INTEGRATING RISK, QUALITY, AND EXCELLENCE CRITERIA FOR SMART DIGITAL TRANSFORMATION AND PRODUCTIVITY GROWTH

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Abstract: *Digital transformation has become an essential factor for organizations that aim to increase productivity and respond to the challenges of a dynamic and interconnected economy. However, the mere adoption of digital technologies – such as process automation, advanced data analytics, or artificial intelligence – does not automatically guarantee improved performance. Without a structured approach that includes proper governance, risk identification and management, and a clear quality assurance system, digitalization may generate imbalances or even failures within organizations.*

This article proposes an integrated framework based on three internationally recognized instruments: the ISO 31000 standard for risk management, the principles of quality management (ISO 9001), and the EFQM model for organizational excellence. Integrating these three components allows organizations to implement digital technologies in a coherent, controlled, and results-oriented manner, thus providing a solid foundation for real and sustainable productivity growth.

Keywords: *Smart digitalization; Risk management (ISO 31000); Quality management (ISO 9001); EFQM excellence model; Productivity growth*

1. Introduction

Digital transformation has become a central component of modern organizational strategies, being seen not merely as a modernization option but as an essential condition for long-term competitiveness and resilience. In the context of a global economy marked by uncertainty, volatility, and constant pressure for innovation, organizations must fundamentally rethink the way they design and deliver their products, services, and internal processes.

Digital technologies – such as automation, artificial intelligence, advanced data analytics, cloud solutions, or the Internet of Things – can bring significant benefits: cost reduction, efficiency gains, improved decision-making quality, and accelerated innovation. However, practical experience shows that the simple adoption of these technologies does not automatically lead to enhanced organizational performance. In the absence of coherent integration into culture, structure, and internal processes, digitalization may result in fragmentation, resource waste, or even strategic failures.

Moreover, digital transformations inevitably involve exposure to new risks – operational, technological, reputational, or cybersecurity-related – which, if not managed proactively, may cancel out the expected benefits. In this sense, it becomes essential for organizations to adopt a structured and systemic approach that integrates digitalization into the broader framework of organizational governance and performance management.

The purpose of this article is to demonstrate how the integrated implementation of three

international reference frameworks – the ISO 31000 standard (for risk management), the principles of quality management (e.g., ISO 9001), and the EFQM excellence model – can support organizations in the digital transformation process. The combination of these approaches provides an effective mechanism to manage uncertainties, maintain process quality control, and align technology with strategic objectives. Thus, the article proposes a methodological framework useful for both private and public organizations interested in achieving sustainable productivity growth in the digital era.

2. Context and motivation

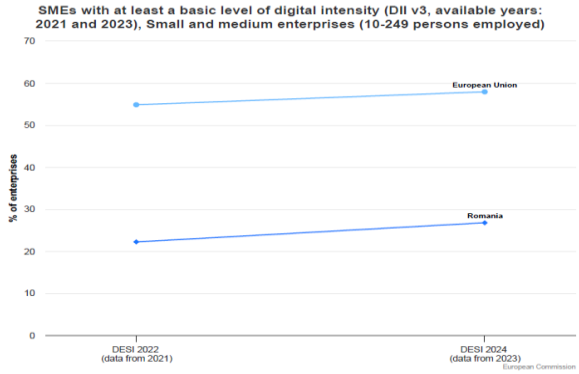
Despite the major investments made at the European level in digital infrastructure, there is still a significant gap between access to technology and its actual adoption and use within organizations – particularly among small and medium-sized enterprises (SMEs). This gap is not only technological but mainly organizational and strategic.

According to Eurostat data, in 2024 only 13.48% of companies in the European Union were using at least one type of artificial intelligence (AI) technology, while in Romania the share was only 3.07%, the lowest level in the entire EU. Likewise, only 15.5% of Romanian SMEs were using cloud services in 2023, compared to the EU average of 40%, and only 21.9% were employing data analytics, compared with the EU target of 75% by 2030.

