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AN EVIDENCE ADJUSTED DIGITAL CORPORATE GOVERNANCE INDEX FOR INDUSTRIAL ENTERPRISES

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Abstract: *Digital-maturity assessments often rely on self-reporting and counts of implemented technologies, which can overstate governance capability. This article develops the D-CGI UZAUTO methodology, an evidence-adjusted digital corporate governance index designed for a large industrial joint-stock company. The index evaluates six capabilities: board direction, portfolio and benefit governance, data and decision quality, process integration and actual use, digital risk and independent assurance, and transparency and accountability. Each indicator receives a maturity score from zero to five and an evidence coefficient reflecting the reliability of interviews, approved documents, system logs or assurance tests. Arithmetic and geometric aggregation are combined, while critical floors prevent strong technical coverage from compensating for weak data governance or risk assurance. The article specifies content validation, analytic hierarchy process weighting, reliability analysis, inter-rater review and sensitivity testing. The proposed index is not a corporate performance score and does not embed realised profit; it is a diagnostic instrument for locating governance gaps and directing corrective decisions. A pilot protocol for UzAuto Motors JSC is presented.*

Аннотация. *Оценка цифровой зрелости зачастую основывается на самооценке и количестве внедрённых технологий, что может приводить к завышенной оценке возможностей корпоративного управления. В данной статье разработана методология D-CGI UZAUTO — скорректированный с учётом доказательной базы индекс цифрового корпоративного управления, предназначенный для крупного промышленного акционерного общества. Индекс оценивает шесть ключевых компонентов: стратегическое руководство со стороны совета директоров; управление портфелем проектов и получаемыми выгодами; управление данными и качество принятия решений; интеграцию процессов и фактическое использование цифровых систем; управление цифровыми рисками и независимое подтверждение; прозрачность и подотчётность. Каждому индикатору присваивается оценка зрелости от нуля до пяти, а также коэффициент доказательности, отражающий надёжность информации, полученной из интервью, утверждённых документов, системных журналов или результатов независимых проверок. При расчёте индекса сочетаются арифметическое и геометрическое агрегирование, а критические минимальные пороговые значения не позволяют высокому уровню технического охвата компенсировать недостатки в управлении данными или обеспечении контроля цифровых рисков. В статье предусмотрены содержательная валидация, определение весов методом анализа иерархий (AHP), анализ надёжности, межэкспертная оценка и анализ чувствительности. Предлагаемый индекс не является показателем общей результативности компании и не включает фактически полученную прибыль; он представляет собой диагностический инструмент для выявления пробелов в корпоративном управлении и определения направлений корректирующих управленческих решений. Представлен пилотный протокол применения методологии для АО «UzAuto Motors».*

Annotatsiya. *Raqamli yetuklikni baholash ko‘pincha o‘z-o‘zini baholash natijalari va joriy etilgan texnologiyalar soniga asoslanadi, bu esa korporativ boshqaruv salohiyatining amaldagi darajasini ortiqcha baholashga olib kelishi mumkin. Ushbu maqolada yirik sanoat aksiyadorlik jamiyati uchun mo‘ljallangan, dalillar sifati hisobga olingan raqamli korporativ boshqaruv*

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indeksi — D-CGI UZAUTO metodologiyasi ishlab chiqilgan. Indeks oltita asosiy salohiyatni baholaydi: direktorlar kengashining strategik rahbarligi; loyihalar portfeli va ulardan olinadigan manfaatlarni boshqarish; ma'lumotlarni boshqarish va qarorlar sifati; jarayonlar integratsiyasi va raqamli tizimlardan amalda foydalanish; raqamli risklarni boshqarish va mustaqil tasdiqlash; shaffoflik va hisobdorlik. Har bir indikatorga noldan beshgacha bo'lgan yetuklik bali hamda intervyular, tasdiqlangan hujjatlar, tizim jurnallari yoki mustaqil tekshiruv natijalarining ishonchliligini aks ettiruvchi dalillar koeffitsiyenti beriladi. Indeksni hisoblashda arifmetik va geometrik agregatsiya usullari birgalikda qo'llaniladi, kritik minimal chegaralar esa yuqori darajadagi texnik qamrovning ma'lumotlarni boshqarish yoki raqamli risklarni nazorat qilishdagi zaifliklarni kompensatsiya qilishiga yo'l qo'ymaydi. Maqolada mazmuniy validatsiya, analitik ierarxiya jarayoni (AHP) asosida vazn koeffitsiyentlarini aniqlash, ishonchlilik tahlili, ekspertlararo baholash va sezgirlik tahlili nazarda tutilgan. Taklif etilgan indeks korxona faoliyatining umumiy samaradorlik ko'rsatkichi hisoblanmaydi va amalda olingan foydani o'z tarkibiga kiritmaydi; u korporativ boshqaruvdagi bo'shliqlarni aniqlash va ularni bartaraf etishga qaratilgan boshqaruv qarorlarini belgilash uchun diagnostik vosita sifatida xizmat qiladi. UzAuto Motors AJ uchun metodologiyani sinovdan o'tkazish bo'yicha pilot protokol taqdim etilgan.

