeneity in risk governance:

- MCO (Micro) = [O7, O18]
- SO (Small) = [O4, O5, O8, O9, O14, O15, O17]
- MDO (Medium) = [O2, O10, O11, O12, O13, O16]
- LO (Large) = [O1, O3, O6]

This stratification enables like-for-like interpretation of corruption-risk patterns across governance complexity levels. All data were sourced from organizations' ISO 37001 risk registers and related documentation; no identifying information was collected or reported.

All participating organizations were located in the Slovak Republic. We personally visited each organization and, for data collection, conducted interviews with the anti-corruption manager and analyzed their ISO 37001 risk registers and documentation. Each organization assessed the corruption risk level for every managerial job position and business associate on a scale of 1–5. We compiled these assessments into the dataset reported in tables 2–5, from which we calculated correlation indices and confirmed or rejected the hypotheses.

Sampling proceeded as follows: (1) the publicly identifiable population of ISO 37001–certified organizations as of June 2023 (N=193) was contacted; (2) organizations were eligible if they held valid certification and maintained role-level and business-associate risk assessments that

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could be shared for research; (3) organizations that declined participation, could not share sufficiently granular assessments, or could not schedule an interview within the field period were excluded; (4) the final analytic sample comprised 18 organizations (coded O1–O18) for which both managerial-role and business-associate assessments were available.

Then we calculated the representativeness of the sample using Pearson's chi-squared test (χ2-test), which is also known as the 'goodness-of-fit' test (Agresti, 2018). It tests a null hypothesis, stating that the frequency distribution of certain events observed in a sample (n_i) is consistent with a particular theoretical distribution (np_i) at the level of statistical significance (α) for appropriate degrees of freedom (k-1), where k is the number of fitted parameters. The frequencies observed and the expected (theoretical) frequencies are shown in table 2.

Tab. 1 – χ2-test due to organizations´ size. Source: own research

	np_i [%]	n_i [%]	$(n_i - np_i)^2$	χ^2
Micro organizations – MCO	10.00	11.11	1.23	0.12
Small organizations – SO	50.00	38.89	123.46	2.47
Medium organizations – MDO	30.00	33.33	11.11	0.37
Large organizations - LO	10.00	16.67	44.44	4.44
			Σ	7.41

The χ^2 value we achieved is lower than the critical χ^2 value at the level of statistical significance $\alpha = 0.05$ for 3 degrees of freedom (4 - 1), which in particular presents the value of 7.815 (value in statistical tables). Although the size distribution of the participating organizations is not statistically inconsistent with the size distribution in the publicly identified certified population (χ^2 goodness-of-fit), this does not establish representativeness in a probabilistic sense because participation required both ISO certification and willingness/ability to share internal risk-register data. The sample should therefore be interpreted as a purposive, information-rich subset of certified organizations, and findings should be generalized cautiously.

4 RESULTS AND DISCUSSION

4.1 Correlation analysis of the mutual influence of risky management positions and business partners

The data obtained through the examination of job positions that are exposed to corruption risk are presented in tables 2 and 3. The number of job positions (COUNTJP) that were evaluated included only a set of managerial job positions with the authority to make decisions. For the organizations in the sample, the number of managerial positions does not correspond to the total number of employees. The total number of employees is not a variable in our empirical

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research. Organizations assessed the level of corruption risk. In tables 2 and 3, job positions that are exposed to medium and high corruption risk are highlighted in gray. The variable is labeled as COUNTRJP.

Tab. 2 – Data set [O1, O9] for AVG_JPCRN calculation. Source: own research

	O1	O2	O3	O4	O5	O6	O7	O8	O9
$JPCRN_1$	1.20	1.20	1.15	1.15	3.00	1.20	1.15	1.15	1.25
$JPCRN_2$	1.30	1.15	1.15	3.50	4.25	1.30	1.25	3.00	3.00
$JPCRN_3$	1.50	1.20	3.55	1.15	1.25	1.50	2.00	3.00	3.50
$JPCRN_4$	1.60	2.50	4.00	4.00	3.00	1.60	3.00	1.25	1.05
$JPCRN_5$	1.70	2.95	4.25	4.50	3.50	1.70	1.50	2.00	1.05
$JPCRN_6$	2.90	2.30	4.00	3.00	2.00	2.90	3.50	2.00	3.75
$JPCRN_7$	3.25	3.15	2.15	1.25	2.00	3.25	4.00	1.15	4.50
$JPCRN_8$	2.90	3.00	1.25	1.75	2.00	3.00	1.50	3.50	2.00
$JPCRN_9$	4.00	4.00	1.25	1.90	2.25	2.00	1.50	4.00	2.50
$JPCRN_{10}$	4.25	3.50	2.50	2.50	1.15	1.75			1.50
$JPCRN_{11}$	3.20	3.50	3.00	2.50	1.05	1.75			1.15
$JPCRN_{12}$	3.25	2.85	2.75	2.25	1.15	3.25			2.00
$JPCRN_{13}$	2.50	1.00	2.75	2.20	1.25	2.50			1.75
$JPCRN_{14}$	2.25	1.15	2.50	1.15		2.25			1.50
$JPCRN_{15}$	2.05	1.15	2.25	1.05		2.05			
$JPCRN_{16}$	2.20	1.25	2.05	1.30		2.20			
$JPCRN_{17}$	2.25	2.00	1.20	1.30		2.25			
$JPCRN_{18}$	2.45	2.10	1.25			2.45			
$JPCRN_{19}$	3.15	2.10	2.00			3.15			
$JPCRN_{20}$	3.50	2.25	2.10			3.50			
$JPCRN_{21}$	2.90	1.10	2.10			3.50			
$JPCRN_{22}$	2.00	1.10	2.25			2.00			
$JPCRN_{23}$	1.20		1.10			2.00			
$JPCRN_{24}$	1.30		1.10			2.50			
$JPCRN_{25}$	1.50					1.50			
$JPCRN_{26}$	2.35					1.15			
$JPCRN_{27}$	1.50					3.00			
$JPCRN_{28}$	1.15					2.00			
$JPCRN_{29}$	2.00					1.75			
$JPCRN_{30}$	2.25					2.25			
$JPCRN_{31}$	2.15								
$JPCRN_{32}$	1.25								
$JPCRN_{33}$	1.25								
AVG_JPCRN	2.25	2.11	2.24	2.14	2.14	2.24	2.16	2.34	2.18
STDEV	0.86	0.96	0.99	1.07	1.02	0.69	1.06	1.07	1.11
COUNTJP	33	22	24	17	13	30	9	9	14
COUNTRJP	7	5	5	4	4	7	3	4	4
%RJP_JP	21.21	22.73	20.83	23.53	30.77	23.3	33.3	44.4	28.6

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Based on the data from the selected sample of organizations, we calculated the average JPCRN (AVG_JPCRN) for each organization from all JPCRNs within that organization. Thus, we calculated 18 JPCRNs. Another variable we calculated was the percentile share between medium- and high-risk job positions and the total number of managerial job positions (%RJP_JP).

