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Data governance and artificial intelligence in the management of small and medium-sized enterprises.
Governance and artificial intelligence in the management of small and medium-sized enterprises
Governance and artificial intelligence in the management of small and medium-sized companies

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Summary

This article examines the organizational conditions necessary for the use of data and artificial intelligence in the management of small and medium-sized enterprises. Through a narrative review of academic literature and institutional documents published up to 2025, it discusses the relationship between information quality, analytical capacity, application selection, and decision-making responsibility. The goal is to organize criteria for evaluating digital initiatives without confusing the acquisition of tools with the effective transformation of processes.

The synthesis proposes a sequence of diagnosis, informational preparation, controlled experimentation, economic evaluation, and knowledge transfer. It is a conceptual contribution, without its own empirical validation and without an estimate of universal return. It concludes that implementation must preserve traceability, supervision proportional to risk, and internal maintenance capacity. Productivity is a verifiable outcome, along with quality, costs, and effects on labor.

Keywords

Data governance; artificial intelligence; small and medium-sized enterprises; analytical capabilities; performance management.

Abstract

This article examines the organizational conditions required for the use of data and artificial intelligence in small and medium sized enterprise management. A narrative review of academic literature and institutional publications issued through 2025 discusses information quality, analytical capabilities, application selection and decision accountability. The objective is to organize assessment criteria without equating software acquisition with effective process transformation.

The propose synthesizes a sequence of diagnosis, information preparation, controlled experimentation, economic evaluation and knowledge transfer. This is a conceptual contribution without original empirical validation or a universal estimate of returns. Implementation should preserve traceability, risk proportionate oversight and internal maintenance capacity. Productivity must be verified alongside quality, costs and effects on work.

Keywords
Data governance; artificial intelligence; small and medium sized enterprises; analytical capability; performance management.

Introduction

The presence of digital tools in daily business routines has increased the amount of record-keeping.

available for commercial and operational decisions. However, orders, customer service and

Financial transactions can remain distributed across systems that utilize concepts

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different. Under these conditions, producing more information does not eliminate the difficulty of recognizing problems, compare alternatives, and monitor the effect of interventions. The managerial issue lies in converting records into justifiable decisions.

Chen, Chiang, and Storey (2012) present business intelligence and analytics as a field that It articulates applications, technologies, and research opportunities. This perspective allows us to distinguish the Informational infrastructure for interpretation work. For a smaller organization, such This distinction favors well-defined projects linked to recurring decisions, rather than the reproduction of... Technological structures whose complexity exceeds the available operational capacity.

The literature on analytical capacity also dispels the idea that data, in isolation, constitute... an organizational competence. Gupta and George (2016) treat this capability as a a combination of resources. The acquisition of a platform must therefore be accompanied by criteria for use, responsibilities and competencies. The contribution of the studies is conceptual and organizational; it does not establish that any application will produce gains in any small way. enterprise.

This article investigates how to structure the use of data and AI in small and medium-sized enterprises. considering limited budget, time, and expertise. The goal is to relate the diagnosis of The processes involved in preparing records, evaluating applications, and ensuring business continuity. The recommendations result from a narrative review and conceptual analysis, without a case study or... own collection of business data.

2 Methodology

A narrative review with conceptual analysis is adopted. The set of sources includes seven publications on Analytical capacity, digitization of SMEs, AI-assisted work, and risk management. The consultation. the pages of periodicals, academic repositories and publications of the OECD and NIST used Combinations of business intelligence, analytics capabilities, SME, generative AI, and risk management. The selection includes works published up to December 31, 2025; the bibliographic review was... held on October 8, 2026.

The survey did not employ a systematic review protocol, exhaustive counting of results, or... Double independent screening. The selection is intentional, aimed at bringing together complementary perspectives. and does not allow for inferences of representativeness of all scientific production. No data were extracted. Individual or calculated combined effects. Publications without identifiable authorship or source. and commercial claims of returns without a verifiable method do not constitute grounds for the claim.

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Baethge, Goldbeck-Wood, and Mertens (2019) present SANRA as an assessment tool.
Critique of narrative reviews, including objectives, research, references, and rationale. These aspects
The scale was not used to assign scores, and its...
Originating from medical literature limits its transfer to management. Published indicators are discussed with
identification of their population and period.1
The analysis covered six areas: diagnosis, information governance, analytical capacity, and selection.
of applications, economic evaluation, and organizational learning. The synthesis connects these axes.
in a proposed implementation sequence. The recommendations are conceptual inferences by the author.
based on sources, not experimental results. The figure reproduces institutional indicators with
indication of the study population, the data collection period, and the limitations of the comparison.

