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Simons' Levers of Control throughout the innovation process

À propos des leviers de contrôle de Simons : un regard critique à partir des processus d'innovation

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Abstract

This paper aims to study the relationship between management control and technological innovation from the perspective of Simons' Levers of Control, focusing on the various phases of an innovation project. Specifically, we will examine how these levers support the initiation, planning, execution, and closure phases. This research outlines how Simons' Levers of Control play multiple roles in the initiation phase, such as fostering creativity, reducing uncertainties, and supporting organizational learning. During the planning stage, these levers help develop budgets, hold stakeholders accountable, and justify funding. In the execution phase, the levers of control generate information to improve understanding, focus attention, track results, promote learning, and encourage feedback. Simultaneously, during this stage, Simons' levers help manage the complexity associated with adopting innovative strategies and implementing product innovation. Finally, the diagnostic use of control systems plays a critical role in the closure phase by establishing key success criteria to assess the success or failure of the project.

Keywords: Diagnostic use of management control systems; interactive use of management control systems; innovative projects; project life cycle; project success criteria.

Résumé

Cet article se propose d'explorer les liens subtils entre le contrôle de gestion et l'innovation technologique, à la lumière du cadre conceptuel des leviers de contrôle élaboré par Simons. L'analyse s'articule autour des principales étapes du cycle de vie d'un projet d'innovation — de l'initiation à la clôture — afin d'appréhender le rôle structurant de ces leviers dans la conduite de l'innovation. Plus particulièrement, cette étude met en exergue la manière dont les leviers de contrôle interviennent dès la phase d'initiation, en stimulant la créativité, en atténuant les incertitudes et en facilitant l'apprentissage organisationnel. Lors de la planification, ils participent à l'élaboration des budgets, à la responsabilisation des parties prenantes et à la légitimation des décisions d'investissement. Au stade de l'exécution, les leviers de Simons jouent un rôle central dans la génération d'informations utiles à la compréhension, à la concentration des efforts, au suivi des résultats, ainsi qu'à la promotion de l'apprentissage collectif et du retour d'expérience. Par ailleurs, ils permettent de maîtriser la complexité inhérente aux choix stratégiques et à la mise en œuvre des innovations produits. Enfin, en phase de clôture, l'usage diagnostique des systèmes de contrôle se révèle déterminant, en fournissant des critères clairs et structurants pour évaluer la réussite — ou l'échec — du projet.

Mots-clés : usage diagnostique des systèmes de contrôle ; usage interactif des systèmes de contrôle ; projets innovants ; cycle de vie du projet ; critères clés de succès.

Introduction

Innovation is widely recognized as a process that begins with creativity. However, the development of valuable and creative ideas depends on key factors, such as interactivity, interdisciplinarity, and autonomy (Robert, 1988; Amabile et al., 1996). This raises the question of whether traditional organizational structures facilitate the effective implementation of innovation. The fundamental principles underlying traditional organizational structures often conflict with the dynamic requirements of innovation, necessitating the adoption of an alternative structure to that advocated by rationalist approaches. Innovation management scholars emphasize the critical role of project-based initiatives in driving successful innovation outcomes (Lenfle, 2004; Lenfle & Midler, 2003).

Given this, *what are the underlying reasons that make the 'project' entity essential for fostering innovation?* A project serves as a focal point for specialized expertise, uniting a multidisciplinary team under the leadership of an experienced manager, promoting constructive discussions, and enabling the delegation of authority to skilled individuals. Additionally, projects are grounded in a participatory management approach that necessitates the active involvement of all stakeholders, with the ultimate aim of achieving predefined objectives, given that each project has a distinct start and finish (Kerzner, 2009; Harrison & Lock, 2017). Despite the advantages offered by this organizational structure, the success of each phase of an innovative project depends on management control (M.C.).

Indeed, a brief overview of the literature shows that management control plays various roles at each stage of an innovative project. To effectively study this relationship, the current paper examines it from the perspective of Simons' Levers of Control, focusing on each phase of the project. In this context, the objective of this article is to answer the following inquiry: ***What roles do Simons' Levers of Control play throughout the entire life cycle of an innovative project?*** To answer this inquiry, the research is structured as follows: the first four sections analyze and discuss the roles of Simons' Levers of Control during the initiation, planning, execution, and closure phases, while the fifth section provides a comprehensive summary of all the roles discussed earlier.

1. Simon's Levers of Control at the outset of the project

1.1. Enhancing creativity through the interactive use of control systems

Robert Simons (1994) argues that management control tools can be used in different ways, namely diagnostic and interactive. The same author also notes that the interactive use of control systems is a crucial driver of cultivating creativity. As a matter of fact, in brainstorming sessions[1], employees from diverse disciplinary backgrounds review the information provided by a specific management control tool, which helps generate new ideas that can lead to the initiation of innovative projects. A concrete example can illustrate these provisions: at the end of each season, companies should pay particular attention to the performance of each product. If the analysis of the dashboard metrics reveals the existence of two categories of products—one deemed value-destroying and the other value-creating—it becomes imperative to eliminate the first product to avoid poor performance. Employees can then consider potential improvements for the second product, based on customer feedback and an analysis of competitors' offerings. Nonetheless, the success of this mission depends on the interdisciplinary collaboration of stakeholders, including marketers, salespeople, production managers, and others. Each member brings ideas relevant to their area of expertise, informed by customer needs and competitor actions. In other words, **the discussions generated by management control tools can result in potential improvements that may ultimately lead to the implementation of an innovation**.

In this regard, **management control tools** play a significant role, as they **instrumentalize the identification of gaps** and the **coordination necessary for achieving collective action processes**. Following this line of reasoning, both financial and non-financial information are typically vital to the decision-making process; nonetheless, they require thorough examination by a multidisciplinary team to generate new perspectives. Thus, management control tools support exchanges and interactions among stakeholders, encouraging fruitful discussions and the emergence of new ideas (Dangereux, 2016).