Tab. 3 – Data set [O10, O18] for AVG_JPCRN calculation. Source: own research

	O10	O11	O12	O13	O14	O15	O16	O17	O18
$JPCRN_1$	1.20	3.00	1.50	4.00	3.00	1.15	4.00	3.50	3.00
$JPCRN_2$	1.30	4.00	2.00	2.00	3.50	3.00	3.00	3.00	3.50
$JPCRN_3$	1.50	4.50	2.00	2.00	1.15	1.05	3.00	4.00	1.50
$JPCRN_4$	1.60	2.00	2.25	2.00	4.00	1.50	1.75	1.25	1.25
$JPCRN_5$	1.70	3.50	3.00	1.50	3.50	2.00	1.70	2.00	2.50
$JPCRN_6$	2.90	3.00	3.50	1.50	1.25	4.00	4.00	2.00	2.00
$JPCRN_7$	3.25	2.00	2.00	3.00	2.00	4.00	3.75	2.25	2.00
$JPCRN_8$	4.00	1.25	1.50	3.50	2.15	3.75	2.00	3.00	
$JPCRN_9$	4.25	2.50	1.50	4.00	2.00	1.50	2.00	1.15	
$JPCRN_{10}$	4.25	1.35	1.75	2.00	2.25	1.75	2.00	1.25	
$JPCRN_{11}$	3.20	1.50	2.00	1.50	1.50	2.00	1.75	1.75	
$JPCRN_{12}$	2.00	1.75	2.25	1.50	1.75	2.00	1.30	2.00	
$JPCRN_{13}$	2.50	2.00	3.75	1.50	3.25	1.15	1.30	2.00	
$JPCRN_{14}$	1.50	1.50	4.00	1.75	1.25	1.25	1.25		
$JPCRN_{15}$	1.90	1.25	1.25	2.50	1.25		2.00		
$JPCRN_{16}$	2.00	2.00	1.50	2.00	1.25		2.00		
$JPCRN_{17}$	2.00	1.25	1.50	2.00	1.75		2.00		
$JPCRN_{18}$	1.75	2.00	1.50	1.75			2.75		
$JPCRN_{19}$	2.00	2.25		4.00			2.00		
$JPCRN_{20}$	1.75	2.00		1.50			2.00		
$JPCRN_{21}$	2.00	2.50		1.25			2.50		
$JPCRN_{22}$	1.25	2.00		1.75			2.75		
$JPCRN_{23}$		2.50		1.75					
$JPCRN_{24}$		2.00		2.00					
AVG_JPCRN	2.26	2.23	2.15	2.18	2.16	2.15	2.31	2.24	2.25
STDEV	0.96	0.85	0.85	0.86	0.94	1.08	0.82	0.89	0.80
COUNTJP	22	24	18	24	17	14	22	13	7
COUNTRJP	5	5	4	5	5	4	5	4	2
%RJP_JP	22.73	20.83	22.22	20.83	29.41	28.57	22.73	30.77	28.57

To evaluate the proposed relationships, Spearman's rank correlation coefficient (r) was used due to the ordinal nature of the indicators and the small sample size (n = 18). All results are interpreted cautiously, focusing on effect size and direction rather than mechanical hypothesis acceptance.

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In Hypothesis H1, we assumed that number of managerial job positions (COUNTJP) has a positive linear dependance on managerial job positions that are exposed to middle and high corruption risks (COUNTRJP) in the sample of organizations certified according to the ISO 37001 standard. The mutual dependency of these two variables is shown in figure 1.

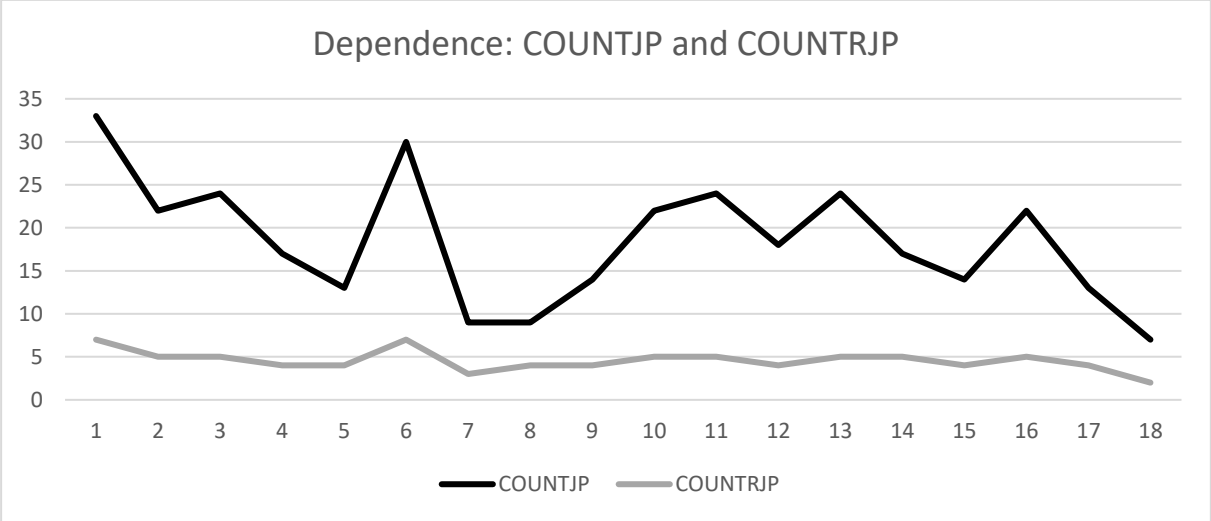


Fig. 1 – Dependance of COUNTJP from COUNTRJP. Source: own research

A strong positive monotonic association was observed between the total number of managerial job positions (COUNTJP) and the number of positions classified as medium or high risk (COUNTRJP) ($r = 0.93$). This provides evidence consistent with the expectation that organizations with more decision-making roles also exhibit a greater absolute number of risk-exposed positions. Given the sample size and purposive design, this result is interpreted as a structural association within the studied organizations rather than a population-level estimate.

In Hypothesis H2, we assumed that number of managerial job positions (COUNTJP) has a positive linear dependance on the ratio between managerial job positions which are exposed to middle or high corruption risks and all managerial job positions (%RJP_JP) in the sample of organizations certified according to the ISO 37001 standard.

