

## Artificial Intelligence and the Transformation of the Management Controller's Role

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**Abstract.** Artificial intelligence (AI) has emerged as a profound yet largely silent force reshaping contemporary organizations, progressively redefining management practices and associated professional roles. This article examines the evolving role of the management controller within an increasingly digitalized environment, highlighting the mechanisms through which AI reconfigures activities, skill sets, and organizational positioning. Based on an extensive literature review, we propose an analytical framework structured around three interdependent dimensions: technological transformations (tools, algorithms, and automation), cognitive shifts (new modes of reasoning and engagement with uncertainty), and decision-making reconfigurations (redistribution of tasks and responsibilities). This framework offers a comprehensive lens through which to capture the dynamics of ongoing organizational transformation. The article further identifies a sequential explanatory mechanism, “Automation → Cognitive Liberation → Analytical Augmentation → Role Transformation”, which helps to explain how the automation of routine tasks generates cascading effects, ultimately leading to a strategic repositioning of the management controller within the organization. In this perspective, we reconceptualize the emerging role of the management controller as that of a “data mediator,” acting as an interface between algorithmic systems and managerial decision-making. Additionally, we develop the notion of hybrid competencies, structured around three complementary languages: that of data scientists, operational managers, and senior executives. This tripartite perspective sheds light on current challenges in training and skills development within highly digitalized environments.

**Keywords:** *Artificial Intelligence; Digital Transformation; Management Controller; Automation; Data Mediation; Hybrid Competencies.*

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### 1. Introduction

Recently, artificial intelligence (AI) has emerged as a key driver in the evolution of organizational practices (Babina et al., 2024), profoundly reshaping management styles, value-creation mechanisms, and even organizational cultures (Saxena, 2024). Today, AI is no longer perceived as an expensive technological innovation reserved for large, well-structured corporations; rather, it has become a strategic tool accessible to organizations of all sizes and across all sectors.

AI systems are capable of mimicking certain human cognitive functions, such as learning and reasoning. They are designed to enable machines to process and analyze large volumes of data rapidly and efficiently (Lazzeretti et al., 2023), while identifying patterns, anomalies, and even threats or opportunities that may not be detectable or foreseeable by humans.

Consequently, the deployment of AI in organizations is associated with profound transformations that are reshaping work practices, decision-making processes, and managerial approaches (Gomes Rickardo & Santos Meiriele, 2023; Pramatha, 2023). In this evolving context, management accountants find themselves in a transitional phase that compels them to adapt to an environment increasingly structured by these advanced technologies. Their profession is therefore likely to undergo a significant transformation, characterized by a reconfiguration of roles, methods, and required skill sets.

Management controllers have historically been responsible for collecting, analyzing, and synthesizing financial data (Lambert & Morales, 2009). However, these functions are being progressively reshaped by artificial intelligence tools capable of processing data in real time, generating detailed reports, and producing reliable forecasts. Within the existing literature, AI is predominantly conceptualized as a means of task automation and process optimization, whereas its deeper effects on professional identity and the strategic positioning of management controllers remain insufficiently explored. In particular, the mechanisms through which AI reconfigures cognitive practices, redistributes decision-making responsibilities, and reshapes the interactions between data, algorithms, and managerial actors remain conceptually fragmented. Prior research thus tends to approach technological change from a predominantly functional and instrumental perspective, without fully capturing the organizational and relational dynamics induced by AI adoption. This gap is particularly significant given the gradual transition of management controllers towards more analytical, interpretative, and strategic roles within increasingly data-driven organizations.

In this context, this article contributes to the emerging debate on artificial intelligence and management control by demonstrating how AI participates in the repositioning of management controllers within contemporary organizations. It specifically seeks to examine the extent to which AI reconfigures the controller's role by steering it towards a more strategic posture. Its originality lies in moving beyond a conception of AI as a mere automation tool, in order to conceptualize the management controller as a "data mediator" positioned at the interface between algorithmic systems and managerial decision-making. This perspective thus offers a renewed understanding of the evolution of management controllers' competencies and decision-making roles in increasingly digitalized environments.

This article is structured around three main axes. First, it examines artificial intelligence as a silent revolution that is progressively reshaping organizational practices and management processes. Second, it explores the ongoing transformation of the management controller profession, highlighting the evolution of its missions, competencies, and organizational role. Finally, the article analyses how artificial intelligence is reshaping the profession by strengthening the strategic positioning of management controllers and redefining their contribution to organizational decision-making.

## **2. Artificial Intelligence as a Silent Revolution Transforming Organizations**

### **a. What are we really referring to?**

The idea of designing machines capable of reproducing certain forms of human intelligence is not new. From the earliest developments in computational thinking, the prospect of an artificial simulation of human reasoning has constituted a foundational idea that has long shaped scientific imagination. However, it was not until the twentieth century that artificial intelligence began to take shape as an autonomous scientific discipline. In fact, the mathematical foundations of AI are often associated with the seminal work of McCulloch et al. (1943), which proposed a formal model of the artificial neuron. This contribution marked a decisive step in

the emergence of research on neural networks and laid the conceptual groundwork for what would, several decades later, become modern machine learning.