However, **aside from the interactive use of control systems and the roles fulfilled by management control tools in addressing gaps and coordinating collective action**, **it is imperative to note that stimulating creativity during the initiation stage is closely linked to the successful implementation of the execution phase**. From this vantage point, Katia Dangereux has pointed out that while innovation is typically associated with medium- and long-term goals, operational activities are increasingly focused on the short term. As a result, it is vital to ensure that daily operations align with established plans before pursuing innovative initiatives. To achieve this, the adoption of management control tools is indispensable to identify problems faced by operational staff. Additionally, pre-established cost methods, variance analysis, and budgeting are vital for highlighting unfavorable variances that can often

[1] Sharing results during meetings and brainstorming sessions provides a comprehensive view of the challenges faced and encourages contributions from various specialists, thereby leading to creative proposals.

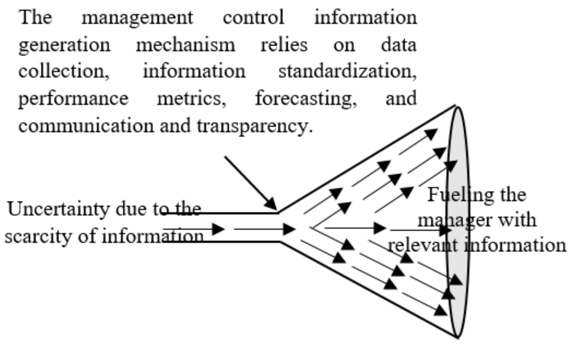
lead to opportunities for innovation. Conversely, if the analysis reveals positive results, it frees employees from routine tasks, allowing them to concentrate more on innovative projects and dedicate additional time to them (Dangereux, 2016).

1.2. Reducing uncertainty via target costing tool

In their article titled '*Defining Uncertainty: A Conceptual Basis for Uncertainty Management in Model-Based Decision Support,*' Walker et al. emphasize that the perception of uncertainty should not be reduced to focusing on a single aspect. This means that uncertainty is not solely limited to situations characterized by a lack of information; it can also manifest more prominently in contexts where information is available. In light of this, the introduction of new information can either reduce or heighten uncertainty, suggesting that uncertainty is fundamentally a matter of information. Consequently, both practitioners and scholars are investigating strategies and options for managing it (Walker et al., 2003). In a similar vein, Otley and Soin (2014) stress that uncertainty results from the inability to predict future events, making it impossible to forecast their consequences, whether positive or negative. When applied to the organizational context, this viewpoint prompts the upcoming issue: ***How can organizations manage these events by leveraging their advantages and preventing negative outcomes?***

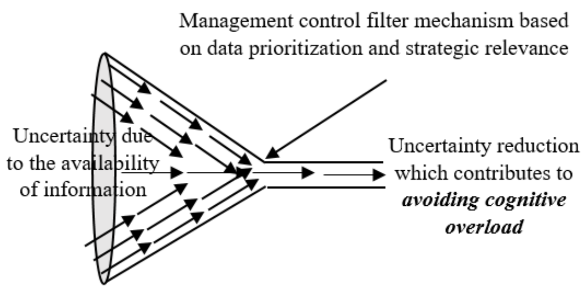
In order to respond to this matter, it is required to demonstrate how management control reduces uncertainty in these cases: when uncertainty arises from a scarcity of information and when it is caused by the availability of information. Research studies reveal **structural isomorphism** and **functional antagonism among management control** and **uncertainty**. First, structural isomorphism suggests that the core of management control and uncertainty lies in information. Second, functional antagonism is shaped by contrasting conditions, resulting in two distinct scenarios. The scarcity of information increases uncertainty and compels management control to use its tools to bridge the gap between the ***known*** and the ***unknown***, as illustrated in **Figure 1**. In contrast, the availability of information emphasizes the filtering capacity of management control, which involves acquiring raw data, aggregating it into information, and ultimately transforming it into valuable knowledge, as depicted in **Figure 2** (Daraban, 2017).

Figure 1: Uncertainty due to scarcity of information and management control.



Source : Authors

Figure 2: Uncertainty due to availability of information and management control.



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To fully understand how management control tackles uncertainty, it is essential to distinguish traditional management control tools from contemporary ones. According to Philippe Lorino (2003), a product can be viewed either as a tangible object or as a concept to be developed. On the one hand, the product is a tangible object because it undergoes physical manipulation, ranging from the purchase of raw materials to their transformation into new technology. On the other hand, the product is a concept, as its development results from close cooperation with various stakeholders, allowing for the collection of all relevant information, such as customer needs, which can then be translated into well-defined technical specifications. It is key to underline that traditional management control tools align with the first perspective[2], whereas new instruments are categorized under the second perspective, commonly known as the informational approach. To put it differently, the new tools developed by practitioners and academics under the umbrella of contemporary management control have just as much potential to handle uncertainty due to their informational aspect.

To better illustrate how contemporary management control tools relate to uncertainty, the ensuing paragraphs will focus on the functioning mechanism of Target Costing. Indeed, every innovation project faces multiple forms of uncertainty, including both technological and market

[2] The traditional management control model developed in an environment characterized by high certainty, where market factors were predictable, the number of competitors was limited, and customers were not particularly interested in added value. Thus, production was adequate for commercialization, and competition mainly revolved around cost reduction. However, as time went on, supply started to surpass demand, resulting in intense competition, challenges in predicting competitor behavior, and an increase in customer power (Benslimane et al., 2024). Consequently, it has become essential to conduct a thorough study to identify customer needs. **However, these needs are uncontrollable and constantly evolving, making them difficult to understand. Furthermore, they can be easily influenced by competitive offerings.**

uncertainties. In their publication: '*The Impact of Competition and Uncertainty on the Adoption of Target Costing,*' Ax et al. (2008) identify market uncertainty as comprising two components: customer uncertainty and competitive uncertainty. From one side, the company faces significant challenges in meeting the evolving needs of its customers, and this situation is worsening, as these needs vary depending on competitors' offerings. Therefore, before initiating the development of a new product, the company must conduct market research to identify customer needs. Nevertheless, this does not eliminate the potential risk of competitors introducing a new product that could alter or evolve these needs. In this regard, no one can predict with certainty the success or failure of a product before it is launched in the market. Thus, it is requisite to take into account several challenges, including: What is the level of progress competitors have made on the subjects we've examined? Are they likely to release their product before their rivals? Do customer needs align with our representations? On the other side, translating customer needs into technical specifications presents various challenges, especially regarding the technological dimension. Engineers assess technical feasibility, which leads them to conduct meticulous research to determine the availability of a reliable and efficient technological solution, all the time staying within acceptable cost limits.