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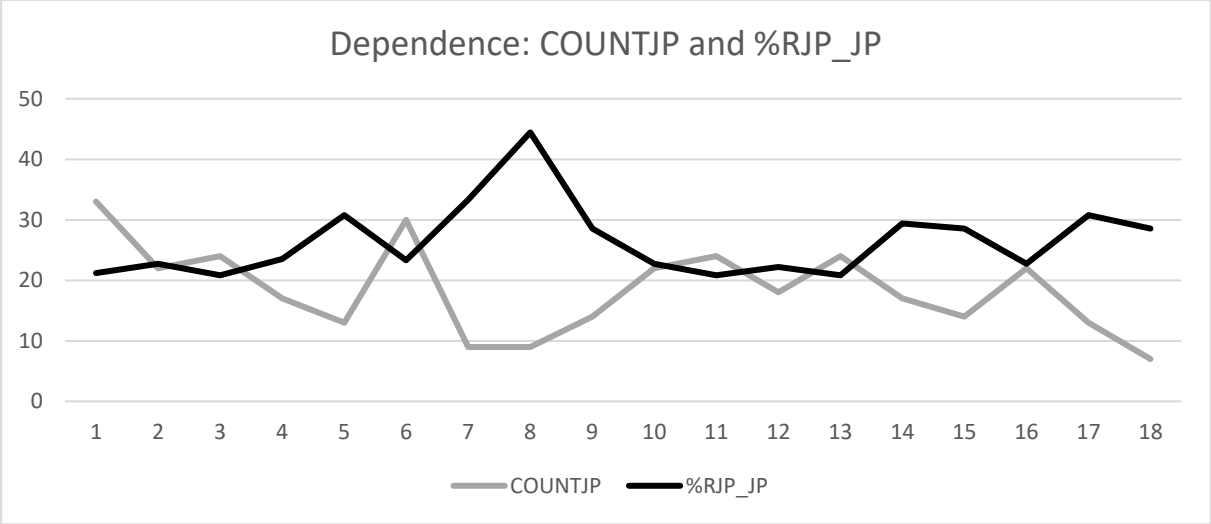


Fig. 2 – Dependance of COUNTJP from %RJP_JP. Source: own research

As figure 2 shows, the association between COUNTJP and the percentage of risk-exposed managerial positions (%RJP_JP) was strong and negative ($r = -0.76$). This indicates that, while larger managerial structures contain more risk-exposed positions in absolute terms, the relative concentration of risk tends to decline as the number of managerial roles increases. This pattern suggests a dilution of corruption risk across a broader decision structure.

In Hypothesis H3, we assumed that number of managerial job positions (COUNTJP) has a negative linear dependance on the average job position corruption risk number (AVG_JPCRN) in the sample of organizations certified according to the ISO 37001 standard. As figure 3 shows, the relationship between COUNTJP and the average JPCRN score (AVG_JPCRN) was weak and close to zero ($r = 0.106$). This result provides no evidence of a monotonic association between organizational managerial size and average internal corruption risk. In other words, increasing the number of managerial positions does not appear to systematically increase or decrease the average level of internal corruption exposure.

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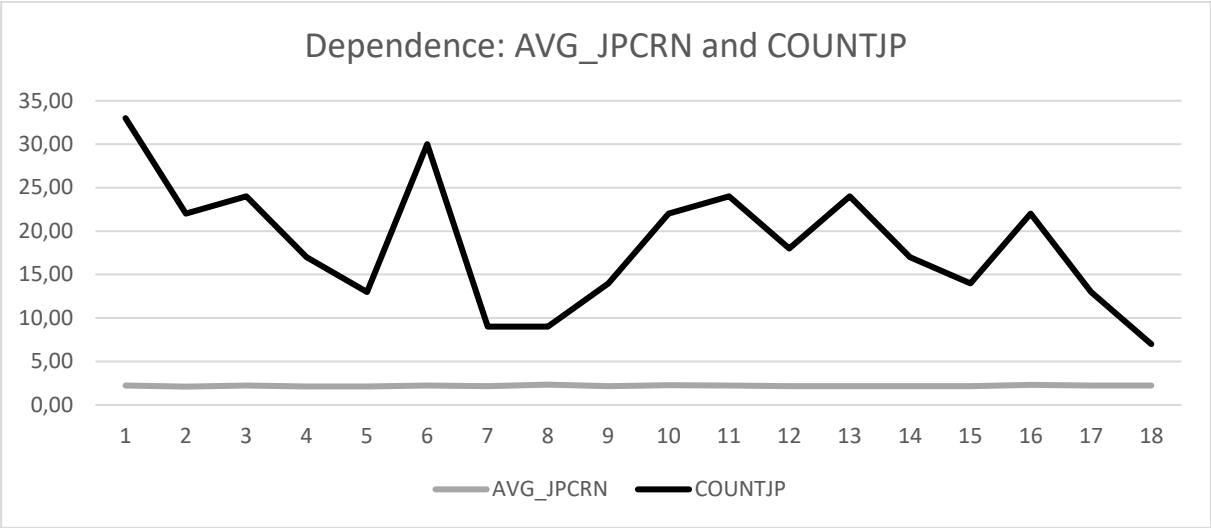


Fig. 3 – Dependance of AVG_JPCRN from COUNTJP. Source: own research

Similar to the procedure used to determine the JPCRN for managerial positions, the BACRN was calculated for each organization. For this purpose, each organization identified its business associates with annual contractual volumes exceeding €100,000. The resulting individual BACRN values are presented in tables 4 and 5. Based on these data, two aggregate indicators were computed at the organizational level: the average BACRN (AVG_BACRN) and the total number of assessed business associates (COUNTBA). Although some organizations apply lower internal thresholds for business-associate risk assessment (e.g., €50,000 annually), only associates meeting the predefined selection criterion were included to ensure consistency and comparability across the sample.

Business associates classified as exposed to medium or high corruption risk are highlighted in Tables 4 and 5. Overall, only a limited number of organizations report business associates in these higher-risk categories. This distribution motivates an examination of the relationship between internal corruption exposure, measured at the level of managerial job positions, and external exposure related to business associates.