Building on this line of work, Alan Turing (1950) played a central role in the theoretical formalization of computation. Through the abstract model of the “Turing machine,” he provided a rigorous framework for conceptualizing the notion of algorithm and the limits of mechanical computation. Moreover, the Turing Test, designed to assess a machine’s ability to exhibit behavior indistinguishable from that of a human, further advanced early philosophical and scientific reflections on the very definition of artificial intelligence.

This foundational dynamic continues, moreover, to shape contemporary research trajectories in artificial intelligence. However, the term “artificial intelligence” was not formally established until 1956, at the Dartmouth Conference, organized notably by John McCarthy and Marvin Minsky. This event, which brought together computer scientists, mathematicians, and psychologists around a shared research agenda, is widely regarded as the official birth of the field (Haiech, 2020). It marked the transition from fragmented theoretical initiatives to the formation of a structured scientific domain, driven by an explicit ambition: to understand and reproduce the mechanisms of intelligence through computational means.

Nevertheless, the history of AI does not follow a linear trajectory. Following an initial phase of enthusiasm, the 1970s and 1980s were characterized by a significant slowdown in both progress and funding, a period commonly referred to as the “AI winter.” This stagnation reflected the gap between theoretical promises and the actual technological capabilities of the time. From the 1990s onwards, however, artificial intelligence experienced a renewed momentum, driven by the exponential growth of digital data, improvements in computational power, and the development of more efficient algorithms. This new phase paved the way for contemporary AI, grounded in machine learning and large-scale data exploitation.

In essence, artificial intelligence (AI) is a field of computer science whose ambition is both conceptually clear and operationally complex: to endow machines with the ability to perform tasks that typically require human cognitive faculties. More specifically, AI seeks to model and simulate processes such as learning, reasoning, and decision-making (Efri Ekaningrum et al., 2023; Khadragey, 2022; Zouinar, 2020). This definition refers to a set of technologies and methods designed to develop systems capable of acting autonomously in diverse environments (McCarthy, 2004; Shapiro, 1992). To achieve this objective, AI draws on several complementary approaches, including machine learning, deep learning, and more recently, generative artificial intelligence.

#### **b. Artificial Intelligence in Action**

Today, artificial intelligence is no longer a futuristic projection. It is now embedded in the daily operations of organizations and occupies a central and increasingly indispensable role in economic dynamics. Its deployment goes far beyond a purely technical innovation perspective. It concretely transforms firms’ modes of functioning and reshapes managerial practices. From the automation of repetitive tasks to the anticipation of market trends, and through the optimization of complex processes, AI has undoubtedly established itself as a structuring lever of organizational transformation.

It contributes to simplifying work structures, both at the operational and decision-making levels (Vieira, 2022). In practice, AI systems enable the automatic extraction and analysis of large volumes of data originating from both internal and external environments. This capability reduces the risk of human error and streamlines workflows, particularly in financial functions, where the speed and reliability of information processing are critical. Consequently, the

challenge is no longer merely to decide faster, but to act appropriately on the basis of more structured and better-exploited information.

By facilitating the identification of patterns and the anticipation of possible developments, AI strengthens predictive analytical capabilities and supports risk management systems (Arjun Santhosh et al., 2023; Badhurunnisa & Dass, 2023). In this regard, several studies highlight the positive effects of AI on firms' strategic positioning as well as on their organizational performance (Badhurunnisa & Dass, 2023; Baha, 2022; Li & Mu, 2023).

Despite the aforementioned advances, artificial intelligence undoubtedly raises major challenges that warrant careful examination. As highlighted by Van Wynsberghe & Donhauser (2018), its deployment is inevitably accompanied by significant ethical concerns. Risks related to data protection, potential infringements of privacy, and discriminatory biases represent key areas of vigilance. These issues call for in-depth reflection in order to appropriately regulate the integration of AI and to ensure its responsible development within organizations.

### **3. Management Control: A Profession in Ongoing Transformation**

#### **a. Controllers Between Financial Specialization and Organizational Ambition**

It is essential to bear in mind that management control represents a central, and at times decisive, function within organizational management. This importance stems from its core purpose, particularly its role in bridging strategic planning and operational control (Anthony, 1965). It acts as the connecting link between the organization's long-term objectives, strategies, and policies on the one hand, and operational control on the other, whose purpose is to oversee the execution of day-to-day activities.

Indeed, Anthony (1965), widely regarded as the founding figure of the discipline in its contemporary form, significantly contributed to formalizing its boundaries and strengthening its theoretical foundations. He emphasized the mechanisms through which organizational performance is steered and improved, thereby clarifying key concepts and structuring both the understanding and implementation of management control.