Yet, the presence of a technological solution alone does not guarantee the success of feasibility. Another critical factor comes into play: the necessary knowledge for the effective operation of the technology (Benslimane and Benjelloun, 2023). This prompts inquiries about the availability of that knowledge and its source. In cases where the company does not have the needed knowledge, it is important to engage an external source. To effectively assess technical feasibility, it is unquestionable to explore the underlying issues: Are there technological solutions available? If so, are they reliable and effective? Are the costs acceptable? Do we possess sufficient internal skills, or is there a need to acquire them? If we lack these skills internally, what forms can we use to obtain them? Is the chosen method of acquisition reliable? (Ax et al., 2008).

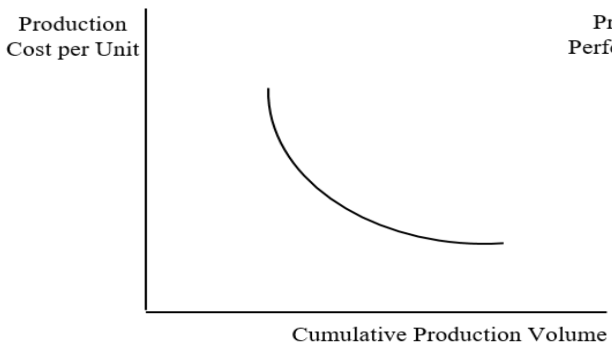
1.3. Encouraging organizational learning using Simons' Levers of Control

Probably, one of the inquiries that constantly challenges the reader of this article is the following: What is the role of organizational learning in analyzing how management control relates to product innovation? To approach this, we will first demonstrate that organizational learning is a crucial partner in product innovation and then explain how the levers of control significantly influence the two types of organizational learning — single-loop and double-loop — leading to incremental and radical innovations.

Organizational learning is a pillar of innovation, as failure undeniably plays a vital role in the implementation of innovations. The next excerpt from Shenhar and Dvir's (2007) work, *Reinventing Project Management: The Diamond Approach to Successful Growth and Innovation*, shows this reality: '*Before introducing its big hit, the Macintosh, in 1984, Apple Computer completely failed with its predecessor, the Lisa computer. Apple's managers later acknowledged that without the lessons learned and technologies developed from the Lisa project, the Mac's success would not have been possible—bringing into question whether Lisa was indeed a complete failure.*' From this excerpt, we can infer that the knowledge gained from a previous project, even if it failed, can be leveraged to develop new technologies. This accentuates why innovation is a continuous learning process that requires strong commitment from all stakeholders (Gupta and Wilemon, 1990; Maidique and Zirger, 1985; Schrage, 1989; Hopkins, 1981; Cooper and Kleinschmidt, 1987; Booz, Allen, and Hamilton, 1982).

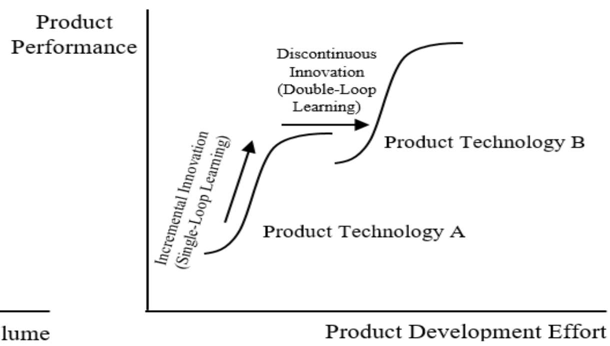
Moreover, it is indispensable to note that, initially, in the literature, organizational learning aimed to ensure production efficiency by giving particular priority to repetitive tasks. This gave rise to a downward-sloping curve that shows the relationship between the cost of production per unit and the cumulative production volume. This curve is commonly referred to as the experience curve, as indicated in **Figure 3**. Still, the perspectives of academics and practitioners have evolved. Today, learning is seen as a driver of innovation, as illustrated by the production-innovation learning curve or "S", which was first introduced by Foster and is represented in **Figure 4**. The curve aims to study how product performance is influenced by the effort invested in its development. Initially, product performance improves rapidly but eventually stabilizes due to the limitations of the technology being studied (McKee, 1992).

Figure 3 : The Experience Curve.



Source : (McKee, 1992)

Figure 4 : Innovation S-Curve.



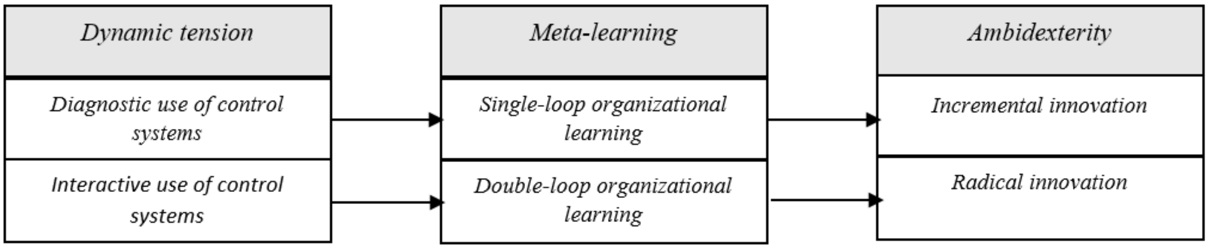
Source : (McKee, 1992)

After examining the relationship among organizational learning and technological innovation, particular emphasis will be given to exploring how management control interacts with organizational learning, especially in terms of single-loop and double-loop learning. Certainly, management control is an inseparable element of organizational learning, and this becomes especially evident when examining the particularities of individual learning and organizational learning. Borrowing the words of Daryl McKee in his research: '***An Organizational Learning Approach to Product Innovation***,' individual learning is consequential to support organizational learning, but by itself, it is not sufficient. This implies that organizational learning is not merely the sum of individual learning, as it involves sharing and storing information in a practical and useful way to make it accessible to all members of the organization. Therefore, organizational learning seeks to ***share assumptions***, ***develop a deeper understanding of the relationship linking actions and results***, and ultimately ***institutionalize experiences***.