Tab. 4 – Data set [O1, O9] for AVGBACRN calculation. Source: own research

	O1	O2	O3	O4	O5	O6	O7	O8	O9
$BACRN_1$	1.50	1.00	1.25	2.00	2.00	1.00	1.50	1.50	1.01
$BACRN_2$	1.00	1.00	2.75	2.00	2.00	1.00	1.00	1.15	1.01
$BACRN_3$	1.25	1.00	2.00	2.25	1.75	1.00	1.25	1.25	1.01
$BACRN_4$	1.25	2.00	1.05	2.75	1.50	2.00	1.25	2.75	1.50
$BACRN_5$	4.00	2.25	1.05	1.00	1.25	2.25	1.50	1.00	1.00
$BACRN_6$	2.00	2.50	1.15	1.15	1.15	2.50	1.15	1.15	1.25
$BACRN_7$	1.15	2.50	1.50	1.50	1.50			2.50	1.25
$BACRN_8$	3.00	2.25	2.00	1.50	1.15				1.25
$BACRN_9$	1.50	1.50			1.25				1.25
$BACRN_{10}$	2.00	2.00			2.00				

https://doi.org/10.7441/joc.2026.03.02

$BACRN_{11}$	2.00	1.25							
$BACRN_{12}$	2.00								
$BACRN_{13}$	2.50								
$BACRN_{14}$									
AVG_BACRN	1.93	1.75	1.59	1.77	1.56	1.63	1.28	1.61	1.17
STDEV	0.84	0.61	0.61	0.59	0.36	0.70	0.20	0.71	0.17
COUNTBA	13	11	8	8	10	6	6	7	9

Tab. 5 – Data set [O10, O18] for AVGBACRN calculation. Source: own research

	O10	O11	O12	O13	O14	O15	O16	O17	O18
$BACRN_1$	1.50	1.50	1.00	1.00	2.00	2.00	2.25	1.15	3.00
$BACRN_2$	1.15	1.15	1.05	2.00	2.00	2.25	1.50	1.15	3.50
$BACRN_3$	1.25	1.25	1.00	2.25	2.00	1.50	1.15	1.75	1.50
$BACRN_4$	1.25	1.25	2.00	2.50	1.15	1.15	1.25	2.50	1.50
$BACRN_5$	1.15	1.50	2.25	2.50	1.15	1.25	2.00	2.25	1.15
$BACRN_6$	3.00	1.00	2.50	1.00	1.75	1.75	2.25	1.50	1.15
$BACRN_7$	2.75	1.25		1.25	1.00	1.75	2.50	1.15	1.15
$BACRN_8$	2.00	1.25		1.25	2.00	2.00	2.50	3.25	1.75
$BACRN_9$				1.00	2.25	1.25	1.15	1.15	1.75
$BACRN_{10}$				1.50	2.50	1.25		1.15	1.50
$BACRN_{11}$				1.15	2.50	2.25		1.75	2.00
$BACRN_{12}$				1.25		1.50			2.25
$BACRN_{13}$				1.25		2.00			1.75
$BACRN_{14}$				1.25		2.25			2.50
AVG_BACRN	1.76	1.27	1.63	1.51	1.85	1.73	1.84	1.70	1.89
STDEV	0.75	0.17	0.69	0.55	0.53	0.41	0.58	0.70	0.71
COUNTBA	8	8	6	14	11	14	9	11	14

Hypothesis H4 examined whether average internal corruption exposure (AVG_JPCRN) is associated with average business-associate exposure (AVG_BACRN) in organizations certified according to ISO 37001. As illustrated in figure 4, the relationship between these variables appears weak. The correlation analysis confirms this visual impression: Spearman's rank correlation indicates a small positive association ($r = 0.20$), with a bootstrapped 95% confidence interval spanning zero. Accordingly, the data provide no evidence of a systematic monotonic relationship between average internal corruption risk and average business-associate corruption risk in the studied organizations. While some organizations exhibit relatively higher risk levels in both domains, this pattern is neither strong nor consistent across the sample.

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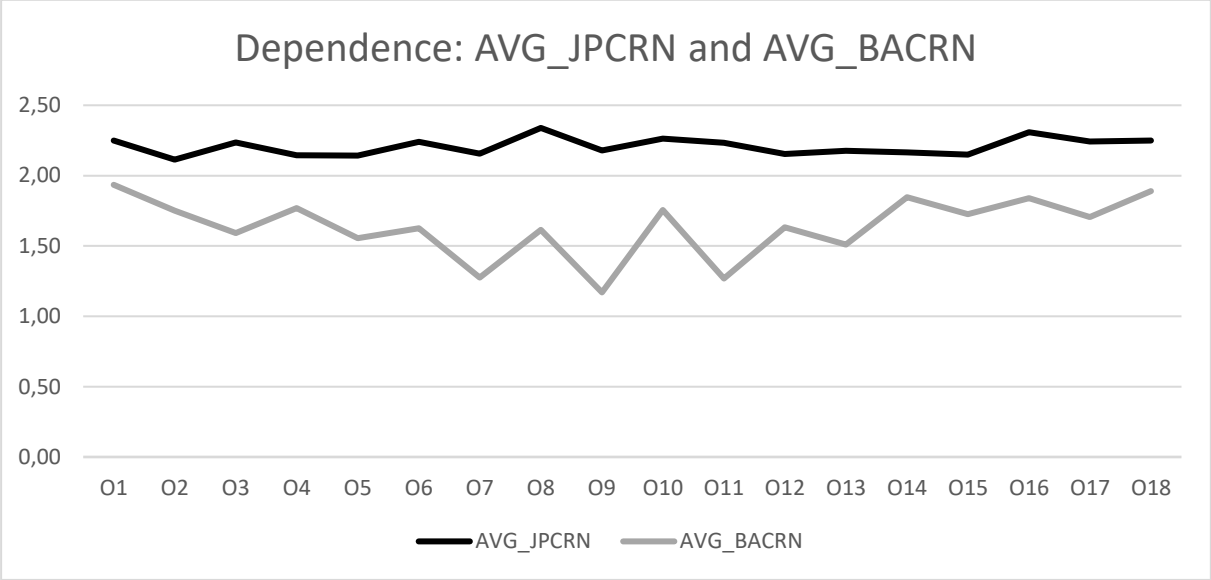


