

**Rethinking the Role of Management Control Systems in Human Capital
Valuation : Insights from a Qualitative Study of Moroccan Companies**

Abderrahim ID BOUFAKIR

(LAREFMO, FSJES Agadir, University IBN ZOHR, Morocco)

Abderrahim.idboufakir@edu.uiz.ac.ma

Said AKRICH

(LAREFMO, FSJES Agadir, University IBN ZOHR, Morocco)

s.akrich@uiz.ac.ma

Abstract

In the era of digital transformation and artificial intelligence, human capital has emerged as a strategic lever for value creation and sustainable performance (Bounfour, 2011). At the same time, management control systems (MCS) have shifted from a budget-focused function to a strategic tool for enhancing intangible resources (Novas et al., 2017).

This study examines how MCS contribute to the evaluation of human capital in large Moroccan companies. It draws on the resource-based view (Barney, 2016), the strategic approach to intangible capital management (Arrègle, 2006), and the MCS model developed by (Anthony & Govindarajan, 2007) as theoretical frameworks.

The empirical investigation is based on semi-structured interviews with managers from sixteen large Moroccan companies, analyzed using NVIVO V10. The findings reveal that MCS-through dashboards and performance measurement tools-play a strategic role in structuring and developing human capital. They foster continuous training, employee engagement, and skills development, thereby strengthening firms competitive advantage in a rapidly changing environment.

Keywords : management control systems ; Moroccan companies ; human capital ; dashboards ; performance measurement.

1. Introduction

The growth of modern organizations increasingly depends on the strategic mobilization of intangible resources. Among these, human capital-encompassing employees' skills, knowledge, innovative capacity, and values-has become a critical driver of sustainable performance (Bontis, 1996; Roos et al., 1997). At the same time, management control systems (MCS), traditionally focused on budgeting and cost control, are evolving toward more integrated and strategic roles.

In Morocco, this shift is particularly significant in an environment marked by growing competitiveness, rapid digitalization, and evolving skill requirements. While the literature acknowledges the strategic role of MCS in performance management, few studies have examined their contribution to the evaluation and enhancement of human capital, especially in emerging economies.

Building on this gap, the present research pursues two objectives :

- (1) To identify how MCS mechanisms enable the measurement, monitoring, and optimization of human capital components ; and
- (2) To enrich the theoretical framework of MCS by emphasizing the valuation of human resources as a form of intangible capital.

Accordingly, this study addresses the following research question :

To what extent do management control systems contribute to the evaluation of human capital in Moroccan companies ?

To answer this question, we conducted an exploratory qualitative study based on semi-structured interviews with managers from sixteen large Moroccan companies operating in various sectors. The aim was to analyze the mechanisms, tools, and managerial perceptions associated with human capital evaluation through MCS.

2. Literature Review

2.1. Human Capital as a Strategic Intangible Resource

Human capital is widely recognized as one of the fundamental pillars of intellectual capital. It encompasses the knowledge, skills, experience, innovative capacities, values, and attitudes of individuals within an organization (Bontis, 1996; Edvinsson & Malone, 1997). These resources are difficult to imitate or transfer and can generate a sustainable competitive advantage when effectively managed (Ricceri, 2008).

According to (Bontis, 2001), human capital cannot be fully owned by the firm-it resides within individuals-but its mobilization and development are critical for organizational performance. In this sense, it constitutes both a lever for value creation and a key factor of innovation and adaptability in competitive and uncertain environments.

Table 1. Definitions of Human Capital

Authors	Definitions
(Bontis, 1996)	« Human capital is the core of intellectual capital. »
(Edvinsson & Malone, 1997)	« The set of tacit and explicit knowledge held by individuals. »
(Bontis, 2001)	« Knowledge, skills, innovation, culture, values. »
(Ricceri, 2008)	« What employees take with them: skills, experience, motivation. »
(Chen, 2009)	« Represents the stock of individual knowledge. »

(Lim et al., 2010)	« The collective capacity to generate innovative solutions. »
(Ramezan, 2011)	« Knowledge relevant to the organization's mission. »

Source : Authors' own elaboration

These definitions underline the intangible, tacit, and non-transferable nature of human capital, as well as its strategic role in long-term organizational performance.