In 1988, R. Anthony further defined management control as the process by which managers influence other members of the organization to implement organizational strategies (Anthony, 1988). This structural and functional perspective of the management control process – often decentralized in large organizations – entails a coordination objective, both between top management and various departments and among the departments themselves (Bollecker, 2011). In this regard, management controllers increasingly act as advisors and key contributors to organizational steering (Bouquin & Fiol, 2007). They support operational managers in facilitating the achievement of strategic objectives (Godener & Fornerino, 2005).

In other words, management controllers occupy a mediating position between senior management and operational staff, as well as between strategy formulation and operational execution. This role is grounded in a logic of dialogue, support, and facilitation. As such, they perform several functions, including:

- Coordination;
- Evaluation of information;
- Communication of information;
- Implementation of appropriate corrective actions when necessary;
- Guidance of internal stakeholders.

Nevertheless, some scholars have highlighted a distinction between the controller's role as an animator and coordinator and their status as a support actor in managerial steering (Bollecker, 2002). However, both perspectives converge on a key point: management controllers exert a

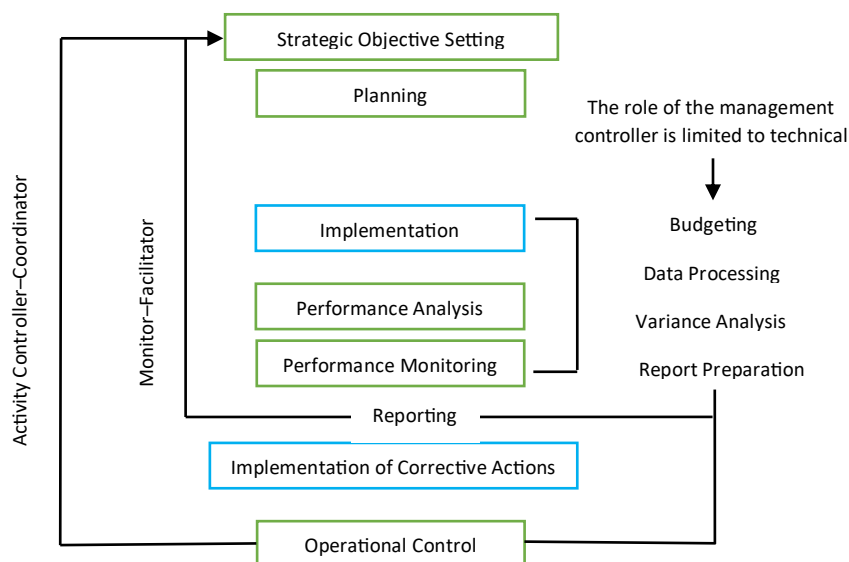
decisive influence in aligning teams with strategic objectives. In this respect, they contribute to strengthening employee accountability and motivation, particularly by linking individual performance to the organization's overall results.

This paradigm has relegated to the background the process-based approach to management control, which is grounded in a sequential logic – planning, executing, measuring, and correcting (Bouquin & Pesqueux, 1999) – as well as in the assumption that management controllers are merely producers and disseminators of information. As early as 1965, Robert Anthony conceptualized management control as a process through which managers ensure that resources are acquired and used efficiently and effectively in order to achieve organizational objectives. This definition highlights the need for a coherent and controlled articulation of the organization's various resources, implicitly emphasizing the dimensions of governance, steering, and oversight.

From this perspective, the controller's monitoring role is primarily operationalized through reporting: tracking performance, measuring actual results, and ideally comparing them with predefined forecasts, as illustrated in Figure (1). Such an activity requires rigorous work in data collection, processing, and analysis. This "traditional" role thus remains largely centered on financial analysis and variance control. Concretely, it translates into a set of activities such as:

- Budget preparation and monitoring;
- Cost control and optimization;
- Internal control and compliance;
- Performance analysis.

**Figure 1: Traditional Tasks of Management Controllers**



From this perspective, the role of management controllers tends to be reduced to administrative activities and routine tasks that are perceived as generating limited added value.

Beyond theoretical debates, whether it is approached from a strictly financial logic or from a broader organizational perspective, the role of the management controller cannot be confined to a purely technical execution function. Given their analytical capabilities, their mastery of information systems, and their cross-functional position within the organization, they emerge

as potentially strategic actors, capable of contributing to the overall direction and steering of the firm.

### **b. Beyond Numbers: The Evolving Daily Work of Management Controllers**

Once again, the classical model of management control, largely centered on quantitative performance indicators, is based on the design and application of formalized rules and procedures intended to ensure strict cost monitoring. Within this configuration, the pursuit of compliance and efficiency occupies a central place, sometimes at the expense of organizational flexibility and managerial innovation capacity.

Faced with these constraints, management controllers frequently seek to redefine their professional positioning by claiming a more value-added role, particularly that of internal consultant. The distancing from the so-called “dirty work” (Cavélius et al., 2020; Morales & Lambert, 2008) – primarily consisting of data validation activities and coordination tasks, often described as passive<sup>1</sup> – thus becomes a key issue.

