A comparative analysis between AI and traditional methods in management control

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Abstract. Artificial Intelligence (AI) is reshaping management control by introducing predictive and automated tools capable of processing vast amounts of data in real time. Unlike traditional methods that rely on static analysis and historical records, AI-driven systems enhance agility, accuracy, and the speed of decision-making. This transformation enables organizations to anticipate changes more effectively and optimize the allocation of their resources. Nevertheless, the integration of AI also raises several challenges, particularly in terms of implementation costs, data quality, and ethical considerations. A hybrid model—combining the reliability of conventional control techniques with the innovative capabilities of AI—emerges as a promising solution. This study investigates the impact of AI on organizational performance through both theoretical analysis and empirical research conducted in Morocco and abroad. It examines how AI contributes to greater organizational agility through predictive analytics, automation, and anomaly detection, while also identifying best practices and existing gaps in the current body of knowledge.

Keywords: Artificial Intelligence; Management Control; Traditional Methods; Comparative Analysis.

1. Introduction

The rise of artificial intelligence (AI) is gradually revolutionizing management methods within companies, particularly in the field of management control. Traditionally, management control relies on static analyses and historical data to assess organizational performance and guide decision-making. While these methods have proven effective, they present limitations in terms of responsiveness and flexibility in an increasingly complex and dynamic environment. Decisions based solely on historical data can lead to inadequate responses to rapid market changes, limiting companies' ability to anticipate trends and seize new opportunities. Furthermore, the cumbersome nature of traditional processes can lead to significant delays in obtaining relevant information, making strategic decisions less effective.

In contrast, AI introduces innovative tools such as predictive analytics, process automation, and anomaly detection, enabling faster, more accurate decision-making that responds to market fluctuations. Predictive analytics, for example, leverages sophisticated algorithms to identify future trends from massive data, facilitating strategic planning and proactive risk management. Process automation reduces repetitive and time-consuming tasks, freeing managers for higher-value missions. Anomaly detection, on the other hand, allows for the real-time identification of financial or operational irregularities, strengthening internal control and risk management.

However, integrating these technologies raises major challenges, particularly regarding implementation costs, data quality, and ethical considerations. The initial investments to acquire powerful AI solutions, train teams, and adapt infrastructure can be a barrier for some

organizations, particularly SMEs. Furthermore, the quality and reliability of the data used are essential to ensure the relevance of AI-generated analyses. Poor data management can lead to bias or errors in the results. Finally, ethical questions arise regarding the transparency of algorithms, the protection of personal data, and the impact of automation on employment. These challenges require careful consideration and appropriate regulatory mechanisms to ensure the responsible adoption of AI.

The theoretical framework of this research is based on the comparative analysis between traditional approaches to management control and those based on AI. This comparison allows for a better understanding of the contributions and limitations of each approach, highlighting the conditions necessary for an effective integration of AI into organizational practices. The literature review explores recent academic work, both nationally and internationally, dealing with the use of AI in management control. This analysis highlights the benefits of AI in improving organizational agility, but also the challenges associated with its adoption, particularly with regard to data governance and compliance with ethical standards.

The central issue of this study revolves around the following question: to what extent can AI replace or complement traditional management control methods to optimize organizational performance? To answer this question, a mixed methodology is adopted, combining a comprehensive review of scientific literature and an empirical analysis of management control practices in Moroccan and international companies. This approach aims to identify best practices and hybrid models likely to maximize the benefits of AI while reducing its risks.

The structure of this article is as follows: first, the theoretical framework will present the fundamental concepts of traditional management control and artificial intelligence. Then, the literature review will analyze pre-existing studies on the integration of AI in management control. The methodology will outline the approaches adopted to conduct the empirical study. Finally, the results obtained will be discussed to formulate practical recommendations and open up avenues for future research.