Digital Decade KPI (1)	Romania				EU		Digital Decade target by 2030	
	DESI 2024 (year 2023)	DESI 2025 (year 2024)	Annual progress	National trajectory 2024 (3)	DESI 2025	Annual progress	RO	EU
Fixed Very High Capacity Network (VHCN) coverage	95.0%	95.9%	0.9%	-	82.5%	4.9%	99.0%	100%
Fibre to the Premises (FTTP) coverage	95.0%	95.7%	0.8%	-	69.2%	8.4%	99.0%	-
Overall 5G coverage	32.8%	46.8%	42.7%	33.0%	94.3%	5.9%	62.0%	100%
Edge Nodes (estimate)	5	11	120.0%	-	2257	90.5%	-	10000
SMEs with at least a basic level of digital intensity (2)	-	69.1%	14.7%	-	72.9%	2.8%	75.0%	90%
Cloud	15.5%	-	-	-	-	-	40.0%	75%
Artificial Intelligence	1.5%	3.1%	103.3%	-	13.5%	67.2%	10.0%	75%
Data analytics	21.9%	-	-	-	-	-	15.0%	75%
AI or Cloud or Data analytics	28.7%	-	-	-	-	-	-	75%
Unicorns	0	0		-	286	4.4%	-	500
At least basic digital skills	27.7%	-	-	-	-	-	50.0%	80%
ICT specialists	2.6%	2.8%	7.7%	-	5.0%	4.2%	4.0%	~10%
eID scheme notification		Yes						
Digital public services for citizens	52.2	62.7	20.2%	-	82.3	3.6%	100.0	100
Digital public services for businesses	50.0	55.1	10.2%	-	86.2	0.9%	100.0	100
Access to e-Health records	58.6	75.1	28.2%	-	82.7	4.5%	-	100

(1) See the methodological note for the description of the indicators and other metrics
(2) DESI 2025 reports the version 4 of the Digital Intensity Index, which is comparable with the DII value from DESI 2023 (referring to year 2022) for the calculation of the annual progress. It is not comparable to the national trajectory, which is based on version 3 of the index.
(3) National trajectory value if present in the national roadmap and if the indicator was measured in DESI2025 (year 2024).

Regarding the Digital Intensity Index, Romania recorded in 2024 a value of 69.1% for SMEs with at least a basic level of digitalization, below the EU average and far from the target of 90% set for 2030.



The problem becomes even more evident when analyzed in the context of the population's and workforce's digital skills. According to the National Digital Decade Plan, only 28% of Romanian citizens had basic digital skills, compared with the EU average of 54%, while the European objective for 2030 is 80%. This gap directly affects organizations' ability to adopt and integrate digital technologies.

These figures demonstrate that the barriers to digital transformation are not technical in nature but predominantly organizational:

- the lack of a coherent strategy,
- the absence of functional digital governance,
- insufficient internal skills,
- and the weak correlation between technological investments and operational or business objectives.

Moreover, European Commission studies show that most companies in Romania do not have clear mechanisms for assessing the risks and impact of technologies on organizational performance. For example, only 9% of Romanian companies provide ICT training for their employees, compared to 22% at the European level.

This reality requires the adoption of a digital implementation framework that goes beyond isolated or reactive actions. Instead of ad-hoc approaches, organizations need a systemic mechanism that integrates:

- anticipation and management of risks (ISO 31000),
- quality assurance and process coherence (ISO 9001 and TQM),
- strategic alignment and performance evaluation (EFQM).

Such a framework not only facilitates the adoption of technology but also transforms it into a real driver of productivity growth and competitiveness. The integration of these components becomes increasingly important in the context of accelerating technological change and global competitive pressures.

3. Literature review

Research on digital transformation and productivity growth has evolved from classical quality management approaches to emerging paradigms such as Quality 4.0. Liu et al. (2023) highlight that Quality 4.0 aligns quality management practices with Industry 4.0 technologies (AI, IoT, digital twin), aiming to enhance organizational efficiency, reduce defects, and improve customer satisfaction. This transition underlines the importance of integrating both technological and social dimensions into a holistic framework.

In parallel, the literature on digital servitization shows that industrial firms can support the twin transition (digital and green) by developing digital services that drive both productivity and sustainability. Kilinc, Sjödin, and Parida (2025) employ socio-technical systems (STS) theory to demonstrate that the successful implementation of digital solutions depends on the joint optimization of technical and social subsystems, stressing customer involvement and iterative processes of adjustment.