Indeed, for a long time, Ardoin J.-L. and Jordan H. (1979) already emphasized the evolving nature of the management controller profession, particularly under the influence of technological development. The increasing use of information and communication technologies has contributed to transforming the function, by facilitating access to more sophisticated tools and strengthening the controller’s involvement in decision-making processes.

In this same line of development, the rise of integrated management systems (ERP), alongside the growing exploitation of big data and the rapid transformations of the economic environment, requires management controllers to acquire new technical and analytical skills (Appelbaum et al., 2017; Granlund & Malmi, 2002; Scapens & Jazayeri, 2003). This gradual transformation leads them to become more directly involved in governance and organizational steering processes.

Their role thus increasingly goes beyond the mere production of financial reports to include data interpretation, the formulation of recommendations, and the design of appropriate management control systems. Management controllers accordingly seek to construct a new professional identity by positioning themselves as genuine Business Partners (Byrne & Pierce, 2007; Järvenpää, 2007), capable of influencing the drivers of sustainable performance, while leaving in the background the previously mentioned “dirty work”.

Indeed, this reflects a shift in the center of gravity of the function: from an ex-post verification role towards a more active participation in strategic orientation setting and planning.

To this end, management controllers deploy various strategies aimed at mitigating, or even rendering less visible, this dimension of their work that is perceived as symbolically devalued. These strategies may take the form of influence mechanisms<sup>2</sup> (Bollecker, 2011), constructive collaborative approaches, or increased relational engagement with operational managers<sup>3</sup> (Nimpa et al., 2019). In addition, the adoption of clear and controlled communication represents an important lever for repositioning their role. By managing information flows and exercising judgment over the data to be processed and disseminated, they seek to assert their expertise and distance themselves from a strictly technical or administrative image.

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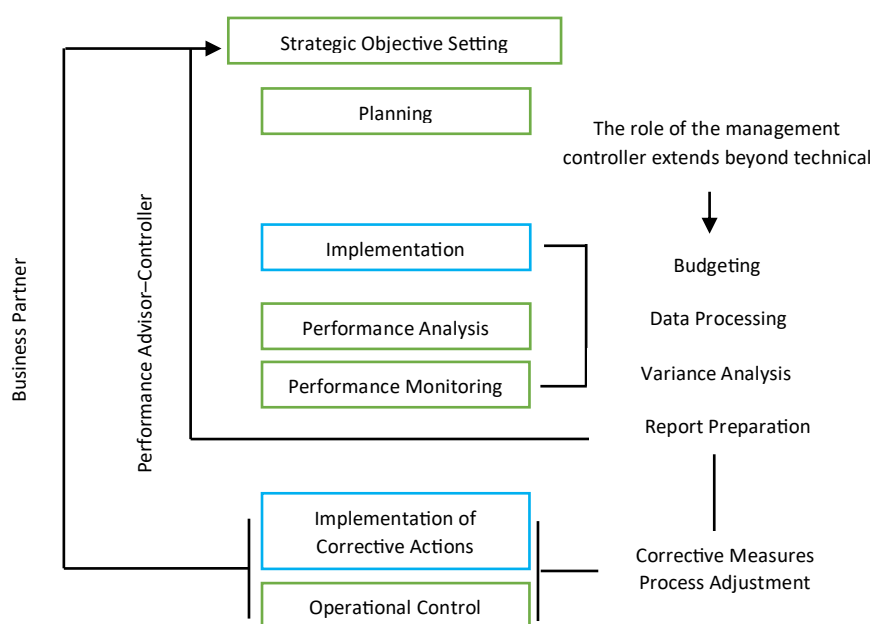
<sup>1</sup> A form of organizational coordination in which management controllers ensure the dissemination and implementation of directives decided by top management, without significant involvement in their formulation or strategic adjustment.

<sup>2</sup> A strategy of persuasion and conviction involves establishing open communication based primarily on listening and rational argumentation. The objective is to promote the ideas and decisions put forward by management controllers in order to achieve organizational goals.

<sup>3</sup> The management controller pays close attention to the activities of operational managers, focusing particularly on their challenges and concerns. In such a context, the controller is regarded as an actor who facilitates the execution of their work.

In parallel with this dynamic, management control is also conceptualized in certain approaches as a genuine management system structuring organizational action (Berland, 2024; Henri, 2006; Jørgensen & Messner, 2010). However, this conceptual expansion remains debated, insofar as, in practice, the management control function remains relatively discreet and predominantly technical, with a strong financial emphasis. It is within this context that Bouquin and Pesqueux (1999) remind us that the actual activities of controllers cover only part of the dimensions theoretically attributed to the discipline. Figure (2) below highlights management controllers' efforts to redefine their professional positioning by claiming a more value-adding role, particularly that of Business Partner.

**Figure 2: Management Controller as a Business Partner**



#### 4. When AI Reinvents the Management Controller Profession

##### a. Artificial Intelligence as a Powerful Ally for Controllers

In a constantly evolving world, shaped by technological, economic, and societal transformations, innovation – encompassing processes, business models, and renewed forms of governance – has now become a central issue for companies. Indeed, organizational innovation appears as a driver of value creation, enabling firms to achieve sustainable differentiation from their competitors (Laperche, 2001). This dynamic raises questions about the relevance of managerial practices, including management control, which are often perceived as rigid and insufficiently adapted to operate effectively in uncertain environments. From this perspective, traditional procedures for cost analysis, budgeting, and variance reporting – well suited to relatively predictable contexts – now appear increasingly challenged by the speed of environmental change.