3. Organizational diagnosis and problem definition

Bianchini and Lasheras Sancho (2025) examine the digitization of SMEs considering both adoption
of technologies as well as adaptation of processes. The distinction helps to formulate the diagnosis: which
The decision needs improvement, and what records allow for evaluating the change? Buying a tool
Answering these questions beforehand makes it difficult to verify their usefulness. Recognizing recurring delays
In customer service, for example, it is necessary to identify the steps involved and their consequences.
Defining the process requires reconstructing the actual process, including exceptions. A formal approval workflow.
This may differ from the routine practiced by employees who resolve emergencies via messaging or
Spreadsheets. If these activities do not appear in the diagnosis, the digital project can only standardize them.
The visible part of the work. The mapping should record transfers, informal decisions, and points.
where the data needs to be corrected manually.
It is also necessary to establish the baseline situation. Execution time, rework, frequency.
Error and cost metrics allow for characterizing the problem before intervention. Metrics need to...
Stable definitions and an observation period compatible with process variability. One week.
Exceptional sales or atypical customer service does not, in itself, constitute an adequate basis.
to gauge typical performance.
In smaller companies, the concentration of knowledge in a few professionals can limit the...
continuity of the process. The diagnosis must recognize which interpretations depend on people.
Specifics and what information is already documented. The next step is to transform some of that.

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[1] SANRA is a scale developed to assess the quality of narrative reviews. Here are your...
Criteria guide the writing; there was no independent evaluation or assignment of scores.

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knowledge of verifiable criteria, preserving the experience of employees in identification.
of situations that a simplified representation cannot capture.
Costs and expertise are also factors in viability. A solution that requires frequent maintenance.
This can create a greater operational obligation than the original problem. Bianchini and Lasheras Sancho
(2025) discuss the digitization of SMEs in connection with process adaptation and barriers to
adoption. This approach supports a joint assessment of tools and conditions of use, without
to authorize a promise of uniform return.
The product of the diagnosis should be a clear description of the decision, the initial situation, and the constraints.
This record allows for the interruption of initiatives where the problem is not sufficiently defined.
It also allows us to recognize that, in certain situations, a change of routine or of
Responsibility resolves the bottleneck without the need for AI. The technological choice remains.
subordinate to the problem and the ability to verify its resolution.

4. Information governance and record quality

According to NIST (2023), the governance function includes defining responsibilities and policies for management.
of the risks of AI. For the use of commercial data, this article breaks down this guidance into rules of
Definition, access, correction, and use of records. In an SME, the rules can be few, as long as...
executables. A definition of a recipe or completed order needs to be shared across departments.
that use the indicator.
Integration should preserve the meaning of the records. Different systems may represent the
Same customer due to incompatible codes or updating inventory at different times. Consolidate
These unreconciled databases can duplicate people, create non-existent sales, or alter the interpretation of the data.
Availability. Before automating reports, it's advisable to verify identifiers, units, and schedules.
Update guidelines and rules for handling inconsistencies.
Quality should be examined in relation to its intended use. Sufficient data to monitor.
Daily volume may be inadequate for estimating profitability per customer. The analysis distinguishes
completeness, consistency, and timeliness as operational checks, without assuming that all
They should have equal importance in all decisions. Priority depends on the potential harm associated with
each type of error.
Traceability means being able to reconstruct the origin of an indicator and its transformations.
completed. When a result is disputed, the team needs to locate records, filters, and versions.
used. This condition reduces discussions based solely on personal trust in the report.

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It also allows you to distinguish between actual business change and changes in the way a measure is calculated.
preserving comparability between periods.
Access should be granted according to work needs. Personal or business information is not allowed.
They need to circulate completely so that the team can analyze a process. Separation is recommended.
permissions, log relevant changes, and anticipate access revocation when roles change.
These are organizational design criteria; their concrete implementation depends on the systems, on the
contracts and obligations applicable to each company.
A simple policy needs to include fault response. If the update is interrupted or the database...
If disagreements arise, there must be a procedure to signal the limitation and suspend decisions.
Automatic when necessary. Governance becomes useful when it guides actions in specific situations.
adverse. A lengthy document without everyday application offers less operational protection than
Simple rules, understood and effectively implemented.