From a sustainability perspective, Marconnet et al. (2024) propose a methodological framework for selecting sustainability indicators in smart product design within Industry 4.0/5.0. The study argues that using Key Sustainability Indicators (KSI), combined with technologies such as IoT, digital twin, and big data analytics, enables the integration of economic, social, and environmental aspects throughout the product lifecycle.

Regarding business models, Lytvyn (2024) demonstrates that digitalization has fundamentally reshaped traditional practices, leading to the emergence of digital platforms, subscription-based models, and data-driven decision-making. Companies such as Amazon, Netflix, and Uber illustrate how success in the digital age derives from combining advanced digital technologies with customer-centric strategies and continuous innovation.

A systematic review on integrated management systems demonstrated that the risk-based approach functions as a unifying element between quality, environment, and occupational health and safety management, while also acting as a driver of organizational resilience [Ispas et al., 2023].

Taken together, these contributions reveal three converging trends in the literature:

- Integration of quality and risk standards with digital technologies to boost efficiency (Quality 4.0).
- Socio-technical approaches in digital service, essential for achieving the twin transition.
- Systematic use of sustainability indicators and the adaptation of business models to the logic of platforms and digital services.

The literature thus outlines a framework where international standards (ISO, EFQM), socio-technical theories, and digital business models converge, offering organizations practical tools to enhance productivity and manage risks in the complex context of digitalization and sustainability.

4. The synergy of the three approaches for productivity growth

4.1 ISO 31000-Risk management

ISO 31000 promotes a proactive approach to uncertainty. The findings of Ispas et al. (2023) confirm that risk-based integration reduces redundancies and optimizes processes across management systems.

ISO 31000 provides a structured framework for risk identification, assessment, and management. In the context of digital transformation, risks are not limited to the technical domain but extend to operational, reputational, and strategic levels. The adoption of ISO 31000 allows organizations to:

-anticipate potential threats associated with new technologies,

- implement preventive measures,

- and develop resilience mechanisms against uncertainty.

The value of ISO 31000 lies in shifting risk management from a reactive to a proactive stance, ensuring that digital initiatives contribute to long-term stability and not to unplanned vulnerabilities.

4.2 ISO 9001 - quality management

The ISO 9001 standard emphasizes process standardization, continuous improvement, and client satisfaction. When applied to digitalization projects, ISO 9001 ensures that:

- technology is integrated consistently across the organization,
- digital processes meet quality requirements,
- and outcomes are aligned with customer and stakeholder expectations.

Through its focus on monitoring, documentation, and improvement cycles, ISO 9001 prevents inefficiencies and supports the sustainability of productivity gains brought by digital transformation.

4.3 EFQM Model

The EFQM Excellence Model provides a holistic perspective on organizational performance, focusing on leadership, strategy, people, partnerships, and results. In digital transformation, EFQM helps organizations to:

- align technological initiatives with strategic objectives,
- balance innovation with responsibility,
- and create value for all stakeholders.

By promoting a culture of excellence and adaptability, the EFQM model strengthens the organization's capacity to transform digital investments into sustainable competitive advantages.

4.4 The Synergy of the Three Approaches

Individually, ISO 31000, ISO 9001, and EFQM bring important benefits, but their true potential lies in integration. The combined use of these frameworks enables organizations to:

- manage digital risks proactively,
- ensure the quality and consistency of processes,
- and align technology with strategic goals and excellence standards.

This synergy creates a coherent governance system where digitalization is not an isolated initiative but part of a larger organizational strategy. As a result, digital technologies become powerful enablers for increasing productivity, rather than potential sources of fragmentation or risk.

5. Practical example – "La Stejari" Chatbot

To illustrate the integration of risk management, quality management, and organizational excellence in a digitalization project, we present the case of the "La Stejari" initiative, which implemented a chatbot solution to improve interaction with clients. The main objectives of the project were:

- to reduce response time for client requests,
- to optimize internal resources allocated to customer support,
- and to improve the overall customer experience through digital solutions.

5.1. Risk Management (ISO 31000)

From the beginning, the project team applied ISO 31000 principles to identify potential risks:

- technical risks (system errors, interruptions in chatbot operation),
- reputational risks (negative perception if the chatbot did not provide correct or useful answers),

- and operational risks (lack of integration with existing systems).