Fig. 4 – Dependance of AVG_JPCRN from AVG_BACRN. Source: own research

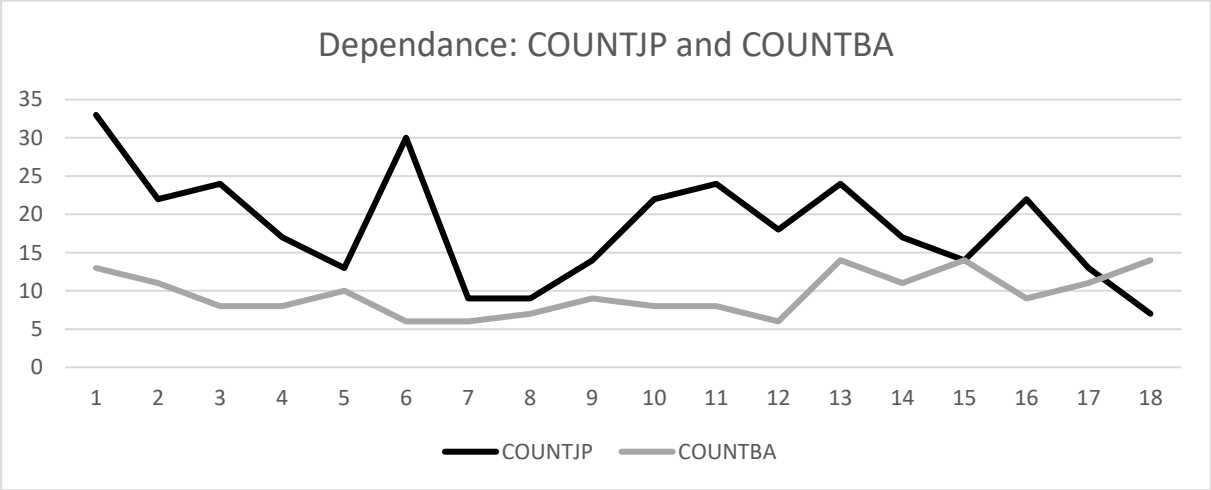


Fig. 5 – Dependance of COUNTJP from COUNTBA. Source: own research

Hypothesis H5 addressed the relationship between organizational size in terms of managerial job positions (COUNTJP) and the number of business associates (COUNTBA). As shown in figure 5, no clear pattern is observable. The correlation analysis yields a near-zero association ($r = -0.014$), again with a wide confidence interval encompassing zero. This result provides no evidence of a monotonic association between the number of managerial positions and the number of business associates. In other words, organizations with more extensive managerial structures do not systematically cooperate with more (or fewer) business associates than smaller organizations. These findings suggest that internal organizational complexity and external relationship breadth are not mechanically linked. Instead, the number and risk profile of business associates likely depend on other contextual factors, such as sectoral characteristics, transaction types, and geographic scope of operations, rather than on the size of the managerial structure alone.

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4.2 Discussion

Interpretation and comparison with prior empirical evidence

The results indicate a systematic association between internal corruption exposure (JPCRN) and external exposure related to business associates (BACRN), suggesting that organizational corruption risk is not confined to a single domain but reflects an integrated governance architecture. This finding is consistent with international evidence emphasizing that bribery risks tend to concentrate at organizational boundaries, where decision authority, discretion, and interaction with third parties intersect.

The strong positive relationship between the number of managerial decision-making roles and the number of internally risk-exposed positions supports governance research arguing that organizational growth and structural complexity increase the number of potential control points requiring oversight. However, the observed decline in the share of high-risk roles as managerial structures expand suggests a dilution effect, whereby risk becomes distributed across a broader decision network rather than concentrated in a small set of pivotal actors. Similar patterns have been reported in studies of internal control systems, which show that smaller or less formalized organizations often exhibit higher vulnerability due to single-point-of-failure dynamics. The positive association between the number of managerial roles and the count of risk-exposed business associates indicates that organizational scale is accompanied by broader external engagement, increasing exposure at the interface with suppliers, intermediaries, and partners. The moderate positive relationship between average JPCRN and average BACRN further suggests that organizations operating in higher-risk transactional environments tend to exhibit elevated risk both internally and externally. This co-movement is consistent with research highlighting the coupling of internal governance quality and third-party risk management, particularly in sectors characterized by regulatory intensity or public-sector interaction.

From an ISO 37001 perspective, these findings reinforce the standard's emphasis on integrating internal role-based risk assessment with business-associate due diligence rather than treating them as independent compliance exercises. The results suggest that organizations may benefit from aligning control intensity across internal and external domains, especially where elevated risk is systemic rather than isolated. At the same time, the absence of strong associations in some dimensions underscores that risk architectures are heterogeneous and shaped by organizational context, maturity of the anti-bribery management system, and sectoral characteristics. While the single-country design limits direct generalization, the observed patterns align with international governance and compliance literature and provide micro-level empirical support for ISO 37001's integrated risk assessment logic.

Correlation results and their implications for competitiveness and corruption risk management

As mentioned earlier, the research results can implicitly be applied to the competitiveness of an organization. Our correlation results translate into concrete competitiveness views:

1. The growth of managerial layers expands absolute risk touchpoints (H1 accepted). A strong positive dependence between COUNTJP and COUNTRJP ($r = 0.93$) shows that adding managerial roles predictably increases the number of medium/high-risk approval nodes. Each additional risky node can inflate procurement prices, delay decisions, and widen compliance workload – effects that erode margins and tender

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readiness. Scaling controls with structure (segregation of duties, tiered approvals, targeted audits) is therefore essential to protect cost efficiency and cycle time as organizations grow.

2. Smaller managerial structures carry a higher share of risk (H2 rejected; r = −0.76). Contrary to expectations, fewer managerial roles are associated with a higher proportion of risk-exposed positions. In compact structures, pivotal roles concentrate authority and external contact, creating single points of failure that can trigger outsized financial and reputational shocks. Competitiveness improves when small organizations ring-fence these roles with enhanced oversight (dual control, rotation, conflict-of-interest checks).
3. Average managerial risk is largely structure-agnostic (H3 rejected; r = 0.106). The mean exposure (AVG_JPCRN) does not materially vary with COUNTJP, implying that expanding or shrinking the hierarchy does not, by itself, lift or lower average risk. Competitiveness, therefore, hinges less on headcount and more on where risk sits and how it is governed. Managers should prioritize heat-spots rather than blanket staffing changes.
4. Internal–external risk sensitivities co-move (H4 rejected; r = 0.20). A slight but meaningful association between AVG_JPCRN and AVG_BACRN indicates that organizations rating internal roles as riskier also tend to face (or perceive) riskier business associates. This co-movement suggests spillovers across the firm–partner boundary: similar incentive environments, governance maturity, or sourcing contexts. Competitiveness gains come from harmonizing inside–outside controls (aligned due diligence, shared red-flag taxonomy, coordinated monitoring), reducing leakage and sanction exposure across deals.
5. Managerial size and partner breadth are independent (H5 accepted; r = −0.014). The number of business associates (COUNTBA) does not depend on the number of managerial positions, enabling firms to diversify suppliers/agents for price and innovation benefits without mechanically expanding management. Competitiveness can thus improve via partner portfolio optimization, provided third-party risk controls are scaled by transaction criticality, not by headcount.