2.2. Dimensions of Human Capital

Human capital is multidimensional and can be assessed using both qualitative and quantitative indicators that capture its contribution to organizational performance. The literature converges on six main dimensions.

Table 2. Main Dimensions of Human Capital

Dimension	Sub-dimensions	Authors
Skills and capabilities	Technical expertise, qualifications, learning ability	(Beattie & Thomson, 2007; Lim et al., 2010)
Creativity and innovation	New ideas, intellectual agility, responsiveness to customer needs	(Manzari et al., 2012)
Experience and expertise	Knowledge transfer, expert networks, employee retention	(Manzari et al., 2012)
Knowledge and efficiency	Outcomes from knowledge, training, organizational learning	(Lim et al., 2010; Wall, 2005)
Attitudes and motivation	Job satisfaction, autonomy, engagement	(Ramezan, 2011; Ricceri, 2008)
Continuous development	Talent development, ongoing training, adaptability	(Lim et al., 2010)

Source : Authors' own elaboration

These dimensions capture the cognitive, behavioral, and motivational facets of human capital, which are essential for building agile, innovative, and resilient organizations.

2.3. Management Control Systems : Definitions and Components

Historically focused on budgeting and financial oversight, management control systems (MCS) have undergone a major transformation. They are now considered comprehensive strategic steering tools that contribute to organizational alignment, innovation, and governance (Chenhall, 2003; Otley, 2016).

Table 3. Definitions of Management Control Systems

Authors	Definitions
(Bouquin, 2006)	« A mechanism ensuring consistency between managers' actions and organizational goals. »
(Anthony & Govindarajan, 2007)	« The process by which managers influence behaviors to achieve strategic objectives. »
(Otley, 2016)	« A strategic information system that fosters organizational alignment. »
(Cheffi et al., 2023)	« A structured set of procedures for steering action and performance. »

Source : Authors' own elaboration

These definitions highlight that MCS go beyond producing accounting information ; they are now seen as integrated systems for steering both tangible and intangible resources, including human capital.

Table 4. Main MCS Components Considered in this Study

Component	Core Function	References
Dashboards	Real-time monitoring, strategic visibility, alignment	(Kaplan & Norton, 1996; Simons, 1995)
Performance measurement	Ongoing evaluation, alignment of actions with objectives	(Riccaboni & Luisa Leone, 2010)

Source : Authors' own elaboration

These two components are the operational levers through which MCS can contribute to the assessment and optimization of human capital.

2.4. Linking MCS and Human Capital Evaluation

Prior research shows that MCS can support the measurement and enhancement of human capital through three main levers :

- Strategic alignment: linking HR-related indicators to strategic objectives (Kaplan & Norton, 2004) ;
- Measurement of intangible **assets**: integrating KPI on innovation, quality, or customer satisfaction (Marr & Roos, 2012);
- Valorization of tacit knowledge : formalizing routines and digitalizing processes (Lev, 2001).

Table 5. Link Between MCS Components and Human Capital Evaluation

MCS Component	Contribution to Human Capital Evaluation	References
Dashboards	Monitoring training, satisfaction, and employee retention indicators	(Bukh, 2003; Kaplan & Norton, 1996)
Performance measurement	Assessing competencies, innovation, and individual efficiency	(Chenhall, 2003; Otley, 2016) Chenhall (2003); Otley (2016)

Source : Authors' own elaboration

These studies support the idea that MCS can act as strategic tools for managing human capital, particularly by integrating qualitative and behavioral indicators into control systems traditionally focused on financial metrics.

2.5. Theoretical Frameworks Underpinning the Study

Two theoretical foundations guided this research:

- The Resource-Based View (RBV) (Barney, 1991), which considers human capital as a rare, valuable, inimitable, and non-substitutable (VRIN) resource that drives sustainable competitive advantage.
- The (Anthony & Govindarajan, 2007) MCS model, which emphasizes dashboards and performance measurement systems as mechanisms for continuous evaluation and strategic alignment.

Table 6. Typology of Resources (Barney, 1991)

Physical Resources	Human Resources	Organizational Resources
Tangible assets, machinery, equipment	Knowledge, skills, expertise, experience	Routines, systems, culture, processes

Source : Authors' own elaboration

This framework positions human capital as a core strategic resource whose quality and management directly affect overall organizational performance.