5. Analytical skills and interpretation of indicators.

Gupta and George (2016) analyze analytics capabilities as a combination of tangible resources,
Human skills and organizational resources. This approach avoids identifying human skills and organizational resources.
Analytical capacity with the purchase of a panel. In the management application proposed here, the measures
They must correspond to the diagnosed problem and have a defined formula, frequency, and responsible party.
Indicators without a clear decision-making function increase maintenance work without clarifying the choice.
that needs to be done.
Interpretation should differentiate between description, prediction, and causality. A series shows what occurred,
A model can estimate what will happen, and an evaluation design seeks to identify why something will happen.
The result changed. These tasks require distinct evidence. The reduction of delays after a
Technological updates, for example, may coincide with lower demand or a temporary increase in...
team.
Segmentation helps reveal differences hidden by averages. Processes with customers, products
Or heterogeneous demands do not necessarily exhibit the same behavior. A global average
A satisfactory outcome can coexist with failures concentrated in a specific category. The analysis requires
compare segments defined for operational reasons, avoiding excessive subdivisions whose
The sheer number of observations does not allow for a stable interpretation.
Uncertainty needs to be communicated in a way that is consistent with the decision. When the historical data is short,
Isolated changes may not justify drawing a conclusion about a trend. The team should report.
Coverage limitations and conditions that could alter the estimate. This practice maintains the indicator.

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as a support tool and reduces the undue transfer of authority to a presentation.
apparently accurate numerical value.
Knowledge of the process is crucial in interpreting exceptions. An unusual value may represent...
Registration error, contractual change, or genuine opportunity. The investigation combines information
Quantitative data with operational verification. It is recommended to record the reason for corrections and preserve...
Use the original version whenever possible, so that exception handling does not become...
Silent modification of the observed results.
The institutionalization of analysis requires meetings that culminate in documented decisions. It is necessary...
To indicate the hypothesis considered, the action chosen, and the moment of reassessment. This sequence
It offers a learning memory. The value of the panel then depends on its contribution to
decisions and revisions, and not just the frequency with which it is viewed or the number of charts.
presented.

6. Selection of artificial intelligence applications

AI applications should be chosen based on the compatibility between the task, the data, and the consequences of the work.
Error. Preliminary text drafting activities present different decision-making conditions.
Regarding prices or commercial commitments, it is recommended to classify usage according to need.
Review and the possibility of reversal. A low-impact task may allow for experimentation.
faster than a difficult decision to correct.
The OECD (2025) reports that 31% of SMEs in a survey conducted at the end of 2024 used
Generative AI. More than five thousand companies in seven countries were surveyed, with no participation from Brazil.
or the United States. The difference between Japan and Germany illustrates variation in adoption, but not
It establishes that a higher proportion of users automatically produces greater productivity or
managerial maturity.

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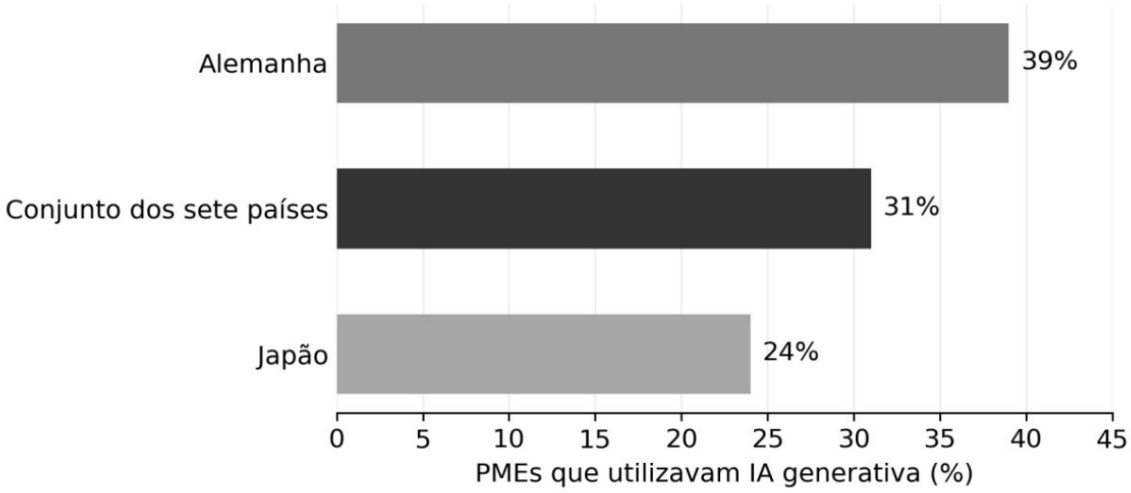
Figure 1: Use of generative AI in SMEs in OECD research.