Undoubtedly, the emergence and adoption of integrated management systems (ERP) and business intelligence tools, as already noted, have represented a significant advancement in corporate management (Boutgayout et al., 2020). Their integration enables more real-time and efficient management. However, these systems remain primarily limited to the processing of

internal organizational data, while the predictive capabilities of business intelligence tools remain relatively constrained (Cavélius et al., 2020). Yet, in today's context, environmental uncertainty requires the combined integration of both internal and external data, structured and unstructured, in order to obtain a holistic view and support appropriate decision-making (Sidi et al., 2023). Moreover, Big Data tools – commonly defined through the “3Vs”: volume, variety, and velocity<sup>4</sup> (Laney, 2001) – further complicate the role of management controllers, who do not always possess the analytical and technical skills required to process and fully leverage such massive datasets.

It is in this respect that artificial intelligence systems fully reveal their significance. They profoundly transform performance management and steering systems by not only automating time-consuming data preparation tasks – such as data cleaning, the structuring of heterogeneous information, and cross-functional consolidation – but also by enriching decision-making analysis. Through their capabilities in machine learning and predictive modelling, these systems facilitate the identification of latent patterns, the detection of complex correlations, and the production of high-value analytical insights. They are thus able to generate both standardized reports and tailored analyses, adapted to the differentiated needs of organizational stakeholders, whether financial directors, operational managers, or external partners.

Indeed, AI contributes to making the traditional tasks of management controllers – data collection, validation, and processing – less time-consuming and more efficient. As a result, controllers are granted greater scope to focus on higher-value strategic activities, particularly decision support and the interpretation of results.

#### **b. Less Reporting, More Impact: Towards a Strategic Role**

With artificial intelligence, the traditional tasks of management controllers are progressively being automated. This does not merely represent a technological upgrade; rather, it opens the way to a redefinition of the profession towards a higher value-added function. Controllers are increasingly expected to participate in defining the organization's long-term strategic orientations, that is, to actively contribute to their formulation and ensure their alignment with operational realities.

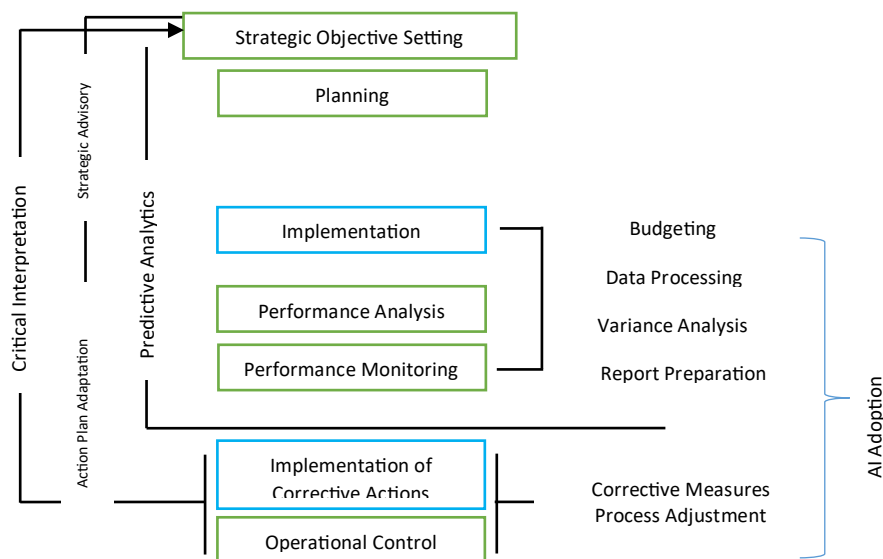
As a consequence, managerial expectations regarding management controllers are undergoing a profound shift. The issue is no longer simply to produce indicators or comment on variances, but to provide a meaningful and insightful interpretation of organizational situations. Controllers are now expected to demonstrate their ability to decode data, extract relevant insights, and enrich managerial reflection.

Their role is thus evolving towards that of a genuine strategic partner, capable of identifying and communicating improvement opportunities, developing alternative scenarios based on advanced simulations, and formulating proactive recommendations aimed at enhancing organizational performance, as illustrated in Figure (3). In essence, decision-makers are no longer seeking an accumulation of figures, but rather an intelligible, contextualized, and action-oriented interpretation of data.

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<sup>4</sup> The concept of the “3V” of Big Data was first introduced by Doug Laney in 2001 during his tenure as an analyst at META Group. He outlined these three dimensions (Volume, Velocity, and Variety) in a report entitled “*3-D Data Management*.” Subsequently, numerous scholars and practitioners expanded this framework by incorporating two additional dimensions – Veracity and Value – thereby enriching the model.