This article brings an original contribution by analyzing the comparative impact of Artificial Intelligence and traditional management control practices in the Moroccan context, focusing specifically on the case of Nestlé. While many international studies have highlighted the benefits of AI in management, this paper provides a practical perspective by combining a theoretical review and an empirical analysis of how Nestlé leverages AI tools. This mixed approach not only demonstrates the concrete improvements achieved by Nestlé but also identifies the specific challenges and opportunities of AI integration in Moroccan companies. The added value of this research lies in its focus on a leading multinational company within the Moroccan market, offering relevant insights for both practitioners and researchers interested in the digital transformation of management control.

2. Theoretical Framework

This section aims to present the foundations of traditional management control by detailing its objectives, key tools, and the limitations that hinder its effectiveness. This analysis will provide a better understanding of the challenges associated with integrating advanced technologies, particularly artificial intelligence, to improve management control practices.

a. Traditional management control
i. Definition and role of management control

Management control is a process that aims to ensure that a company's resources are used effectively and efficiently to achieve its strategic objectives. It involves planning, measuring, analyzing, and managing the organization's performance. Its primary role is to help managers make informed decisions by providing relevant information on results and deviations from objectives.

The concept of management control has evolved over time to accommodate organizational changes and new perspectives. Originally, the term "control" referred to duplicate record keeping, a classic view of control as a means of verification (Anthony, 1965). Anthony (1988) defines management control as "the process by which managers influence other members of the organization to implement strategies." Simons (1995) expands on this perspective by considering management control as "the information-based processes and procedures that managers use to maintain or change certain configurations of organizational activities." This definition emphasizes the central role of information in steering organizational activities.

Table 1: Main roles of management control

Role	Description
Planning	Set short-, medium- and long-term goals.
Performance monitoring	Measure the gaps between objectives and actual results.
Analysis and management	Identify the causes of deviations and propose corrective actions.
Resource optimization	Allocate resources efficiently to maximize performance.
Decision support	Provide reliable information to decision-makers to guide strategic choices.

ii. Classic tools and methods

Traditional management control uses several tools to monitor and optimize company performance.

Table 2: Classic tools and methods

Tool	Description	Benefits	Boundaries
Dashboards	Groups together key performance indicators (KPIs).	Global and synthetic view.	Unresponsive to rapid changes.
Budgets	Financial plan forecasting resources and expenses.	Allows you to control expenses.	Rigidity, difficult to adapt.
Performance indicators	Quantitative and qualitative outcome measures.	Detailed performance tracking.	Risk of limiting oneself to past figures.
Financial reporting	Periodic reports on financial results.	Regular communication of results.	Delay in disseminating information.

Table 3: Example Dashboard

Objective	Indicator (KPI)	Target	Actual Result	Gap
Increase turnover	Quarterly turnover growth (%)	+10%	+7%	-3%
Reduce operational costs	Production cost (€)	100,000€	110,000€	+10,000€
Improve customer satisfaction	Satisfaction rate (%)	90%	85%	-5%

This type of table allows you to track the gaps between objectives and actual results.

iii. Limits of traditional practices

Despite its usefulness, traditional management control has several limitations that hinder its ability to adapt to complex and uncertain environments:

1. **Rigidity of tools:** Difficulty in adapting quickly to market changes.

2. **Long processing time:** Manual collection and analysis causing delays.

3. **Lack of anticipation:** Orientation towards historical data rather than forecasts.

4. **Fragmented data:** Information systems are often compartmentalized.

5. **Human errors:** Manual data processing is prone to errors.

Table 4: Summary of Limits

Limit	Consequence
Rigidity of tools	Poor responsiveness to market changes.
Long processing time	Late decisions, lack of agility.
Lack of predictability	Inability to anticipate developments and manage risks.
Data fragmentation	Difficulty in centralizing and analyzing information effectively.
Risk of human error	Compromised data reliability, errors in analyses and reports.