3. Theoretical Framework and Conceptual Model

This research draws on two complementary theoretical pillars to explain how management control systems (MCS) contribute to the evaluation and enhancement of human capital in large Moroccan companies.

3.1. Resource-Based View (Barney, 1991)

The Resource-Based View (RBV) developed by (Barney, 1991) provides a foundational framework for analyzing how firms build a sustainable competitive advantage from their internal resources, whether tangible or intangible.

Unlike market-based approaches such as Porter's five forces, which emphasize external conditions, the RBV highlights that only resources that are valuable, rare, inimitable, and non-substitutable (VRIN) can generate lasting strategic differentiation.

Human capital clearly meets these criteria: it is firm-specific, tacit, and difficult to imitate, and it plays a pivotal role in driving organizational performance and innovation.

Within the RBV perspective, human capital is positioned as a core strategic resource, whose effective management directly determines a firm's ability to achieve sustainable performance.

3.2. Anthony & Govindarajan's MCS Model (2007)

The MCS model developed by (Anthony & Govindarajan, 2007) provides a second theoretical anchor. It views MCS as a strategic infrastructure enabling planning, monitoring, and steering of organizational performance.

This model emphasizes two operational components :

- **Dashboards**, which serve as real-time tools for visualizing key performance indicators (KPIs) and aligning managerial actions with strategic objectives.
- **Performance measurement systems**, which enable the continuous evaluation of results and the coordination of resources to support strategic priorities.

This dual perspective is particularly relevant for understanding how MCS can integrate human capital considerations into decision-making processes, positioning employees' skills and development trajectories as drivers of competitive advantage.

3.3. Research Hypotheses

Building on these two frameworks, this study formulates three hypotheses to explore the link between MCS and human capital :

- **H1** : Management control systems have a positive effect on human capital.
- **H2** : Dashboards positively influence the development and management of human capital.

- **H3** : Performance measurement systems positively influence the evaluation of human capital.

3.4. Conceptual Research Model

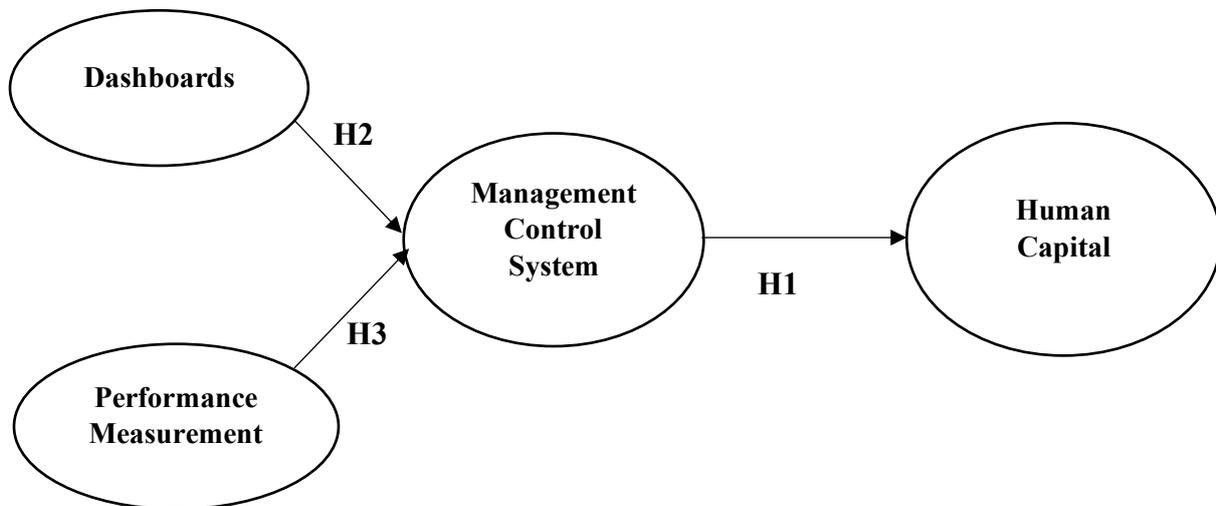
The conceptual model developed for this study assumes that MCS-through their two operational components (dashboards and performance measurement) -contribute to the evaluation and enhancement of human capital within organizations.