**Figure 3: The Strategic Role of the Management Controller in the Age of AI**



In reality, the management controller profession is not disappearing; rather, it is being redefined. The expected skill set is no longer limited to budgeting tools or variance analysis. These so-called hybrid competencies are expanding to encompass a broader combination of technical, analytical, and relational knowledge, reflecting a profound transformation of the role.

A strong digital culture is becoming essential. Controllers are expected to understand the basic principles underlying advanced analytics tools, automation systems, and predictive models. The objective is not to become data scientists, but rather to be able to interact effectively with these experts, ask the right questions, interpret algorithmic outputs, and critically assess their limitations. This capability is crucial in order to avoid blind reliance on technological outputs.

### c. Conceptual Contributions, Implications, and Research Agenda

This research provides a meaningful contribution to understanding the transformation of the management controller in the era of artificial intelligence. The first contribution consists in proposing an analytical framework structured around three interdependent dimensions: technological transformations (tools, algorithms, automation), cognitive shifts (new modes of reasoning, relationship to uncertainty), and decision-making reconfigurations (redistribution of tasks and responsibilities). This framework offers a holistic view of the dynamics at play.

The second contribution lies in the conceptualization of the underlying mechanisms driving this transformation. Expressed through a typical sequence – “Automation → Cognitive release → Analytical augmentation → Role transformation” – this explanatory model helps to understand how initial technological changes generate cascading effects: the automation of repetitive tasks frees up cognitive capacity; this released cognitive time, when reinvested in deeper analysis, increases the value added by the controller’s work; which ultimately transforms their strategic positioning within the organization.

Thirdly, our literature review leads to a reconceptualization of the controller’s emerging role, which may be described as a “data mediator.” This role positions the controller as a critical interface between algorithmic systems and strategic decision-making, translating technical outputs into managerial language and reintegrating algorithmic results into the specific organizational context of the firm.

Fourthly, we further develop the notion of hybrid competencies. Our approach identifies, through a cross-analysis of management and data science literature, three distinct “languages” that the modern controller must master: the language of data scientists (understanding of algorithms and statistical literacy), the language of operational managers (in-depth knowledge of business processes), and the language of executives (ability to synthesize information and guide strategic decision-making). This tripartite perspective provides a concrete lens through which to understand the challenges of training and professional development in increasingly digitalized environments.

For management controllers, our research outlines the contours of a distinctly hybrid form of expertise. This no longer involves simply adding technical skills to an existing knowledge base, but rather developing three complementary domains simultaneously. First, a solid technical mastery is required: data literacy, a foundational understanding of algorithms, and the ability to conduct statistical analyses. Second, refined contextual intelligence is essential, namely a deep understanding of the firm’s business and strategic issues. Finally, advanced soft skills, communication, influence, and leadership, become crucial in transforming analytical complexity into decisions that are both understandable and actionable. This threefold competence fundamentally redefines the core of the profession.

On the other hand, for training institutions and academic programs, the implications are equally profound. It is not simply a matter of adding a data science module to a traditional management control curriculum. A genuine pedagogical transformation is required, based on three pillars. First, an integrative approach combining disciplinary foundations (management control, finance, auditing) with digital competencies (data analysis, programming, visualization). Second, experiential teaching methods aimed at fostering critical thinking in relation to algorithmic outputs. Finally, sustained attention must be given to the development of professional judgment and contextualization skills, which remain inherently human capabilities. Training the controller of the future therefore means preparing a professional capable of navigating between data, meaning, and relationships.

In this perspective, several promising avenues for future research deserve further exploration. It would be valuable to test the analytical framework derived from our literature review against a large-scale quantitative study. Similarly, identifying the organizational factors that facilitate – or, conversely, hinder – this transformation, such as firm size, industry sector, digital maturity, and managerial culture, would provide significant insights for practitioners.

Furthermore, the ethical issues associated with the use of artificial intelligence in management control, algorithmic bias, model opacity, responsibility in the event of errors, and implications for professional autonomy, call for dedicated investigation. These questions would be best addressed through in-depth field studies or action-research approaches.

## **5. Conclusion**

There is little doubt that artificial intelligence has emerged as a pivotal force in contemporary organizational transformation, reshaping in depth both operational activities and strategic decision-making processes. Through the automation of routine tasks and the enhancement of analytical and predictive capabilities, it is significantly redefining the ways in which data are generated, interpreted, and mobilized for the purpose of performance management and control.

In this context, the role of the management controller is undergoing a significant reconfiguration. Beyond its traditional function as a provider of reporting and cost monitoring, it is increasingly evolving towards a more strategic position, captured here through the notion of a “data mediator,” acting as an interface between algorithmic systems and managerial decision-making processes. This evolution is also accompanied by the emergence of hybrid

competencies, combining data literacy, an understanding of business logics, and the ability to interact with different levels of organizational decision-making. The transformation model proposed in this article thus highlights a progressive dynamic ranging from task automation to a broader redefinition of the management controller's organizational role.