Source: compiled from OECD (2025). Data collected at the end of 2024. Set of seven countries: Austria,

Canada, Germany, Ireland, Japan, Korea, and the United Kingdom. The aggregate is not the average of the two countries.

displayed.

The figure combines two countries and the aggregate reported by the research. The aggregate is not a third country.

Nor is it a simple average of the two values presented. The indicators describe usage, without measuring it.

Quality of implementation. Its interpretation requires preserving this distinction, especially when given data.

Adoption factors are used to justify investments that depend on processes and characteristics.

specific business needs.

Brynjolfsson, Li and Raymond (2025), in an article published in The Quarterly Journal of Economics,

They are analyzing the introduction of an AI assistant among 5,172 customer service professionals. The increase

The average productivity was 15%, measured by issues resolved per hour, with differences between

The workers. The estimate pertains to the environment and design examined; it does not constitute a prediction.

a gain for any SME or for tools used in other sectors.

NIST (2023) organizes its framework into four functions: govern, map, measure, and manage.

The framework offers a reference point for discussing risks throughout the usage cycle, without constituting...

Performance certification. In this article, its application is translated into defined responsibility.

Understanding the context, testing criteria, and response to failures, respecting the scale of each.

organization.

A pilot must specify limits before starting. It is necessary to inform what data can be...

The methods used, who reviews the responses, what errors prevent continuation, and how the process works.

If the tool fails, the pilot's conclusion may recommend expansion, modification, or abandonment.

The possibility of interrupting inappropriate use is part of a responsible deployment and not

This represents a methodological failure.

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7. Economic evaluation and performance monitoring

The productivity measure used by Brynjolfsson, Li and Raymond (2025) relates issues
resolved within working hours. Their economic interpretation also requires considering the resources employed.
in the operation. For the evaluation proposed here, time saved must be compared with verification,
Correction and maintenance, plus subscription, integration, and training. Savings in one step.
This can transfer effort to another professional or to those with higher labor costs.
It is also necessary to distinguish between freed-up capacity and actual cost reduction. Saving hours
This does not automatically mean reducing personnel costs. Capacity can be allocated to...
service, analysis or expansion, the effects of which need to be monitored. The interpretation
The finance department should clearly state the intended use of the time and avoid converting all estimated hours into cash.
especially when costs remain contractually fixed.
Quality is integral to performance. A quick response can lead to complaints, rework, or loss.
Trustworthiness is important if it is incorrect. It is recommended to monitor the correction rate and the incidence of errors.
Relevant and in need of review. The choice of indicators should reflect the process being analyzed. One
The gain in speed does not necessarily compensate for an increase in errors, the consequence of which...
whether financial or reputational standing is high.
Comparing periods requires considering external factors. Changes in demand, staff, and
Portfolio studies can affect the outcome. When feasible, a pilot study with comparable groups and criteria should be conducted.
defining the rules before the intervention improves the evaluation. When this organization is not possible, the
Conclusions should remain descriptive. The language used in the report needs to correspond to...
strength of the available evidence.
NIST (2023) provides for periodic monitoring and review of risks during system use.
Supplier updates, new products, and changes in user behavior may
to reduce the adequacy observed in the pilot. Review samples and incident logs help to
to identify these changes. The initial test does not replace daily monitoring, especially
when situations arise that were not present during implementation.
The return needs to be assessed in conjunction with risk and operational sustainability. An application
An economically promising market may depend on a single supplier or concentrated expertise.
In a single person. The assessment includes portability, continuity, and maintenance in the expansion decision.
The investment is evaluated as an organizational commitment, not merely as a comparison.
between license prices.

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8. Knowledge transfer and organizational continuity

The human dimension of analytical capacity discussed by Gupta and George (2016) makes it
Knowledge transfer is part of the implementation process. If only those who developed the solution...
By understanding its parameters, the company can gain speed but lose autonomy.
The documentation needs to include definitions, boundaries, and review procedures. The internal team
You must understand the purpose of the tool and recognize when an answer requires further investigation.
additional.