Traditional management control, while essential for business performance (Badre et al., 2024),, has limitations that hamper its ability to adapt. These shortcomings justify the integration of more efficient and responsive solutions, particularly those offered by artificial intelligence, which allow for the automation of processes, the analysis of large amounts of data in real time, and the improvement of strategic decision-making.

b. Artificial intelligence (AI)
i. Definition and key concepts of AI

Artificial intelligence (AI) refers to the harmonized techniques aimed at allowing machines or computer systems to perform human-like cognitive abilities, such as learning, understanding, thinking, and decision-making. The purpose of AI is to implement complex principles by replicating intelligent behaviors based on algorithms and computer models.

Table 4: Key AI concepts

Concept	Description
Machine Learning	Systems capable of learning from data and improving their performance without being explicitly programmed.
Artificial neural networks	Models inspired by the human brain, used to detect complex patterns in large amounts of data.
Deep Learning	A subcategory of machine learning that uses multi-layer neural networks to process massive data.
Natural Language Processing (NLP)	Techniques that enable machines to understand, interpret, and generate human language.
Computer vision	Techniques that allow machines to interpret and analyze images and videos.

Artificial intelligence relies on several advanced technologies that enable the automation and optimization of processes:

Table 6: AI-related technologies

Technology	Description	Examples of use
Machine Learning (ML)	Algorithms that allow systems to learn and adapt automatically from data.	Predictive sales analysis, fraud detection.
Big Data	Management and analysis of massive volumes of structured and unstructured data.	Customer behavioral analysis, strategic monitoring.
Process Automation (RPA)	Using software robots to automate repetitive and low-value tasks.	Automatic invoice processing, email management.
Internet of Things (IoT)	Connected objects collecting and transmitting data in real time.	Predictive maintenance, inventory management.
Cloud Computing	Large-scale data storage and processing via remote servers.	Hosting data analysis applications.

Artificial intelligence represents a strategic lever for businesses, enabling them to automate their processes, improve their operational efficiency, and enrich the customer experience. Thanks to technologies such as machine learning, big data, and robotization, companies can not only optimize their performance, but also anticipate market developments and strengthen their competitiveness. These technological advances represent major opportunities to rethink traditional management control practices.

ii. Integrating AI into management control

Table 7: The different aspects of integrating AI into management control.

Category	Key elements
System	- Smart data collection via IoT and data platforms. - Automation of repetitive tasks (transaction, financial reports).
Tasks	- Financial forecasting and budgeting via AI. - Variance analysis and automated reporting. - Cost optimization through AI.
Process	- Automation of the decision-making process with AI-based recommendations. - Real-time performance management via AI analysis.
Performance	- Improved decision-making through AI. - Optimized resource allocation. - Continuous improvement of management control through AI learning.

3. Literature Review
a. Existing work on AI and management control

The impact of Artificial Intelligence (AI) on the world of family planning has become the focus of many recent developments. Here is a summary of key academic research:

- **AI in maximizing decision-making algorithms:** Several studies (e.g., this one by Smith & Lee, 2023) show that AI can improve decision-making algorithms by analyzing more tolerant and complex asset volumes than traditional methods. AI therefore

facilitates more accurate forecasts, risk management, and strategic coordination.

- **Automation of repetitive tasks:** AI is being used to automate administrative and repetitive tasks in government family planning departments, as evidenced by a survey by Wang et al. (2022). The use of automated processing of algorithms (RPA) has eliminated human errors and boosted the impact of financial audits and cost management.

- **Anomaly prediction and risk management:** Recent work (e.g., Khan & Nguyen, 2024) focuses on the ability of AI models to understand anomalies in financial assets or predict risks in advance. This allows managers to make more informed decisions and uncover economic crises.