However, this evolution cannot be fully understood without acknowledging its limitations and areas of tension. The growing reliance on algorithmic systems raises concerns regarding the gradual erosion of certain analytical skills, the risk of overreliance on predictive models, and the potential opacity of automated decision-making mechanisms. Far from being a linear and entirely positive process, the integration of artificial intelligence into management control thus appears as an ambivalent phenomenon, characterized both by opportunities for enhancing the controller's role and by new forms of technological dependence.

Indeed, the future of the profession depends on the ability of management controllers to effectively articulate human expertise with artificial intelligence tools. Those who succeed in navigating this hybridization between analytical expertise, organizational understanding, and technological mastery will not merely be actors of adaptation, but active contributors to the redefinition of performance management practices and value creation within contemporary organizations.

## 6. References

- Anthony, R. N. (1965). *Planning and Control Systems: A Framework for Analysis*. Boston, Division of Research, Graduate School of Business Administration, Harvard University.
- Anthony, R. N. (1988). *The Management Control Function*. The Harvard Business School Press.
- Appelbaum, D., Kogan, A., Vasarhelyi, M., & Yan, Z. (2017). Impact of business analytics and enterprise systems on managerial accounting. *International Journal of Accounting Information Systems*, 25, 29–44. <https://doi.org/10.1016/j.accinf.2017.03.003>
- Ardoin j.-l., & Jordan h. (1979). *Le contrôleur de gestion*. Flammarion.
- Arjun Santhosh, risya Unnikrishnan, Sillamol Shibu, K. M. Meenakshi, & Gigi Joseph. (2023). AI Impact on Job Automation. *International Journal of Engineering Technology and Management Sciences*, 7(4), 410–425. <https://doi.org/10.46647/ijetms.2023.v07i04.055>
- Babina, T., Fedyk, A., He, A., & Hodson, J. (2024). Artificial intelligence, firm growth, and product innovation. *Journal of Financial Economics*, 151. <https://doi.org/10.1016/j.jfineco.2023.103745>
- Badhurunnisa, M., & Dass, V. S. (2023). Challenges and opportunities involved in implementing AI in Workplace. *International Journal for Multidisciplinary Research*, 5(6).
- Baha, H. (2022). The Impact of Society 5.0 and Industrial Revolution 4.0 on Employment and Future Job in Brunei Darussalam. *E-Jurnal Penyelidikan Dan Inovasi*, 9(1).
- Berland, N. (2024). Approches stratégiques du contrôle organisationnel. In *Les grands courants en contrôle de gestion* (pp. 138–159). EMS Editions. <https://doi.org/10.3917/ems.dambr.2023.01.0138>
- Bollecker, M. (2002). Le rôle des contrôleurs de gestion dans l'apprentissage organisationnelle : une analyse de la phase de suivi des réalisations. *Comptabilité - Contrôle - Audit, Tome 8-Volume 2*, 109–126.

- Bollecker, M. (2011). Contrôleur de gestion : une profession à dimension relationnelle ? *21-Ème Congre De l'AFC*. <https://shs.hal.science/halshs-00587432>
- Bouquin, H., & Fiol, M. (2007, May). Le contrôle de gestion : repères perdus, espaces à retrouver. *Comptabilité et Environnement*. <https://shs.hal.science/halshs-00543107v1>
- Bouquin, H., & Pesqueux, Y. (1999). Vingt ans de contrôle de gestion ou le passage d'une technique à une discipline. *Comptabilité - Contrôler - Audit*, 93–105.
- Boutgayout, B., Barka, M. ', & Ghazali, E. (2020). Contrôle de gestion 3.0 : Nouveaux outils et prise de décision à l'ère de la transformation digitale. *The International Journal of Digital Economy*, 2(1).
- Byrne, S., & Pierce, B. (2007). Towards a more comprehensive understanding of the roles of management accountants. *European Accounting Review*, 16(3), 469–498. <https://doi.org/10.1080/09638180701507114>
- Cavélius, F., Endenich, C., & Zicari, A. (2020). Back to basics or ready for take-off? The tensions on the role of management controllers in the digital age. *Comptabilité – Contrôle – Audit*, 2(26).
- Efri Ekaningrum, N., Syahrul Hidayat, M., & Yuliaty, F. (2023). Exploring the Future of Work: Impact of Automation and Artificial Intelligence on Employment. In *ENDLESS: International Journal of Future Studies* (Vol. 6, Number 1). <https://endless-journal.com/index.php/endless/125>
- Godener, A., & Fornerino, M. (2005). La métamorphose du contrôle de gestion. *L'Expansion Management Review*, 54–59.
- Gomes Rickardo, & Santos Meiriele. (2023). Artificial intelligence: Its impact on employability. *World Journal of Advanced Research and Reviews*, 18(3), 198–203. <https://doi.org/10.30574/wjarr.2023.18.3.1056>
- Granlund, M., & Malmi, T. (2002). Moderate impact of ERPS on management accounting: A lag or permanent outcome? *Management Accounting Research*, 13(3), 299–321. <https://doi.org/10.1006/mare.2002.0189>
- Haiech, J. (2020). *Parcourir l'histoire de l'intelligence artificielle, pour mieux la définir et la comprendre*. (10), pp. <https://doi.org/10.1051/medsci/2020145i>
- Henri, J. F. (2006). Management control systems and strategy: A resource-based perspective. *Accounting, Organizations and Society*, 31(6), 529–558. <https://doi.org/10.1016/j.aos.2005.07.001>
- Järvenpää, M. (2007). Making business partners: A case study on how management accounting culture was changed. *European Accounting Review*, 16(1), 99–142. <https://doi.org/10.1080/09638180701265903>
- Jørgensen, B., & Messner, M. (2010). Accounting and strategising: A case study from new product development. *Accounting, Organizations and Society*, 35(2), 184–204. <https://doi.org/10.1016/j.aos.2009.04.001>
- Khadragy, S. (2022). Artificial Intelligence and the future of employment; a systematic review of the state of the art literature. *International Journal of Mechanical Engineering*, 7(2), 974–5823.
- Lambert, C., & Morales, J. (2009). Les pratiques occultes des contrôleurs de gestion : une étude ethnographique du « sale boulot ». *Finance Contrôle Stratégie*, 12(2), 5–34.
- Laney, D. (2001). *3D Data Management: Controlling Data Volume, Velocity, and Variety*.
- Laperche, B. (2001). Potentiel d'innovation des grandes entreprises et État, argumentation évolutionniste sur l'appropriation des informations scientifiques et techniques. *Innovations*, 13(1), 61–86.