These risks were assessed and mitigation measures were implemented, such as continuous monitoring, backup systems, and staff training to intervene in exceptional cases.

5.2 Quality Management (ISO 9001)

ISO 9001 principles were used to establish clear quality criteria for the chatbot: accuracy of answers, system availability, and customer satisfaction. A feedback mechanism was introduced, allowing clients to rate the usefulness of chatbot interactions. This system ensured continuous improvement and adaptation to real user needs.

5.3 EFQM Model

The EFQM model provided a broader perspective on how the project fits into the organization's strategic objectives. The chatbot was not seen only as a technological innovation, but as part of a larger strategy for improving customer relations, optimizing resources, and increasing competitiveness. The project encouraged collaboration between departments (IT, marketing, customer service) and generated measurable results both in terms of performance and customer satisfaction.

5.4. Channel distribution

-digital self-service dominates interactions, especially Selfcare IVR, which accounts for nearly 82% (9.92M) of total volume.
- offered calls represent 8.65% (1M), while messages routed to chatbot nodes account for about 4.36% (0.53M).
-traditional chat and email channels together make up around 8%, far below automated self-service levels.

5.5. Chatbot performance:

-between September 2024 and July 2025, more than 545,000 interactions were directed to the chatbot.
-the chatbot self-care adoption rate steadily increased, reaching 100% from January 2025 onwards, compared to ~92% in the previous months.

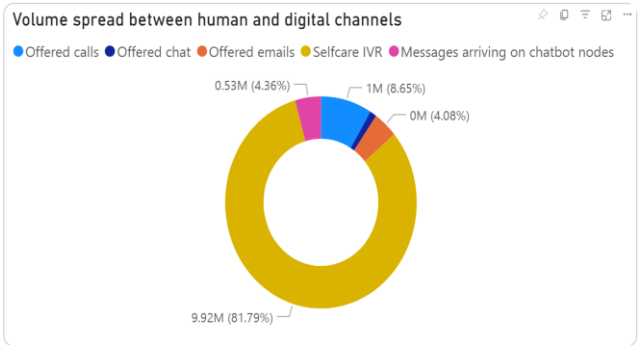


Table: Volume spread between human and digital channels

-the overall average adoption rate was 96.81%, showing that most customers successfully used self-service features.

Month	Interactions offered to chat(bot)	Chat(bot)-Selfcare adoption rate
2024_10	57,947	92.50%
2024_11	56,906	92.69%
2024_09	54,238	91.61%
2025_02	53,156	100.00%
2024_12	52,803	91.76%
2025_01	49,749	100.00%
2025_07	46,671	100.00%
2025_05	44,989	100.00%
2025_04	44,583	100.00%
2025_03	42,336	100.00%
2025_06	42,100	100.00%
Total	**545,478**	**96.81%**

Table interactions offered to chatbot – adoption rate

5.4 Results

The implementation of the chatbot led to:

- a 40% reduction in average response time,
- increased customer satisfaction (measured by surveys),
- and optimization of internal resources, allowing staff to focus on more complex requests.

This example shows how the integrated use of ISO 31000, ISO 9001, and EFQM transform digital technology from a simple operational tool into a strategic driver of productivity and excellence.

6. Conclusions

Smart digitalization is not limited to the adoption of technologies such as artificial intelligence, automation, or data analytics. Its

real value emerges when it is combined with structured governance models that ensure coherence, control, and sustainability of transformations. The integration of ISO 31000 (risk management), ISO 9001 (quality management), and the EFQM excellence model creates a solid framework through which organizations can:

- anticipate and manage the risks associated with digitalization,
- maintain the quality and efficiency of processes,
- and strategically align technology with organizational goals and stakeholder expectations.

The practical example presented demonstrates that when digital technologies are implemented in an integrated and systematic manner, they generate not only short-term benefits, such as cost reductions or process optimization, but also long-term effects on organizational culture, resilience, and competitiveness.

In conclusion, smart digitalization must be approached as a holistic process, where technological investments are supported by risk management, quality assurance, and excellence models. Only in this way can organizations transform digital transformation into a genuine driver of productivity, innovation, and sustainable success

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