Competitiveness is most threatened not by average risk, but by the accumulation of risky nodes as structures grow and the concentration of pivotal risk in lean structures. Coupled with observable inside–outside risk co-movement, organizations should map risk density across roles, harden boundary interfaces (such as procurement, sales, and grants), and align internal and third-party controls. These measures operationalize ISO 37001 and ISO MSS clause 9 “performance evaluation” while safeguarding costs, speed, eligibility, and reputation. Similarly, the results of the correlation analysis can be interpreted explicitly from the perspective of corruption risk management. Our correlations translate directly into design rules for ISO 37001–aligned control systems. More managers mean more risky approval nodes, because as the number of managerial positions (COUNTJP) grows, the count of roles exposed to medium/high risk (COUNTRJP) rises sharply. It is necessary to scale anti-bribery controls with structure, harden segregation of duties, escalate approval thresholds, and target audits to newly created decision nodes to prevent control dilution as hierarchies expand. Lean structures concentrate risk, because smaller managerial corps have a higher share of risk-exposed roles (%RJP_JP). In compact organizations, it is necessary to prioritize heightened oversight for

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pivotal posts (procurement, sales, grants), e.g., via two-person rules, mandatory rotations, conflict-of-interest attestations, and enhanced monitoring of third-party touchpoints. Average internal risk is size-independent, because the mean managerial risk (AVG_JPCRN) does not meaningfully change with COUNTJP. Management effort should therefore pivot to risk mapping, where JPCRN hot-spots sit, then tailor controls to those roles. Inside–outside risks co-move, because a higher average internal risk (AVG_JPCRN) tends to accompany a higher associate risk (AVG_BACRN). It is necessary to align internal and third-party policies where can be applied a shared red-flag taxonomy, link role-based controls to due-diligence depth, and synchronize monitoring (e.g., high-JPCRN roles paired with enhanced contractual audit rights for high-BACRN partners). This "mirrored" sensitivity reduces leakage across the firm–partner boundary. Managerial size and partner breadth are independent; therefore, organizations can diversify or rationalize the partner portfolio (COUNTBA) without mechanically adding managers. Third-party oversight by transaction criticality and BACRN – not by headcount is also useful in ISO 37001 corruption risk management.

Placing our Slovak, ISO 37001–certified sample in a broader context helps interpret how manager–partner corruption risks translate into competitive pressure elsewhere. Slovakia's 2024 Corruption Perceptions Index (CPI) score is 49/100 (rank 59/180), a 5-point decline year-on-year, signaling rising governance frictions that can spill into procurement and partner management; this reinforces the value of auditable, ISO-aligned controls in firms operating from or into such environments. Across Western/Northern Europe, procurement analytics, reviewed also in chapter 2, show that measurable warning signs predict elevated corruption risk and distorted market outcomes. This mirrors our finding that internal and associate risks co-move (albeit modestly), suggesting the need to mirror controls on both sides of the boundary. From a capital-market angle, international evidence shows stock-price penalties when corruption emerges in the supply chain, especially upstream at suppliers, precisely the domain of business associates in our framework. Firms with high-risk associates face valuation hits beyond the immediate legal costs, reinforcing our recommendation to calibrate third-party due diligence (BACRN-informed) to transaction criticality. Together, these international aspects also converge on implications that echo our results. For managers operating internationally, these implications suggest adopting risk management based on our indicators (JPCRN/BACRN) for targeting controls at approval/tender nodes; extending red-flag logic to private contracts; and coupling internal role safeguards with proportionate third-party diligence. In countries with slipping CPI scores, Slovakia included, such ISO 37001–consistent rigor is likely to yield differential competitive advantage in tenders, financing, and reputation.

4.3 Research limitations and future research

External validity is limited by the sampling frame: 18 ISO 37001–certified organizations, all based in the Slovak Republic. All 193 organizations were properly approached to participate in the research, but only 18 responded because we visited each organization in person or conducted interviews online. Access to the data was therefore limited. Nevertheless, we had to select an ISO 37001-certified organization because it is their obligation to measure the riskiness of managers and business partners. Next, certification may select firms with more mature governance, potentially understating risk patterns relative to non-certified peers, while nonresponse could introduce participation bias. Measurement rests on organization-provided, 1–5 risk ratings for managerial roles and business associates, gathered via site visits and interviews; although aligned with ISO practices, such assessments may reflect subjectivity and rater heterogeneity. The JPCRN and BACRN indices use fixed criterion weights and category

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thresholds, The JPCRN and BACRN indices use fixed criterion weights and category thresholds, therefore the risk assessment was consistent and this research limit is reduced. Our third-party scope covers associates with contracts exceeding €100,000 per year, truncating the partner distribution and possibly omitting relevant exposures among smaller contracts. However, here too, we were based on the practice of organizations, where most of them had a limit of €100,000 per year. Finally, competitiveness was not modeled directly; implications are inferred from observed interdependencies rather than estimated through explicit performance equations. These constraints suggest the need for larger, multi-country, longitudinal designs with direct performance outcomes and robustness checks on indicator construction, which we want to take into account in further research.

5 CONCLUSION

This study introduced ISO 37001–consistent indicators – JPCRN and BACRN – and examined linear dependencies within managerial roles and across the firm–partner boundary in 18 certified organizations. We found a strong positive link between the number of managerial roles and the count of medium/high-risk roles ($r = 0.93$), a negative association between managerial size and the share of risky roles ($r = –0.76$), no meaningful relation between managerial headcount and average internal risk ($r = 0.106$), modest co-movement of internal and associate risks ($r = 0.20$) and independence between managerial size and partner breadth ($r = –0.014$). These patterns map implicit channels through which risk architecture can influence competitiveness – via costs, delays, tender eligibility, and reputation. The main and partial objectives were achieved, we operationalized standardized indicators, quantified intra-managerial and cross-boundary dependencies, and translated results into potential performance-evaluation guidance. Our research results can be used for practical management. In practice, anti-bribery controls are best aligned with organizational growth so that each additional approval node is accompanied by appropriate segregation of duties, tiered thresholds, and targeted audits. In lean hierarchies – where authority and external contact often concentrate – greater protection of pivotal roles (e.g., two-person rules, rotation, conflict-of-interest attestations) tends to reduce exposure. Attention is shifted from overall averages to identifiable crucial activities: JPCRN/BACRN can inform a role- and partner-level high and middle riskiness that guides documentation rigor and monitoring cadence. Defenses are more effective when mirrored across the firm–partner boundary, pairing higher-risk roles with deeper due diligence, stronger contractual audit rights, and a shared red-flag taxonomy for both managers and business associates. Third-party oversight is most efficient when calibrated to transaction criticality and BACRN rather than headcount, enabling diversification for price and innovation benefits without automatic expansion of managerial layers. Future research should move beyond cross-sectional associations to establish causal pathways from risk architecture to performance. Longitudinal or panel designs could track JPCRN/BACRN dynamics and link them to competitiveness outcomes (cost-to-serve, bid-win rates, time-to-contract, innovation output), using fixed effects, difference-in-differences, or instrumental variables to address endogeneity. We would like to validate construct reliability and measurement invariance of JPCRN/BACRN across sectors and countries.

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The authors hereby declare that they used ChatGPT 5.0 only to verify and to correct the grammar of their written text, as they are not native speakers. A.I. was not used for research purposes, data analysis and interpretation, conclusions, discussion, or results.