Exogenous variables :

- Dashboards
- Performance measurement systems

Endogenous variable :

- Human capital



Source : Authors' own elaboration

Figure 1. Conceptual Model and Research Hypotheses

This conceptual model highlights the structuring and evaluative role of MCS in human capital dynamics, illustrating how they act as strategic levers for assessing and developing intangible resources.

4. Methodology

4.1. Research Context

This study was conducted in the context of large Moroccan companies during a period of profound transformation in work organization. Digitalization, process automation, and the rise of artificial intelligence are reshaping managerial practices and prompting firms to rethink how they assess and develop their human capital.

Within this evolving environment, management control systems (MCS)-traditionally focused on financial and budgetary control-are progressively incorporating the human and intangible dimensions of performance.

The purpose of this research is to analyze how MCS are used within large Moroccan firms to assess, steer, and enhance human capital as part of their strategic efforts to build sustainable competitive advantage.

4.2. Research Approach

Given the emerging and underexplored nature of this topic in the Moroccan context, we adopted an exploratory qualitative approach.

This approach is particularly suitable for investigating complex and multidimensional organizational phenomena, as it allows an in-depth understanding of actors' perceptions, practices, and reasoning (Miles & Huberman, 2003).

4.3. Data Collection

Data were collected through semi-structured interviews conducted with senior managers and executives from various industries.

The interview guide was structured around three main themes:

- Perceptions of human capital within the firm,
- Existing MCS tools and practices (dashboards, indicators, HR reporting),
- Interactions between MCS and human capital evaluation.

This format allowed respondents to share detailed and nuanced insights into how they manage, monitor, and value their human resources.

4.4. Sampling

A purposive sample of sixteen (16) large Moroccan companies was selected, leveraging pre-existing professional contacts to ensure access to strategic profiles involved in both performance management and human resource oversight. This sampling strategy provided sectoral diversity while ensuring relevance and depth of responses.

Table 7. Distribution of Respondents by Job Position

Job Position	Percentage
Management Controller	56.25%
Chief Financial Officer / Administrative Director	25.00%
Performance Management Officer	12.50%
Human Resources Director	6.25%

Source : Authors' own elaboration

Most respondents held positions directly related to performance management and HR, ensuring a high level of expertise and relevance regarding the topic of this study.

Table 8. Distribution of Companies by Industry

Industry Sector	Number of Companies
Agribusiness	4
Renewable energy	2
Hospitality	2
Pharmaceutical industry	1
Agricultural equipment manufacturing and distribution	1
Services	3
Cement industry	1
Construction (BTP)	1
Textile industry	1

Source : Authors' own elaboration

This sectoral diversity allowed for a rich comparison of practices related to human capital evaluation across different organizational contexts, enhancing the external validity of the findings.

4.5. Data Processing and Analysis

All interviews were fully transcribed and analyzed using NVivo V10 through a multi-step process :

- **Lexical analysis** to examine the frequency and co-occurrence of key terms related to MCS and human capital ;
- **Thematic analysis** to categorize responses according to the main themes in the interview guide ;
- **Matrix-based analysis** to cross-compare the dimensions of MCS and human capital and identify convergences and divergences among respondents.

This methodological approach enabled the emergence of robust empirical categories grounded in participants' discourse, structured around two core themes :

- MCS as a strategic steering mechanism,
- and human capital as a strategic intangible asset to be structured and developed.

5. Results

The analysis of the sixteen (16) semi-structured interviews confirmed the three research hypotheses and revealed several ways in which management control systems (MCS) contribute to the evaluation of human capital in large Moroccan companies.

The findings are presented in three parts :

- (1) Lexical analysis,
- (2) Thematic analysis of MCS and human capital, and
- (3) Empirical confirmation of the research hypotheses.

5.1. Lexical Analysis

A lexical frequency and co-occurrence analysis was conducted using NVivo V10. It highlighted the centrality of concepts such as « management », « capital », « performance », and “control” in respondents' discourse, demonstrating the strategic importance attached to both MCS and human capital.



Source : NVivo V10

Figure 2. Word Cloud of the Most Frequent Terms

The dominant terms-such as « management », « capital », « performance », « control », and « indicators » -show that participants consistently associate performance monitoring with the management of human capital.