Ключевые слова: *цифровое корпоративное управление, композитный индекс, модель зрелости, качество доказательств, надзор совета директоров, управление данными, D-CGI.*

Kalit so'zlar: *raqamli korporativ boshqaruv, kompozit indeks, yetuklik modeli, dalillar sifati, direktorlar kengashi nazorati, ma'lumotlarni boshqarish, D-CGI.*

Keywords *digital corporate governance, composite index, maturity model, evidence quality, board oversight, data governance, D-CGI*

Introduction. Boards increasingly receive dashboards showing numbers of digital projects, deployed platforms and trained users. These metrics are useful but do not establish that digital governance is effective. A policy may exist without implementation, a licence may exist without use, and an automated control may exist without testing. A maturity score based only on managerial perceptions can therefore reward documentation and optimism rather than verified organisational capability [1-4].

The research objective is to develop a composite measure that distinguishes maturity from evidence quality and converts the result into a governance decision. The proposed Digital Corporate Governance Index for UzAuto Motors, abbreviated D-CGI UZAUTO, is tailored to an automotive joint-stock company but designed so that its logic can be adapted to other large industrial enterprises. The index asks two questions for every indicator: how institutionalised is the practice, and how strongly is that judgement supported by reproducible evidence?

The index does not replace financial analysis. It measures the governance capability required to select digital investments, maintain trustworthy data, supervise risk and verify benefits. Financial results remain outside the composite score and are tested separately. This separation avoids circularity in which high profit mechanically produces a high governance score and the same score is then used to explain profit [5-7].

Theoretical and standards foundation

The G20/OECD principles emphasise strategic guidance, board accountability, disclosure and equitable treatment of shareholders. The OECD guidance for state-owned enterprises adds the need to separate ownership, policy and commercial functions while maintaining professional boards. ISO 37000 and ISO/IEC 38500 frame governance as evaluation, direction and monitoring in relation to organisational purpose and responsible use of technology. COBIT 2019 translates these principles into decision rights, governance objectives, risk and benefit practices [8-11].

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The Three Lines Model distinguishes operational ownership, second-line risk and compliance oversight, and independent internal-audit assurance. Digital-maturity literature contributes staged development from ad hoc practice to integrated and adaptive capability. Information-system success research shows that system quality and information quality generate benefits through use and process effects. Composite-indicator methodology requires a documented conceptual framework, normalisation, weighting, aggregation and sensitivity analysis. These bodies of knowledge support an index that is governance-led, evidence-adjusted and transparent about uncertainty [12].

Index architecture

Table 1

D-CGI UZAUTO blocks and pilot weights

Code	Governance capability	Weight	Core indicators
B1	Strategic direction and board oversight	20%	Approved strategy, board competence, digital agenda, risk appetite and decision follow-up
B2	Digital portfolio and benefit realisation	15%	Project charter, business owner, prioritisation, life-cycle cost, benefit register and post-review
B3	Data governance and decision quality	20%	Data owner, business glossary, lineage, version control, quality rules and analytical decision trail
B4	Process integration and actual use	15%	Active users, automated transactions, integration, manual workarounds and process KPIs
B5	Digital risk, cybersecurity, compliance and assurance	20%	Risk register, access, continuity, AI risk, second-line monitoring and internal audit
B6	Transparency, digital participation and accountability	10%	Electronic meetings, disclosure speed, investor information, stakeholder response and digital-risk reporting

The six blocks represent governance capabilities rather than technologies. B1 asks whether the board directs and monitors digital strategy. B2 tests whether projects are connected to business ownership and verified benefits. B3 focuses on trusted data and decision quality. B4 separates installed systems from actual process use. B5 assesses risk ownership, cyber resilience, compliance and independent assurance. B6 evaluates whether relevant stakeholders receive timely, understandable and controlled digital information.

The pilot weights sum to one hundred percent and intentionally place stronger emphasis on strategic direction, data governance and risk assurance. The configuration is not a final norm. Expert weighting and equal-weight scenarios must be compared, and any major change in block ranking or investment priority must be reported as model uncertainty rather than hidden by a single headline score.

Maturity scoring and evidence adjustment

Table 2

Maturity and evidence scales

Scale	Level	Operational meaning	Coefficient
Maturity	0 Absent	No defined policy, owner, process or evidence	0 of 5
Maturity	1 Initial	Isolated or person-dependent activity	1 of 5

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Maturity	2 Repeatable	Practice repeats in some units but lacks a common standard	2 of 5
Maturity	3 Standardised	Approved policy, RACI, definitions and regular execution	3 of 5
Maturity	4 Integrated	Systems and units are connected; KPIs and exceptions are monitored	4 of 5
Maturity	5 Adaptive	Practice is outcome-linked, predictive, improved and independently supported	5 of 5
Evidence	E0	No verifiable evidence	0.00
Evidence	E1	Survey, interview or unsupported management statement	0.50
Evidence	E2	Approved policy, minutes, register or control record	0.75
Evidence	E3	System log, reconciled ledger, control test, audit or external assurance	1.00

For each indicator, the maturity value is divided by five and multiplied by its evidence coefficient. Consequently, an interview-based claim of advanced practice cannot receive the same adjusted value as a control that is demonstrated by a system log and tested independently. Evidence level E2 confirms formal design and recorded execution, but it does not automatically establish operating effectiveness. E3 is reserved for evidence that can be reproduced or reconciled.