- **Impact of AI on Organizational Style:** The implication of AI in governance family planning can change the overall style of a table by reducing operational costs and increasing efficiency by making more reliable asset-based decisions.

b. **Case studies of companies that have integrated AI into management control**

Table 8: Examples of companies that have successfully integrated AI

Business	Sector	AI technology used	Measured impact
Siemens	Industry	Automating cost management through RPA and AI	30% reduction in errors in financial reporting, 25%-time savings in cost management.
Tesla	Automobile	AI for Supply Chain Management and Cost Optimization	15% reduction in logistics costs and 20% improvement in production forecast performance.
Unilever	Consumption	AI for Treasury and Cash Flow Management	Optimized cash flow management with 10% cost reduction and more accurate forecasting.
HSBC	Banking	AI for internal audit and fraud detection	40% reduction in time spent on audits and early detection of fraud.
Nestlé	Agri-food	Sales prediction and inventory management via AI	12% increase in sales forecasting efficiency and 8% reduction in excess inventory.

c. **Identified benefits of integrating AI into management control**
   i. **Improved decision making**

Artificial Intelligence offers faster and more informed decision-making thanks to its processing of massive data and its ability to detect patterns invisible to the human eye. Here are the benefits associated with this improvement:

Predictive Analytics: AI models can predict future trends based on historical data, allowing managers to make informed decisions in strategic planning, risk management, and financial planning.

Increased accuracy: AI eliminates the human shortcut and the inherent complexity of decision-making by relying heavily on objective algorithms. This leads to decisions based on concrete facts and figures rather than impressions.

Responsiveness: AI-powered systems can be cycle-sensitive to market trends, allowing businesses to quickly adapt to market changes and define their strategy.

ii. Optimization of costs and mechanisms

AI contributes to better money management and cost reconciliation between businesses by optimizing cumbersome operational mechanisms:

Automation of repetitive roles: Automating administrative and financial roles, such as auctions, relationship management, or transaction authentication, frees up time for managers to focus on higher-demand activities. This reduces the costs of human error and increases efficiency.

Optimizing management mechanisms: AI helps understand inefficiencies between operational and financial mechanisms, facilitating their continuous rectification. For example, algorithms can analyze store expenses and identify areas where savings can be made.

Financial Disbursement Prediction: AI helps predict cash flow by predicting cash needs and adjusting spending and investments to meet forecasts. This encourages streamlining donor operations and improving profitability.

Reducing logistics costs: By observing opportunities in cycle sensitivity, AI optimizes supply chains, reduces authority costs and improves forecasting of material or product needs, which minimizes costs associated with inventory management errors.

4. Research Methodology

This research adopts a qualitative case study methodology to investigate how Nestlé integrates Artificial Intelligence (AI) into its management control systems. The study is based on the collection and triangulation of data from multiple sources to ensure the robustness and reliability of the findings.

Nestlé was selected as the case study because of its status (Nestlé S.A., 2024) as a global leader in the agri-food sector and its advanced approach to integrating AI and digital transformation practices in its management control systems. Nestlé's active commitment to transparency, as illustrated in its detailed corporate governance and financial statements reports (Nestlé, 2024), provides a valuable and authentic example for studying the real-world impact of AI in management control processes. Moreover, Nestlé's operations in Morocco make it particularly relevant (Nestlé Global, 2024) for exploring the adoption of AI tools within the Moroccan economic and cultural context.

The data for this study were gathered from several reliable sources:

- The **Corporate Governance Report 2024** and the **Financial Statements 2024** of Nestlé (Nestlé, 2024), which provide insights into the governance structures, strategic objectives, and financial data related to AI implementation.

- Official websites and reports of Nestlé, including the Nestlé Global site and Nestlé Maroc, offering updates on ongoing initiatives and performance.

- Interviews with managers and employees involved in AI and management control activities at Nestlé Morocco, providing qualitative insights and real-world applications.

- Academic literature and previous research on the role of AI in management control in emerging markets (e.g., Tangniho & Chanhoun, 2024; Badre et al., 2024).

The methodology combines **qualitative content analysis** of Nestlé's governance and financial reports with **semi-structured interviews** to identify key performance indicators (KPIs), challenges, and opportunities associated with AI implementation. The data are triangulated to ensure validity, and findings are analyzed in the context of Nestlé's broader corporate strategy and AI-driven transformation.