Table 9. Most Frequent Terms and Weighted Frequency

Term	Length	Frequency	Weighted Percentage (%)
management	7	68	1.83
capital	7	46	1.24
performance	11	35	0.94
control	8	31	0.83
indicators	11	30	0.81
objectives	9	24	0.65
tools	6	23	0.62
system	7	21	0.56
intangible	10	20	0.54
organizational	15	18	0.48
processes	9	16	0.43
monitoring	5	16	0.43
financial	10	15	0.40
internal	8	15	0.40
competencies	11	13	0.35

Source : NVivo V10

These findings confirm that control and performance management practices are systematically associated with human capital, and that the MCS vocabulary is deeply embedded in managerial discourse.

5.2. Thematic Results-Theme : Management Control Systems

Thematic analysis identified two key components of MCS in practice :

- **Dashboards** as tools for monitoring and sharing KPIs across departments,

- **Performance measurement systems** as mechanisms for continuous evaluation integrating both financial and non-financial dimensions (e.g., quality, customer satisfaction, environmental and social impact).

Table 10. Excerpts from the Condensed Matrix « Management Control Systems »

Respondent	F: Management Control Systems	G: Dashboards	H: Performance Measurement
R1	Essential strategic tool for effective management and planning.	Uses dashboards to monitor performance indicators.	Tracks performance gaps through evaluation tools.
R2	Incorporates intangible capital indicators for proactive management.	Dashboards include intangible assets in financial reporting.	Analyzes data to assess overall strategic performance.
R3	Enables tracking performance across subsidiaries and regions.	—	Uses comparative tools to evaluate regional performance.
R4	Monitors service quality and values patents and licenses.	—	Employs indicators to measure service quality and efficiency.
R5	Tracks R&D investments with environmental and social indicators.	—	Uses KPIs to assess social and environmental impact.
R9	Provides real-time monitoring of financial and operational performance, quickly identifying gaps.	—	Measures customer satisfaction and quality indicators.
R10	Implements interactive dashboards to share KPIs across departments.	Displays and shares key KPIs among departments.	Optimizes internal processes using dashboards.

Source : NVIVO V10

These excerpts show that MCS are perceived as strategic, integrative tools that go beyond budgeting to steer qualitative aspects of performance, including innovation, service quality, and intangible assets.

5.3. Thematic Results-Theme: Human Capital

Respondents' discourse revealed several core dimensions of human capital directly linked to the indicators embedded in MCS : competencies, continuous training, talent development, know-how, autonomy, and engagement.

Table 11. Summary of Verbatim on « Human Capital »

Subthemes	Illustrative Quotes
Competencies	« Skills are a major driver of our innovation strategy. » R1
Continuous training	« Continuous training is essential to maintain our competitive edge. » R3
Know-how	« The expertise we have built up is irreplaceable and part of our DNA. » R2
Talent development	« We prioritize internal promotion to retain key profiles. » R8
Autonomy and engagement	« Autonomy increases motivation and improves performance. » R15

Source : Authors' own elaboration

These findings show that companies are actively integrating human development indicators into their control systems, treating human capital as a strategic asset to be cultivated and valued.

5.4. Confirmation of Research Hypotheses

Cross-analysis of the matrices confirmed all three hypotheses.

Respondent	F: Management Control Systems	G: Dashboards	H: Performance Measurement
R1	Essential strategic tool for effective management and planning.	Uses dashboards to monitor performance indicators.	Tracks performance gaps through evaluation tools.
R2	Incorporates intangible capital indicators for proactive management.	Dashboards include intangible assets in financial reporting.	Analyzes data to assess overall strategic performance.
R3	Enables tracking performance across subsidiaries and regions.	—	Uses comparative tools to evaluate regional performance.

Table 12. Confirmation of Hypotheses

Source : Authors' own elaboration

These findings highlight the structuring role of MCS in managing human capital, especially through the increasing integration of HR indicators into strategic control systems.

6. Discussion

This exploratory study confirms that management control systems (MCS) play a strategic role in the evaluation and enhancement of human capital in large Moroccan companies. The analysis of the interviews reveals three key insights, which support the three research hypotheses (H1, H2, and H3).