By analyzing the objectives of organizational learning, it becomes clear that management control plays a cornerstone role in fostering it, as it allows for sharing and storing information, as well as institutionalizing experiences. Nevertheless, in order to make a rigorous judgment about this relationship, we believe it is essential to study it through the lens of Simons' levers of control and the types of organizational learning, particularly single-loop and double-loop learning. Based on the literature review, the diagnostic use of control systems supports single-loop organizational learning (Hedberg and Jönsson, 1978, Argyris, 1982; 1990; Miler, 1993; Hoque and Hopper, 1994; Simons,1995), and the interactive use promotes double-loop learning (Simons,1995; Abernethy and Brownell, 1999; Bisbe and Otley, 2004; Widener, 2007; Shurafa and Mohamed, 2016). At this stage, several interrogations arise: which type of organizational learning is most appropriate for the initiation phase? This also involves determining which lever of control is best suited for this phase.

To address these concerns, we find it important to point out that single-loop organizational learning nurtures the emergence of incremental innovations, whereas double-loop organizational learning stimulates disruptive innovations, often referred to as radical innovations (McKee, 1992), as shown in **Figure 5**. Additionally, the implementation of radical and incremental innovations does not occur within the framework of a single project; instead, it can involve the simultaneous adoption of two innovation projects, which will be the focus of an in-depth discussion in a future publication. In fact, in contrast to the execution phase, which focuses on implementing previously chosen products and ensuring the effectiveness and efficiency of the production process through continuous single-loop organizational learning, the initiation phase is of paramount importance for making a reasoned judgment about the lived experiences throughout the various stages of already implemented innovation projects. It thus encourages a multitude of interactions aimed at discussing the vulnerabilities of marketed products and the adopted strategy, and perhaps even the need to implement new strategies to cope with evolving and multifaceted contextual needs (Benslimane, 2023).

Figure 5. Dynamic tension, meta-learning, and ambidexterity.



Source: Authors

In this way, the interactive use of control systems[3] is more likely to emerge during the initiation phase to stimulate the development of new technologies that meet the changing needs of customers and the unpredictable behaviors of competitors, thereby requiring a change in norms. Yet, double-loop organizational learning, closely associated with the interactive use of control systems, does not necessarily or automatically lead to disruptive innovations, as it is ultimately the company's environment that determines whether deep changes are required. Consequently, the diagnostic use of control systems is expected to manifest during the initiation phase, facilitating the improvement of actions undertaken to achieve organizational objectives in subsequent phases (Benslimane, 2023).[4]

2. Simon's Levers of control throughout project planning

2.1. Project profitability and innovation funding

Management control systems (M.C.S.) do not merely serve to encourage the emergence of new ideas or oversee the execution of innovative projects. Rather, these systems can curb excessive innovation by focusing solely on products that create value and significantly improve the company's performance. As a result, management control tools act as a filter, enabling the

[3] The interactive use of management control systems during the initiation phase of a project can be beneficial for organizational learning, as it fosters communication and collaboration among project team members. Indeed, this promotes the exchange of information and ideas, thereby driving learning and innovation. However, this lever of control is likely to have negative effects on organizational learning during this phase. In this regard, the excessive interactive use of control systems can result in information overload and confusion among project team members, potentially hindering organizational learning.

[4] In a stable environment, we increment; however, in a dynamic environment, exploitation and exploration converge harmoniously.

selection of projects that generate increasing profitability from a variety of options (Davila, 2005; Chenhall & Morris, 1995).

To this end, management control uses financial indicators such as return on investment (R.O.I.). This indicator allows project members to assess the return on an investment relative to its initial cost by calculating the gain or loss as a percentage of the initial investment.[5] In contrast, the internal rate of return (I.R.R.) helps identify the rate of return on the discounted future cash flows required for the net present value (NPV) of those cash flows to equal zero, which corresponds to the initial investment.[6] At the planning stage, management control provides relevant information on realistic financial forecasts, meticulously analyzing all costs vital for a project's successful completion. This includes budget preparation[7], estimation of fixed and variable costs, and the identification of expense items that may impact profitability, such as indirect costs and associated risks, particularly those related to cash flow volatility.

Since its emergence, financial control has often been seen as an element that stifles innovation. Contrary to this view, various researchers have shown that this widely held belief contradicts actual practices. Truthfully, it is through management control tools, such as budgets, that a company evaluates its financing needs and seeks the necessary funds to allocate appropriate financial resources. In turn, the role of management control is to legitimize the allocation of funds to capital providers and external financiers (Dangereux, 2016).

2.2. Resource allocation, goal setting, and stakeholder engagement

Management control is a mechanism that influences behavior by motivating individuals to adopt desired behaviors and penalizing undesired ones. It also encourages people to collaborate for the benefit of the company by taking initiative, assuming responsibility, and receiving appropriate rewards. Thus, (M.C.) limits opportunistic behavior, prevents dysfunctional decisions, and ultimately measures results, as it also regulates incentives. From this perspective,

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[5] The ROI is calculated by subtracting the initial investment from the gains generated by the project and then dividing the result by the initial investment. A positive ROI indicates that the project has generated a return greater than the initial investment, signifying profitability.

[6] If the IRR is higher than the required rate of return (often the cost of capital), it indicates that the investment generates a return greater than the required return and is therefore considered profitable.

[7] The budget preparation process is complex and requires collaboration across departments to gather information and create a unified budget that meets both internal and external needs. It involves input from various teams, including sales for forecasting product demand, technical managers for resource planning, human resources for personnel-related costs, and quality controllers for product inspection needs. The information gathered is both qualitative and quantitative, and any contradictions are addressed through strategic alignment by top management. Ultimately, the management controller compiles the final budget using these inputs (Benslimane, 2023).