References

1. Agresti, A. (2018). *An introduction to categorical data analysis*. Wiley.
2. Alani, S. H. N., & Mahjoob, A. M. R. (2021). Corruption risk analysis at the project planning stage in the Iraqi construction sector using the bowtie methodology. *Engineering Technology & Applied Science Research*, *11*(3), 7223-7227. https://doi.org/10.48084/etasr.4060
3. Aponte, W. I. G. (2019). An approximation to the "corruption risk" in the public procurement. *A&C-Revista De Direito Administrativo & Constitucional*, *19*(75), 39-64. https://doi.org/10.21056/aec.v20i75.1081
4. Audretsch, D. B., et al. (2022). Necessity or opportunity? Government size, tax policy, corruption, and implications for entrepreneurship. *Small Bus Economics*, *58*, 2025–2042. https://doi.org/10.1007/s11187-021-00497-2.
5. Bellaubi, F., & Visscher, J. T. (2016). Integrity and corruption risks in water service delivery in Kenya and Ghana. *International Journal of Water Governance, 4*(11). https://doi.org/10.7564/14-IJWG73
6. Biderbost, P., Boscán, G., & Rochin, N. (2019). Corruption as shared responsibility: A review of anti-corruption strategies in the private sector. *Revista Del Clad Reforma y Democracia*, *8*(2), 229-240. https://doi.org/10.22370/rgp.2019.8.2.2461
7. Bogachek, O., Gietzmann, M., & Grossetti, F. (2023). Risk guidance and anti-corruption language: Evidence from corporate codes of conduct. *Journal of Risk Research*, *27*(7), 735-769. https://doi.org/10.1080/13669877.2023.2181857
8. Budak, J., Rajh, E., Slijepcevic, S., & Maloca, M. (2023). Corruption pressure on business revisited: Bribery incidence in European countries. *Ekonomski Vjesnik*, *36*(1), 15-30. https://doi.org/10.51680/ev.36.1.2
9. Calin, B. A. (2022). The effects of political risk and corruption on innovation-based competitiveness. *Annales Universitatis Apulensis Series Oeconomica*, *24*(2), 21-30.
10. Cardoni, A., Kiseleva, E., & De Luca, F. (2020). Continuous auditing and data mining for strategic risk control and anticorruption: Creating "fair" value in the digital age. *Business Strategy and the Environment, 29*(8), 3072-3085. https://doi.org/10.1002/bse.2558
11. Charron, N., Dahlström, C., Fazekas, M., & Lapuente, V. (2017). Careers, connections, and corruption risks: Investigating the impact of bureaucratic meritocracy on public procurement processes. *Journal of Politics*, *79*(1), 89-104. https://doi.org/10.1086/687209
12. Davis, D. B., Mendoza, R. U., & Yap, J. K. (2024). Corruption risk and political dynasties: Exploring the links using public procurement data in the Philippines. *Economics of Governance*, *25*, 81-109 https://doi.org/10.1007/s10101-023-00306-4
13. Decarolis, F., & Giorgiantonio, C. (2022). Corruption red flags in public procurement: New evidence from Italian calls for tenders. *EPJ Data Science*, *11*(1), 16. https://doi.org/10.1140/epjds/s13688-022-00325-x
14. Díaz, J. M., Martinez, A. C. I., Caldés, R. G., & Carranza, J. C. (2022). Corruption risk analysis in local public procurement: A look at the area Metropolitana De Barcelona. *International Review of Administrative Sciences, 89*(3), 919-934. https://doi.org/10.1177/00208523221126860
15. Fazekas, M., & Kocsis, G. (2020). Uncovering high-level corruption: Cross-national objective corruption risk indicators using public procurement data. *British Journal of Political Science*, *50*(1), 155-164. https://doi.org/10.1017/S0007123417000461

16. Fazekas, M., Tóth, I. J., & King, L. P. (2016). An objective corruption risk index using public procurement data. *European Journal on Criminal Policy and Research*, *22*(3), 369-397. https://doi.org/10.1007/s10610-016-9308-z
17. Hazy, J. K., et al. (2023). Value sinks: A process theory of corruption risk during complex organizing. *Nonlinear Dynamics, Psychology, and Life Sciences, 27*(3), 319-350.
18. Healy, P. M., & Serafeim, G. (2016). An analysis of firms' self-reported anticorruption efforts. *Accounting Review*, *91*(2), 489-511. https://doi.org/10.2308/accr-51191
19. Hnylytska, L. V., Ortynska, N. V., Blikhar, M. M., & Andrienko, V. M. (2018). Management of corruption risks: Law problems of identification and legal assessment of probability of manifestation. *Financial and Credit Activity-Problems of Theory and Practice*, *4*(27), 122-130. https://doi.org/10.18371/fcaptp.v4i27.154178
20. Ivanyna, M., Moumouras, A., & Rangazas, P. (2016). The culture of corruption, tax evasion, and economic growth. *Economic Inquiry*, *54*(1), 520-542. https://doi.org/10.1111/ecin.12228https://doi.org/10.1111/ecin.12228.
21. Kim, S., & Wagner, S. M. (2020). Examining the stock price effect of corruption risk in the supply chain. *Decision Sciences*, *52*(4), 833-865. https://doi.org/10.1111/deci.12487
22. Kotchegura, A. (2018). Preventing corruption risk in legislation: Evidence from Russia, Moldova, and Kazakhstan. *International Journal of Public Administration*, *41*(5-6), 377-387. https://doi.org/10.1080/01900692.2018.1426011
23. Krishnamurti, C., Pensiero, D., & Velayutham, E. (2019). Determinants of defence industry corruption risk: Firm level empirical evidence using Transparency International's anti-corruption index. *Singapore Economic Review*, *64*(3), 675-708. https://doi.org/10.1142/S0217590816500053
24. Krishnamurti, C., Shams, S., & Velayutham, E. (2018). Corporate social responsibility and corruption risk: A global perspective. *Journal of Contemporary Accounting & Economics*, *14*(1), 1-21. https://doi.org/10.1016/j.jcae.2018.02.002
25. La Rosa, F., Bernini, F., & Terzani, S. (2022). Does corporate and country corruption risk affect CEO performance? A study of the best-performing CEOs worldwide. *European Management Journal*, *40*(2), 234-246. https://doi.org/10.1016/j.emj.2021.05.002
26. Lisciandra, M., Milani, R., & Millemaci, E. (2022). A corruption risk indicator for public procurement. European *Journal of Political Economy*, *73*(102141). https://doi.org/10.1016/j.ejpoleco.2021.102141
27. Liu, X. J., Arthanari, T., & Shi, Y. Y. (2019). Making dairy supply chains robust against corruption risk: A systemic exploratory study. *International Journal of Logistics Management*, *30*(4), 1078-1100. https://doi.org/10.1108/IJLM-02-2018-0039
28. Lopatta, K., Jaeschke, R., Tchikov, M., & Lodhia, S. (2017). Corruption, corporate social responsibility and financial constraints: International firm-level evidence. *European Management Review*, *14*(1), 47-65. https://doi.org/10.1111/emre.12098
29. Makhdalena, M., Zulvina, D., & Zulvina, Y. (2021). Anti-bribery disclosure trends among mining sector stocks listed on the Indonesia stock exchange. *Indonesian Journal of Sustainability Accounting and Management*, *5*(2), 279-290. https://doi.org/10.28992/ijsam.v5i2.346
30. Markscheffel, J., & Plouffe, M. (2021). Multilevel determinants of MNC corruption risk. *Journal of International Business Policy*, *5*(4), 512-528. https://doi.org/10.1057/s42214-021-00116-7
31. Marzouki, A., Chouaibi, J., & Amara, T. (2024). Do business ethics moderate corporate corruption risk-ESG reporting relationship? Evidence from European ESG firms. *International Journal of Ethics and Systems*, *40*(4), 734-758. https://doi.org/10.1108/IJOES-07-2023-0166
32. Méan, J. P., & Gehring, H. (2018). Implementing ISO 37001 to manage your bribery risks. *Global Trade And Customs Journal*, *13*(5), 191-197. https://doi.org/10.54648/GTCJ2018022