6.1. MCS as a Strategic Lever for Human Capital Development (H1)

H1 proposed that MCS have a positive effect on human capital.

The findings show that respondents perceive MCS not merely as monitoring or oversight mechanisms, but as strategic instruments for planning and developing human resources.

Several interviewees highlighted that MCS enable them to :

- plan and monitor training initiatives,
- track the evolution of critical skills,
- allocate talent more effectively across units,
- and align human resources with the organization's strategic goals.

These results are consistent with the Anthony & Govindarajan (2007) model, which conceptualizes MCS as strategy-supporting systems.

They also align with the Resource-Based View (Barney, 1991), which positions human capital as a valuable, rare, inimitable, and non-substitutable (VRIN) resource a cornerstone of sustained competitive advantage.

MCS therefore appear to act as strategic enablers of human capital integration, shifting from their traditional financial focus to become instruments for managing human value creation.

6.2. Dashboards as Tools for Steering Human Capital (H2)

H2 suggested that dashboards positively influence human capital. The evidence confirms that dashboards are increasingly used to integrate HR-related indicators into decision-making processes, such as:

- training completion rates,
- employee engagement and satisfaction levels,
- retention of high-potential talent,
- and the development of strategic competencies.

By incorporating these indicators, dashboards enable dynamic and cross-functional monitoring of human resources, fostering stronger alignment between workforce capabilities and organizational strategy.

These findings echo the work of (Kaplan & Norton, 1996) and (Simons, 1995), who view dashboards as organizational learning and innovation tools. When infused with HR data, dashboards evolve into governance instruments for human capital, supporting agility, adaptability, and innovation in rapidly changing environments.

6.3. Performance Measurement as a Mechanism for Objectifying Human Capital (H3)

H3 posited that performance measurement positively influences human capital. The data confirm that firms have developed performance systems incorporating HR-related key performance indicators (KPIs) that allow them to:

- monitor both individual and collective contributions,
- detect skill gaps,
- adjust professional development pathways,
- and link human efforts to strategic outcomes.

This aligns with (Novas et al., 2017), who argue that MCS support the valuation of intangible **assets** by making knowledge, skills, and behaviors visible and measurable.

Performance measurement thus serves as a mechanism for objectifying and recognizing human capital, transforming previously subjective aspects (engagement, creativity, learning capacity) into tangible and actionable elements within strategic management systems.

7. Conclusion

This study highlights the evolving role of management control systems (MCS) as strategic tools for evaluating and enhancing human capital in large Moroccan companies. By integrating both human and intangible dimensions into their mechanisms, MCS contribute to structuring, developing, and valuing employees' skills, engagement, and potential. Drawing on the Resource-Based View (Barney, 1991) (Barney, 1991) and the (Anthony & Govindarajan, 2007) and model, the findings provide an original explanatory framework that demonstrates how dashboards and

performance measurement systems can serve as instruments for steering human capital and aligning it with organizational objectives.

Beyond its theoretical contributions, the study also offers significant managerial insights. It suggests that Moroccan companies should reinforce the integration of HR indicators into their control systems, design dynamic and cross-functional HR dashboards, implement continuous systems for monitoring competencies and potential, and train management controllers to interpret human capital data strategically. Such measures would help transform MCS into effective governance levers for human capital, thereby fostering agility, innovation, and sustainable performance.

While the results are insightful, this research remains exploratory and qualitative, which limits the generalizability of the findings. The sectoral coverage, although diverse, is relatively restricted, and the absence of a longitudinal perspective prevents an assessment of long-term impacts. These limitations, however, open promising avenues for future work. Subsequent studies could adopt a quantitative confirmatory approach using structural equation modeling (PLS-SEM), explore moderating and mediating variables such as HR strategy, organizational culture, or leadership style, examine the impact of digital technologies and artificial intelligence on human capital management, and extend the analysis to small and medium-sized enterprises (SMEs) to allow comparisons across firm sizes and maturity levels.

In sum, this research demonstrates the emergence of an enhanced form of MCS that goes beyond financial oversight to actively support the creation of intangible value. By embedding human capital into their strategic frameworks, Moroccan companies can strengthen their resilience, innovation capacity, and long-term competitiveness.

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