- Lazzarotti, L., Domenech, R. B., Hervás-Oliver, J. L., & Innocenti, N. (2023). Artificial intelligence, big data, algorithms and Industry 4.0 in firms and clusters. In *European Planning Studies* (Vol. 31, Number 7, pp. 1297–1303). Routledge. <https://doi.org/10.1080/09654313.2023.2220490>
- Li, T., & Mu, Z. (2023). The Employment Impact of Digital Transformation in the Logistics Industry in the Age of Artificial Intelligence – Take Shunfeng as an Example. *Advances in Economics, Management and Political Sciences*, 52(1), 1–8. <https://doi.org/10.54254/2754-1169/52/20230680>
- McCarthy, J. (2004, October 24). *What is Artificial Intelligence?* Stanford University. <http://www-formal.stanford.edu/jmc/>
- McCulloch, W. S., Lrerr, W., & Pitts, H. (1943). A Logical Calculus of the Ideas Immanent in Nervous Activity. *Bulletin of Mathematical Biophysics*, 5, 115–133.
- Morales, J., & Lambert, C. V. (2008, May). Du " dirty work " au " dirty dust " Efforts de contrôleurs de gestion pour entrer dans le processus de décision. *La Comptabilité, Le Contrôle et l'audit Entre Changement et Stabilité*. <https://shs.hal.science/halshs-00525818v1>
- Nimpa, A. T., Ndjanyou, L., Kembou, A., & Management, K.-R. A. De. (2019). La nature de la relation contrôleur de gestion et responsables opérationnels comme facteurs explicatifs de la performance managériale. *Revue Africaine de Management*, 4(3), 103–112.
- Pramatha, S. (2023). The Impact of artificial intelligence and automation on businesses processes and employment: An analytical study. *PsychologyandEducation*, 55(1). <https://doi.org/10.48047/pne.2018.55.1.03>
- Saxena, A. K. (2024). Navigating the AI Landscape: Sectoral Insights on Integration and Impact with a focus on Machine Learning and Natural Language Processing), USA. *Independent Researcher, M. Tech in Computer Science and Engineering*, 12(1).
- Scapens, R. W., & Jazayeri, M. (2003). ERP systems and management accounting change: opportunities or impacts? A research note. *European Accounting Review*, 12(1), 201–233. <https://doi.org/10.1080/0963818031000087907>
- Shapiro, S. C. (1992). *Encyclopedia of Artificial Intelligence* (Vol. 1). Wiley-Interscience.
- Turing, A. M. (1950). Computing Machinery and Intelligence. *Mind: A Quarterly Review of Psychology and Philosophy*, 59(236), 433–460. <https://academic.oup.com/mind/article/LIX/236/433/986238>
- van Wynsberghe, A., & Donhauser, J. (2018). The Dawning of the Ethics of Environmental Robots. *Science and Engineering Ethics*, 24(6), 1777–1800. <https://doi.org/10.1007/s11948-017-9990-3>
- Vieira, L. (2022). L'intelligence artificielle : déni de conscience ou nouvel humanisme ? *Communication, Technologies et Développement*. <https://doi.org/10.4000/ctd.7510>
- Zouinar, M. (2020). Évolutions de l'Intelligence Artificielle : quels enjeux pour l'activité humaine et la relation Humain-Machine au travail ? *Activites*, (17–1). <https://doi.org/10.4000/activites.4941>