https://doi.org/10.7441/joc.2026.03.02

33. Monteduro, F., Cecchetti, I., Lai, Y. I., & Allegrini, V. (2020). Does stakeholder engagement affect corruption risk management? *Journal of Management and Governance*, *25*(3), 759-785. https://doi.org/10.1007/s10997-020-09527-9
34. Pinchuk, V., et al. (2022). Corruption risks in the system of providing economic security of the state. *International Journal of Computer Science and Network Security, 22*(1), 69-76. https://doi.org/10.22937/IJCSNS.2022.22.1.11
35. Pogozhina, I. N., & Sergeeva, M. V. (2021). The logical component of thinking as a predictor of decision-making about the presence of corruption risk in business interaction situations. *Psikhologicheskii Zhurnal*, *42*(6), 25-34. https://doi.org/10.31857/S020595920017069-1
36. Pogozhina, I. N., & Sergeeva, M. V. (2022). Psychological indicators of the decision-making system in corruption risk situations and their change as a result of training. *Psychology-Journal of the Higher School of Economics, 19*(3), 587-605. https://doi.org/10.17323/1813-8918-2022-3-587-605
37. Prozumentov, L. M., M. E., & Nabeeva, N. G. (2019). Corruption risks: Classification, assessment and measures for their prevention. *Tomsk State University Journal, 445*, 210-216. https://doi.org/10.17223/15617793/445/32
38. Qazi, A., Simsekler, M. C. E., & Formaneck, S. (2022). Impact assessment of country risk on logistics performance using a Bayesian belief network model. *Kybernetes*, *52*(5), 1620-1642. https://doi.org/10.1108/K-08-2021-0773
39. Rimsaite, L. (2019). Corruption risk mitigation in energy sector: Issues and challenges. *Energy Policy*, *125*, 260-266. https://doi.org/10.1016/j.enpol.2018.10.066
40. Sartor, M. A., & Beamish, P. W. (2020). Private sector corruption, public sector corruption and the organizational structure of foreign subsidiaries. *Journal of Business Ethics*, *167*(4), 725-744. https://doi.org/10.1007/s10551-019-04148-1
41. Sharma, S. K., Sengupta, A., & Panja, S. C. (2019). Mapping corruption risks in public procurement: Uncovering improvement opportunities and strengthening controls. *Public Performance & Management Review, 42*(4), 947-975. https://doi.org/10.1080/15309576.2018.1535984
42. Soloviev, A. A., & Khurshudyan, A. L. (2020). A complex of anti-corruption measures in state and municipal institutions. *Russian Journal of Criminology*, *14*(2), 256-267. https://doi.org/10.17150/2500-4255.2020.14(2).256-267
43. Spyromitros, E. & Panagiotidis, M. (2022). The impact of corruption on economic growth in developing countries and a comparative analysis of corruption measurement indicators. *Cogent Economics & Finance*, *10*(1). https://doi.org/10.1080/23322039.2022.2129368
44. Van der Wal, Z., Graycar, A., & Kelly, K. (2016). See no evil, hear no evil? Assessing corruption risk perceptions and strategies of Victorian public bodies. *Australian Journal of Public Administration, 75*(1), 3-17. https://doi.org/10.1111/1467-8500.12163
45. Vasconcelos, M. O., & Cavique, L. (2022). Dataset for corruption risk assessment in a public administration. *Data in Brief*, *40*, 107768. https://doi.org/10.1016/j.dib.2021.107768
46. Velasco, R. B., et al. (2020). A decision support system for fraud detection in public procurement. *International Transactions in Operational Research*, *28*(1), 27-47. https://doi.org/10.1111/itor.12811
47. Veselovská, L., Závadsky, J., & Závadská, Z. (2020). Mitigating bribery risks to strengthen the corporate social responsibility in accordance with the ISO 37001. *Corporate Social Responsibility and Environmental Management*, *27*(4), 1972-1988. https://doi.org/10.1002/csr.1909
48. Vitvitskyi, S., Syzonenko, A., & Titochka, T. (2022). Peculiarities of corruption risk management in economic activity. *Baltic Journal of Economic Studies*, *8*(3), 42-47. https://doi.org/10.30525/2256-0742/2022-8-3-42-47
49. Wachs, J., Fazekas, M., & Kertész, J. (2021). Corruption risk in contracting markets: A network science perspective. *International Journal of Data Science and Analytics, 12*(1), 45-60. https://doi.org/10.1007/s41060-019-00204-1

https://doi.org/10.7441/joc.2026.03.02

50. Wittberg, E., & Fazekas, M. (2023). Firm performance, imperfect competition, and corruption risks in procurement: Evidence from Swedish municipalities. *Public Choice*, *197*, 227-251. https://doi.org/10.1007/s11127-023-01102-8
51. Wittberg, E., Erlingsson, G.Ó. & Wennberg, K. (2024). Does local government corruption inhibit entrepreneurship? *Small Business Economics*, *62*, 775-806. https://doi.org/10.1007/s11187-023-00783-1
52. Yanishevska, K., et al. (2023). Corruption risks in the provision of administrative services. *Amazonia Investiga*, *12*(64), 217-227. https://doi.org/10.34069/AI/2023.64.04.21
53. Závadský, J., et al. (2025). Assessing the accuracy of evaluations for managerial positions prone to corruption risks. *Polish Journal of Management Studies*, *31*(2), 288-305. https://doi.org/10.17512/pjms.2025.31.2.18

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