M.C. supports learning and inspires innovation. To achieve these outcomes, it is important to introduce variables connected to strategic objectives and desired behaviors, breaking them down into indicators that measure the performance of specific activities (such as quality and time indicators) and evaluate specific behaviors (such as productivity, safety, and absenteeism indicators) (IFAC booklet, 1999).

M.C. focuses on aligning knowledge transfer with the appropriate decision-making power, as an organization's performance relies on placing the right knowledge in the hands of those with the power to make decisions and drive innovation. Indeed, the role of M.C. is strengthened by informal control mechanisms that encourage participation in the decision-making process. This justifies the integration of training and participatory techniques to provide the process with valuable information and sustain actions likely to generate knowledge and innovation.

The **introduction** of **communication** and **discussion channels**—such as working groups, **brainstorming sessions**, and suggestion programs—promotes participation and enables M.C. to reach its full potential by **guiding learning**, **motivating knowledge acquisition**, and **encouraging innovation** (IFAC booklet, 1999). Eventually, Gautier (2002) argues that (M.C.S) are decisive for **ensuring the success of an innovation project** by ***communicating objectives***, monitoring progress, and managing risks and uncertainties.

In light of the above, the development of budgets and the communication of objectives play a pivotal role in stimulating the motivation and engagement of the vast majority of managers, who have actively participated in creating the overall budget through the transmission of local budgets. Moreover, the definition of objectives cannot be a unilateral act; it must occur within a bilateral framework, taking into account the skills and abilities of each employee to enhance their involvement and motivation.

3. Simon's Levers of control for the project execution stage

3.1. Using information provided by (M.C.S.)

The adoption of management control tools at the operational level aims to regularly compare planned objectives with actual results. Often a constructive analysis of discrepancies reveals dysfunctions, necessitating the organization of several meetings to identify their causes. Identifying and inventorying the causes of these dysfunctions contributes to the development of tailored, innovative solutions to deal with them. In fact, the roles of these tools are not limited to detecting dysfunctions and developing new solutions; they also ensure control and monitor the impacts of newly implemented solutions. Sometimes, the analysis of underperformance leads to the conclusion that improving the current situation requires the development of a new product or expansion into a new market. In other words, management control tools facilitate the detection of anomalies, monitor the performance of previously implemented technologies, and encourage innovative ideas (Benslimane, 2023).

The detection of a negative variance indicates an unfavorable deviation or loss, suggesting the need for corrective action to resolve the situation. Therefore, systematic monitoring of these variances becomes imperative to fix issues and ensure the project's success. On the other hand, variances provide a concrete and comparative assessment of actual performance, making it easier to highlight favorable or unfavorable factors. This real-time assessment is invaluable for identifying areas that need improvement and strengthening effective practices (Benslimane, 2023).

However, the information generated by management control tools extends beyond merely identifying dysfunctions. It also helps improve understanding by identifying the interdependence of units, pinpointing weaknesses, assessing the impact of external events, and exploring options. Additionally, it directs attention to problems encountered by different areas and signals imminent threats to the organization. Monitoring performance is another aspect, as it involves tracking progress toward achieving objectives, measuring key success factors, and comparing results to expectations. Furthermore, it contributes to enhancing learning by identifying weaknesses in the current strategy and improving the competitiveness of products or services. Finally, management control tools provide feedback to managers at all hierarchical levels (Hui Wee et al., 2014).

3.2. Dealing with complexity using information systems

The complexity of innovation has three aspects. First, companies engaged in an innovation strategy have an expanded product portfolio; due to this, the complexity at this level is linked to the diversity of the products. Second, to develop innovative products, companies undertake projects consisting of many phases and involving numerous stakeholders, which intensifies the flow of information generated by all collaborators. Third, beyond the complexity stemming from the nature of the strategy adopted, the projects undertaken, and the stakeholders involved in each phase of the innovation process, the innovative nature of the products themselves is an undeniable source of complexity. At this level, this complexity derives from the proliferation of components constituting the technology and the unexpected outcomes of the interactions between the different components of the technology under examination. Given the multidimensional nature of complexity, M.C. is fundamental to ensure its effective management, but this can only be achieved through the use of information systems such as ERPs (Hooge, 2010; Dangereux, 2016).

To analyze this tripartite relationship involving (M.C.), information systems, and complexity, it is crucial to highlight the objectives of each variable. Actually, the goal of M.C. is to monitor performance achieved by each department, individual, and process, provide valuable support for decision-making, closely track the alignment of activities conducted by the organization to achieve its strategic objectives, and implement corrective actions to remedy deviations. Information systems, such as ERPs, centralize data provided by each department, automate processes, procedures, and inventory management, and provide real-time data. **As a consequence, ERPs are pivotal in supporting M.C. by accelerating decision-making, assisting managers in performance monitoring, and ultimately automating and standardizing processes while ensuring meticulous control over operations** (Teittinen et al., 2013).

The implementation of an innovation strategy goes hand in hand with the deployment of an information system designed to acquire precise, comprehensive, relevant, and up-to-date data. If the information systems supporting the M.C. are misaligned with the strategy being implemented, there is a risk that the reports generated will not meet the requirements of the innovation process. One of the major challenges companies face is managing a large volume of data, which raises interrogations about the adequacy of tools like Microsoft Excel in fulfilling these needs. For the efficient management of thousands of products, shifting from an individualized management methodology to a more holistic approach is essential, requiring advancements in both instrumentation and methodologies. In this context, adopting an ERP system becomes an unavoidable necessity to meet the requirements of the innovation strategy, as it helps mitigate the shortcomings of using Excel for data management (Benslimane, 2023).

3.3. Fostering organizational learning via the diagnostic use of control systems

Organizational learning is an inseparable partner of (M.C.), as tools such as dashboards and budgets are used to assess the gap that exists from initially set objectives to the results achieved. Furthermore, calculating variances helps legitimize their interpretation, drawing conclusions that contribute to organizational learning, whether in single-loop or double-loop modes of learning. In other words, comparing actual and budgeted data establishes two scenarios. The first supports the idea that achieving objectives requires revising actions, leading to single-loop learning. In contrast, the second highlights that merely modifying actions does not automatically guarantee the achievement of objectives, due to the evolving needs of customers and intensified competition. This drives the organization to either reformulate its objectives or thoughtfully reconsider its strategy and norms, which implies double-loop learning (Benslimane, 2023).