Indicator values are aggregated within each block using documented within-block weights. The overall index combines a seventy-percent weighted arithmetic component and a thirty-percent weighted geometric component. The arithmetic part preserves interpretability, while the geometric part penalises an unbalanced profile in which one high block masks another very low block. To strengthen non-compensability, the data-governance and risk-assurance blocks act as critical floors. If either is below the pilot threshold of 0.20, the headline result cannot exceed 39.9; if either is below 0.40, it cannot exceed 59.9.

Table 3

Interpretation levels and governance response

Index range	Maturity interpretation	Required governance response
0.0-19.9	Initial	Establish owners, mandatory policies and a verified inventory
20.0-39.9	Fragmented	Standardise critical practices and close E0 evidence gaps
40.0-59.9	Standardising	Integrate systems, data definitions and control monitoring
60.0-79.9	Integrated	Optimise benefit realisation, assurance and cross-unit learning
80.0-100	Evidence and value oriented	Maintain independent validation and adaptive improvement

Validation and reliability protocol

Content validity should be established before scoring. A panel of 12-20 experts from governance, strategy, finance, operations, IT, data, cybersecurity, risk, compliance and internal audit evaluates whether each indicator is essential, useful or unnecessary. Lawshe's content-validity approach identifies indicators requiring revision or removal. The exercise prevents the

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index from becoming a catalogue of technically convenient metrics that does not represent the governance construct.

Weights are then derived through pairwise comparisons using the analytic hierarchy process. Consistency ratios above 0.10 trigger reconsideration rather than automatic averaging. Expert weights are compared with equal weights and, once a sufficient dataset exists, data-driven alternatives. The purpose is not to discover one objectively perfect weight vector, but to test whether major governance conclusions remain stable across plausible assumptions.

A pilot survey of 80-150 employees should cover functions that interact directly with governance and digital processes. Internal consistency may be assessed with Cronbach's alpha, but a high coefficient is not treated as sufficient validation because redundant questions can inflate it. Item-total relationships, expert judgement and the decision relevance of each indicator are considered together. Two independent reviewers code documentary and log evidence, and inter-rater disagreements are resolved through a recorded protocol.

Table 4

Minimum validation package for the D-CGI pilot

Validation task	Method	Decision rule
Content coverage	Expert panel and Lawshe coefficient	Revise or remove indicators below the applicable critical value
Weight consistency	AHP pairwise comparison	Reassess judgements when consistency ratio is 0.10 or higher
Internal consistency	Cronbach alpha and item review	Interpret with content quality; do not optimise alpha mechanically
Evidence coding	Two independent reviewers	Record and resolve material scoring differences
Robustness	Equal, expert and statistical weights	Disclose changes in level, block ranking and project priority
Missing evidence	E0 scenario and coverage ratio	Report data gaps separately from low maturity

Governance use and pilot implementation

The index should be stored as a versioned register rather than a one-off spreadsheet. Each record needs an indicator code, definition, formula, organisational unit, period, data owner, source system, evidence level, reviewer, version and change reason. The board receives the six-block profile, critical floors, evidence coverage and overdue corrective actions. Executives receive unit- and process-level indicators with named owners and deadlines. Risk, compliance and internal audit focus on E0-E1 claims, repeated exceptions and the effectiveness of controls.

The pilot begins by defining the assessment perimeter and an indicator dictionary. Expert content validation and AHP weighting follow. Survey results are then triangulated with documents and logs, and the adjusted index is calculated under alternative weighting and missing-data scenarios. Corrective actions are assigned to low indicators. After at least four quarters of micro-data are available, changes in D-CGI blocks can be examined against process and financial outcomes using lagged panel or event-study models.

D-CGI should not be used as a league table or an incentive to maximise a headline number. A rising score is meaningful only when evidence coverage, actual use, process outcomes and control effectiveness improve. A new dashboard cannot compensate for weak master data, and a high-return project cannot bypass a critical cyber or compliance gate. The index is therefore a diagnostic and prioritisation instrument, not an automatic investment rule.

Conclusion

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The D-CGI UZAUTO methodology contributes an explicit separation between maturity judgement and evidence reliability. Six governance capabilities, evidence coefficients, balanced aggregation and critical floors create a more conservative measure than technology counts or self-assessment alone. The validation protocol makes assumptions visible and testable.

For an industrial enterprise, the method helps the board locate where digital value is constrained: strategy, portfolio accountability, data, use, risk or transparency. Its scientific value will depend on pilot calibration and subsequent testing against process-level outcomes. Until that evidence is collected, the index should guide inquiry and corrective action rather than serve as proof that digitalisation has already improved financial performance.

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