5. Discussion of Results

The findings of this study demonstrate that the integration of Artificial Intelligence (AI) into Nestlé's management control systems has had a profound impact on both operational efficiency and strategic decision-making. Through the analysis of Nestlé's 2024 Corporate Governance Report and Financial Statements, as well as qualitative insights gathered from interviews with key personnel at Nestlé Morocco, it becomes evident that AI technologies are being utilized across multiple functional domains (Tangniho & Chanhoun, 2024; Badre et al., 2023)., including sales forecasting, supply chain management, and predictive maintenance of production assets.

One of the most notable outcomes is the enhanced accuracy of sales forecasts, driven by the deployment of AI-powered predictive models. According to internal estimates shared during interviews, these tools have increased forecast precision by approximately 12% (Nestlé S.A., 2024), enabling the company to better synchronize production volumes with actual market demand. This improvement has directly contributed to a reduction in inventory holding costs and has enhanced Nestlé's operational agility, allowing for more responsive and cost-effective production planning.

In addition, the implementation of AI-based automation systems has significantly accelerated data processing and financial reporting workflows. Interviewees reported a 70% decrease in processing time (interviews with Nestlé Morocco managers, 2024), which has empowered management teams with faster access to critical insights and enabled more timely, data-driven decisions. This time gain has been particularly valuable for scenario planning and resource allocation, key components of modern management control.

Beyond efficiency gains, AI has also played a strategic role by enhancing Nestlé's **capabilities in market analysis and trend anticipation**. Managers highlighted how AI tools support the early identification of emerging consumer preferences and business opportunities, reinforcing the company's **competitive positioning** in both local and global markets.

However, despite these advantages, the study also revealed persistent challenges. Data governance—including data quality (Tangniho & Chanhoun, 2024), consistency, and ethical use—remains a major concern, especially given the reliance of AI on accurate and reliable data inputs. Furthermore, the need for continuous upskilling of employees was frequently mentioned, underscoring the human capital dimension of AI adoption. Without ongoing training and capacity building, the full potential of AI tools may not be realized.

In sum, the results of this case study highlight the **transformative potential of AI in reshaping management control systems**, while also pointing to the **critical importance of robust data governance frameworks and active employee engagement**. These elements are essential for ensuring the sustainability and scalability of AI-driven innovations within complex organizational environments like Nestlé.

6. Conclusion

This study provided an in-depth analysis of the impact of integrating artificial intelligence (AI) into management control practices. Drawing on a solid theoretical framework and a comprehensive literature review, the results highlight the major transformations that AI brings to the optimization of decision-making processes and organizational performance.

However, integrating AI into management control also presents challenges, particularly in terms of skills adaptation, big data management, and ethical considerations. It is therefore essential for companies to implement appropriate strategies to maximize the benefits of AI while mitigating the associated risks.

The integration of artificial intelligence (AI) into management control at Nestlé has led to major transformations, significantly improving the company's overall performance. The results demonstrate substantial gains in terms of reduced production costs, optimized decision-making processes, and improved customer satisfaction.

Thanks to AI, Nestlé has been able to refine its sales forecasts, significantly reduce data processing time, and strengthen its quality control, contributing to better resource management and more responsive decision-making. These advances have also promoted more sustainable operations management and effective adaptation to market changes.

In summary, AI is emerging as a key strategic lever in management control, enabling Nestlé to optimize its financial performance, improve its competitiveness, and strengthen customer satisfaction. This dynamic of innovation positions the company to meet future challenges and seize new opportunities for sustainable growth.

In conclusion, this research highlights the strategic potential of AI as a lever for innovation in management control. It encourages companies to continue investing in smart technologies and develop the appropriate skills to fully exploit these tools. Finally, this study opens up avenues for future research on the impact of AI in other areas of management and on the ethical issues related to its deployment.

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