During the execution phase, the primary objective is not to develop new strategies or alter existing goals. Rather, it is to allocate the company's resources effectively to achieve the objectives that were set beforehand. For this reason, it becomes indispensable to compare these objectives with the results achieved to take corrective actions if necessary. As such, diagnostic use is considered integral for supporting organizational learning at this stage, with a particular emphasis on single-loop learning.

In this perspective, according to Ismail Benslimane and Sanae Benjelloun in their article titled ***Re-writing Management Control Philosophy***, *it is clear that the diagnostic use of control systems plays a decisive role in implementing strategy by using tools from different logics (financial, non-financial, and hybrid) to identify errors, evaluate performance, uncover root causes, foster organizational learning, update objectives, track subordinate performance, allocate resources, and provide early warning signals.* ***The highlighted elements are intended to ensure that everything functions smoothly and remains under control*** (Benslimane and Benjelloun, 2025). As a result, this lever of control can lead to adjustments and improvements in the innovation process, thereby advancing organizational learning.

3.4. Management control tools as risk mitigators

The management of the risks inherent in an innovation project is carried out using management control tools. As it pertains to this, the target costing method focuses on the dimensions related to the mentioned risks, particularly cost reduction, time optimization, and quality improvement. By emphasizing customer orientation, this method facilitates the identification and assessment of needs, enabling the creation of a product that encompasses all the key attributes desired by the customer, as it helps avoid unnecessary expenses. As well, proximity to the customer significantly reduces the time required to bring the product to market. Alongside the target costing method, value analysis is an additional tool aimed at addressing the risks associated with an innovative project. It focuses on developing several customized solutions that meet customer requirements by selecting the best alternative that offers the most advantages in terms of reliability, desired features, and development costs (Benslimane and Benjelloun, 2025).

Additionally, it's important to recognize that the literature emphasizes target costing as a thorough cost reduction program that covers the entire lifecycle of a project. It's also notable that target costing, similar to value analysis, is applied at the early stages of the project. The

Kaizen philosophy is prevalent at the operational level to continuously improve existing processes, reduce costs, optimize timelines, and ultimately enhance quality significantly (Benslimane and Benjelloun, 2025).

Kaizen refers to a philosophy of continuous improvement. Walton (1988) emphasized that the Deming Wheel is central to this philosophy. This methodology is based on the Plan-Do-Check-Act (PDCA) cycle, which originated from the initial proposal by Shewhart, a prominent expert in statistics. Following the substantial contributions of William Edwards Deming, widely recognized as the precursor to Total Quality Management, the third phase of the PDCA cycle was adapted and renamed 'Study.' Furthermore, the Deming Wheel represents a model of continuous improvement, consisting of four consecutive and recurring phases.

Continuous improvement involves the ongoing, incremental enhancement of existing processes, products, or services. When implemented effectively, it can drive innovation by sparking creativity and exploring new ideas to further refine and improve these products. In fact, a company can start by improving small details of a product and, over time, these incremental improvements can lead to significant changes that completely transform the product, making it more competitive in the market or better able to meet new customer needs. Product innovation can also stem from identifying new improvement opportunities through the analysis of customer feedback or by observing market trends. Continuous improvement creates an environment conducive to innovation by encouraging creative thinking and gradually eliminating inefficiencies and obstacles to transformation (Benslimane, 2023).

4. Simon's Levers of control during project closure

In order to assess the success of an innovative project, Shenhar and Dvir, in their work titled *Reinventing Project Management: The Diamond Approach to Successful Growth and Innovation,* proposed a model consisting of five critical criteria, which are presented as follows:

First, project efficiency aims to meet the classical criteria of a project, commonly known as the iron triangle (reduce cost, optimize timelines, and enhance quality). This compels the project team to examine the following issues: *'Was the project completed within the allocated time and budget? Was it executed as planned?'*

Second, the criterion of 'impact on the customer' is closely associated with the concept of customer value creation, prompting these inquiries: *'Does the final product enhance the client's experience? Does it add value to their business? How will the client's needs be satisfied? Does the product fulfill both functional requirements and technical specifications? Does it contribute to strengthening customer loyalty?'*

Third, if the second criterion is linked to customer value creation, the next criterion proposed by Shenhar and Dvir highlights the prominent necessity of creating value for internal stakeholders, namely employees. To this end, the two researchers have proposed the subsequent reflections to evaluate the impact of the project on employees: *'Has the project enabled the team to develop new skills, enhance organizational capabilities, and strengthen management abilities? Have team members remained in their roles after the project's completion? Has the project contributed to employee satisfaction and loyalty?'*

Last but not least, the undertaken project must positively impact the financial performance of the company. In view of this, several preoccupations occur about the business and the direct success of the implemented project, which leads us to the ensuing interrogations: *'How much has the project helped improve the financial performance of the parent company? What are the anticipated results of launching the final product in terms of sales, growth, and profitability?'*

Lastly, the fifth criterion is positioned at the heart of survival skills acquisition, in terms of knowledge, technologies, and the ability to deal with profound changes. This reflection has led scholars to raise the upcoming inquiries: *'Does the project help the organization prepare its infrastructure (new organizational processes, acquisition of new technological and organizational skills) for the future? Has the project tested new ideas to implement an innovative product? Is the company ready to initiate change and become a leader in the industry? Will the company be able to adapt quickly to external challenges, unexpected competitor movements, and surprises in markets and technologies?'*

The success criteria we've outlined are assessed at various stages throughout the project's lifecycle. Effectiveness is typically evaluated during the execution and closure phases, while the impact on the customer and the team is generally measured a few months after the project has concluded. The evaluation of business success and its consequences should take place one to two years' post-completion. At last, the dimension of preparation for the future is usually assessed several years after the project's closure, typically between three and five years. In reality, there is no universal set of criteria that applies to all projects. Managers must adjust their expectations based on the type of project and prioritize certain criteria over others, depending on the project's specific nature. For example, a project with a high degree of uncertainty and risk should be evaluated based on long-term dimensions rather than traditional ones. In contrast, a project with low uncertainty and risk will align with traditional short-term criteria rather than long-term ones.