The training should utilize real-world process scenarios, with authorized data and examples of failures.
A generic presentation about AI may increase familiarity without preparing professionals for it.
concrete decisions. The proposal is to verify learning through the assisted execution of tasks and by
The ability to explain the reason for a review. Participation should not be confused with
operational domain.

Distributing responsibilities reduces dependencies. Whoever manages access, verifies
The person who handles updates and incident analysis may not be the same person who makes business decisions.
In small organizations, one person can take on multiple roles, but the roles need to remain distinct.
identifiable. This diagram makes it clearer what to check when a problem involves
information, technical operation or managerial interpretation.

Learning also depends on having space to question results. Employees can
To recognize errors that aggregate indicators do not reveal. It is recommended to create a procedure.
accessible for recording questions and incidents, without treating every complaint as resistance to change.
Investigating these occurrences can improve the representation of the process and indicate uses that
They require more intensive supervision.

Documentation and continuity need to be tested. The company should verify if another professional is available.
It is able to execute the procedure, locate the correct base, and recognize limitations. The simulation of
The absence of a responsible party or the unavailability of a supplier offers a practical way to assess.
dependencies. The goal is to make the operation recoverable, prioritizing processes whose...
The interruption would produce a greater impact.

The proposed synthesis connects problem, data, use, evaluation, and learning. The relationship is iterative: a
Reviewing the results may require redefining indicators or reconsidering the application. This is not a...

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This is an empirically validated model, but it requires an organization of criteria for further discussion and research.
Its use should be tailored to the complexity, sector, and resources of the company.2

Conclusion

The use of data and artificial intelligence in SMEs requires coherence between the problem, the information, and...
Operational capacity. The presence of software does not, in itself, demonstrate managerial transformation.
The diagnosis needs to identify a relevant decision and establish a baseline situation that...
allow for the recognition of change, taking into account process variability and limitations.
Records available.
Information governance supports this assessment by organizing definitions, responsibilities, and
Traceability. Rules proportionate to the enterprise scale can reduce discrepancies without producing...
an overly structured administration. Its usefulness depends on its daily application, especially
In failure situations, the team needs to decide whether to correct data or suspend automation.
or maintain the manual procedure.
Analytical ability is evident in the interpretation and review of decisions. Panels become
Useful when they support verifiable hypotheses and tracked actions. The distinction between description,
Prediction and causality prevent observed associations from being treated as definitive explanations.
It also preserves space for knowledge of the process, necessary for the investigation of exceptions and
to understand unusual results.
The selection of AI applications should consider the consequences of error and the possibility of revision.
The adoption data presented do not demonstrate a generalizable economic benefit. Similarly
In this way, evidence of productivity in customer service is not a predictor for all businesses.
The literature offers reasons to experiment with criteria, while keeping the conditions explicit.
They define each outcome.
Economic evaluation needs to incorporate human review, maintenance, and effects on quality.
Freed-up hours represent capacity, the use of which can take different forms. Your
The conversion into financial results must be demonstrated, without equating it to estimated time savings.
The effective reduction of cash. Post-monitoring preserves the analysis when tools and teams
and processes change.

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2 The proposed implementation strategies are a conceptual synthesis by the author. They have not been tested in [context missing - likely referring to a specific context or system].
Neither companies nor have they established a validated protocol.

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Knowledge transfer provides a condition for continuity. Documentation, training
Contextualized and recovery testing helps reduce dependencies. The development of
Autonomy requires the team to understand both the use and the limitations of the application. This
Understanding allows one to recognize situations in which an automated result should be questioned.
or subject to further review.

The article's contribution is a conceptual synthesis to guide implementation and evaluation. The review
The narrative does not allow for estimating the prevalence of practices, measuring causal effect, or defining a return.
expected. Future studies could investigate the proposed sequence in different sectors.
monitoring total costs, quality of decisions, and retention of skills after the
intervention, with appropriate comparative drawings.

It can be concluded that digital management in smaller companies should be judged by its ability to produce...
Verifiable decisions and maintaining reliable processes. The expansion of use needs to keep pace.
local evidence, without being guided solely by the availability of tools. The continuity of
Learning and accountability for choices are central criteria for modernization that is compatible with organizational
resources.[3]

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[3] The literature's timeframe ends in 2025. The text does not claim to represent the complete state of tools or standards after that period.

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