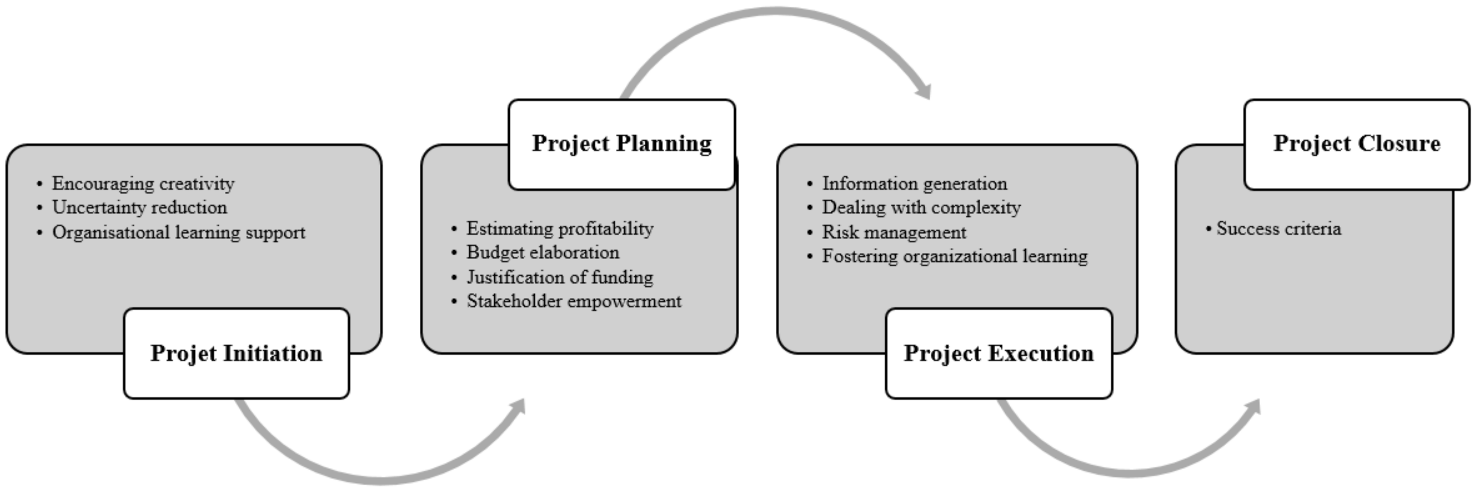
Since radical innovation projects do not exist within the Moroccan context for several reasons, our analysis will focus solely on incremental project innovation. A brief overview of the literature shows that such projects are typically characterized by a low level of uncertainty and risk, as the project team already has thorough knowledge of the technology to be used and a clear understanding of customer feedback, since the project has already been commercialized. From this perspective, and based on the assumptions formulated by Shenhar and Dvir, the criteria for evaluating the success of these projects are project efficiency and impact on the customer. The question that now attracts our attention is: ***What role do management control systems play in assessing project success?***

The exploration of management control and technological innovation through the perspective of Simon's Levers of Control in this publication reveals that the diagnostic use of control systems is the most effective lever during the closure stage. In this stage, the purpose is to provide useful insights into the limitations of the previous phases, which may help guide discussions and interactions at the start of a new project to tackle challenges concerning product limitations, customer needs, and the unpredictable behavior of competitors. In fact, management control tools, such as dashboards, can assess the two critical criteria under examination: project efficiency and customer impact, using relevant indicators at the end of the project. A straightforward example of this is the ongoing adjustment of the dashboard to align with the required demands. In this framework, a project focused on achieving high efficiency and delivering value to the customer must incorporate these elements into the dashboard, using indicators that measure factors such as cost, quality, timelines, and customer satisfaction.

5. Discussion

The implementation of an innovative project is a process closely linked to numerous challenges, including managing risks and uncertainties, assessing financial, human, and material resources, analyzing profitability, handling complexity, advancing organizational learning, and evaluating the project's success. In this regard, several matters arise with equal strength and fairness regarding the roles assigned to Simons' levers of control in managing an incremental innovation project. The answer to these matters led us to examine the roles of these levers at each phase of such a project, namely: initiation, planning, execution, and closure, as shown in **Figure 6**.

Figure 6. Roles assigned to Simons' levers of control throughout the project lifecycle phases.



Source : Authors

5.1. Project initiation

The launch of an innovative project is truly a journey into the unknown, where one faces various uncertainties. In this context, management control plays a critical role, with tools such as target costing helping to close the gap from the known to the unknown, easing uncertainties related to both technology and the market. This is accomplished by the joint efforts of marketers and research and development engineers. The marketers identify and gather customer needs, ensuring follow-up, and the engineers focus on studying the most suitable technology for implementing the innovation, its availability, and the means necessary for its acquisition.

Management control is not solely limited to reducing uncertainties; it also aims to cultivate creativity through the interactive use of control systems. Indeed, encouraging a multidisciplinary and interactive analysis of the data provided by management control tools during meetings organized by supervisors for their peers can uncover new avenues for reflection. These avenues often lead to innovative and pertinent ideas for solving problems, whether at the operational or strategic level.

Beyond reducing uncertainty and boosting creativity, the diagnostic use of control systems promotes single-loop organizational learning, and the interactive use encourages double-loop learning. This distinction provokes a fundamental topic: which type of learning is most applicable during the initiation phase of a project, and which lever of control is best suited for this stage? Single-loop learning is typically associated with incremental innovations, while double-loop learning is a driver of radical innovations. In contrast to the execution phase, which focuses on the efficiency of implementing existing products, the initiation phase is of paramount importance. It allows for the evaluation of past experiences, the examination of vulnerabilities in the products and the adopted strategy, and possibly the redefinition of approaches to manage contextual challenges. It is precisely at this moment that double-loop learning finds its place, catalyzing the emergence of radical solutions capable of meeting the evolving needs of customers. However, it is reliable to emphasize that double-loop learning is not necessarily the corollary of radical innovation, as the business environment plays a crucial role in the emergence—or lack thereof—of profound changes.

5.2. Project planning

After identifying the root causes of dysfunctions, detecting new opportunities for improving the existing system, and proposing numerous innovative solutions to handle the current situation, what is the next step? Naturally, it is invaluable not to overlook the fundamental principle on which every business relies: profitability. Management control certainly plays a core role, acting as a filter to select only those projects likely to achieve a high level of profitability.

The choice of investment therefore requires the identification of financial, human, and material resources, in order to allocate them with optimal efficiency. This task cannot be accomplished by the management controller alone; it necessitates the collaboration of all teams to define and communicate the resources needed for the implementation of a specific project, guided by assumptions informed by the sales forecasts. Yet, this in no way eliminates the need for rigorous coordination to assess the feasibility of the project in terms of resources. As an example, when the sales team informs us that a client is considering a large order, the key point that comes up, considering our current production capacity, is this: can we fulfill this request? If the answer is yes, we proceed; if not, we turn to other clients. This is why every initiative must be carefully evaluated, seeking the collaboration of various internal departments to ensure the project's feasibility.

As soon as the budgets are developed, the process is accompanied by the commitment of nearly all the managers, since they participated in their development. Consequently, the objectives set are perceived as logical and achievable. Moreover, it is important not to lose sight, from either perspective, that the identification of resources is also indispensable for justifying the funds to investors, such as credit institutions.

5.3. Project execution

The central objective of this phase is primarily focused on realizing innovative ideas, leading to the creation of new products. By extension, it is pivotal to closely monitor the production process to identify any potential issues, which requires organizing meetings to diagnose the root causes hindering the smooth progress of this process. To this end, it is consequential to compare the previously established objectives with the results achieved. Still, it is important to note that information from management control tools is not limited solely to identifying dysfunctions, but also extends to other aspects such as improving understanding, focusing attention, monitoring performance, enhancing learning, and offering feedback.

In addition to generating information at the operational level, management control aims to manage complexity. In reality, companies that adopt an innovation strategy aim to create a multitude of products, which requires the involvement of many actors, thereby intensifying the flow of information. Furthermore, this complexity also stems from the nature of technological products, which are often considered complex. It is based on two elements: the proliferation of technological components and the unforeseen results of interactions between these components. In this regard, the use of information systems, such as ERPs, becomes essential to ensure the monitoring and control of these information flows.

Apart from generating information and managing complexity, management control plays a major role in addressing the internal risks associated with an innovation project. It notably contributes to cost reduction, optimization of project timelines, and continuous improvement of quality. In this context, the target costing method focuses on cost reduction, time optimization, and quality improvement, prioritizing customer needs to create a product that meets their desires without incurring excess expenses. Proximity to the customer helps shorten the time to market. Additionally, value analysis assists in identifying optimal solutions, and balancing reliability, features, and development costs to mitigate risks in innovative projects.

Finally, as we mentioned during the initiation phase, management control is an inseparable element of organizational learning. Depending on the complexity and turbulence of the environment, the initiation phase may involve single-loop or double-loop organizational learning. In contrast, the execution phase relies exclusively on single-loop organizational learning, as the objective does not focus on technological change or changes in norms. Given this, the execution phase is primarily concerned with the realization of innovative ideas, leading to the creation of innovative products. As a result, the main objective is to achieve the previously set goals, identifying and overcoming blocking elements, which often involve modifying actions.

5.4. Project closure

In order to evaluate the success of an innovation project, we can refer to five key success criteria: (1) Project efficiency, (2) Impact on the customer, (3) Impact on the team, (4) Business and direct success, (5) Preparation for the future. Even so, it is crucial to note that the choice of the most appropriate criteria depends on the degree of novelty of the project, whether it is incremental or radical. Specifically, incremental innovation projects prioritize the first two criteria: Project efficiency and Impact on the customer. However, as risks and uncertainties increase and technology becomes more advanced, shifting to radical innovation projects alters the criteria to prioritize, focusing more on the last three: (3) Impact on the team, (4) Business and direct success, (5) Preparation for the future.

Considering that, in the Moroccan context, higher-level innovations are almost nonexistent, we have focused our attention exclusively on incremental innovation. The matter under consideration is as follows: how does management control intervene in measuring the success of an innovative project? Although indicators such as customer satisfaction score, net promoter score, repeat purchase rate, customer retention rate, time to resolution, and customer lifetime value are used, they primarily assess the level of customer satisfaction. As well, by mobilizing management control tools as a package that creates an irreversible synergy throughout the different phases of an innovation project, this approach allows for achieving or exceeding the classic objectives of a project, commonly referred to as the *'iron triangle.'*

Conclusion

By studying the relationship between management control and product innovation from the perspective of Simons' levers of control and the innovation process, we were able to deduce that these levers play multiple roles at each phase of an incremental innovation project, namely: the initiation phase, the planning phase, the execution phase, and the closure phase. In the initiation phase, the levers of control aim to foster creativity and organizational learning, alongside reducing uncertainties related to technology and the market. In contrast, in the course of the planning phase, Simons' levers attempt to estimate project profitability, develop budgets, justify funds to investors, and engage and motivate internal stakeholders, particularly employees. Then, within the execution phase, these levers try to generate information that helps improve understanding, focus attention, track results, facilitate learning, and encourage feedback, while tackling the complexity associated with adopting an innovation strategy and the nature of innovative products. They also help manage internal risks, particularly by reducing costs, optimizing timelines, and improving quality. Eventually, throughout the closure phase, the levers of control, and more specifically the diagnostic use of control systems, seek to assess the success of the incremental innovation project based on a multitude of criteria.

After examining the roles played by levers of control in each phase of an incremental innovation project, several questions present themselves with equal force and fairness: What is the most effective lever, or which levers of control, according to Simons, are best suited for each phase of an incremental innovation project? What are the conditions for transitioning from one lever of control to another within the same phase, excluding the conditions previously outlined by Simons? Is the list of roles we have discussed throughout this work exhaustive? How do Simons' levers of control behave within each phase of paradoxical innovation projects, particularly incremental and radical ones? What are the most suitable management control tools for each phase of an innovation project? To wrap up, what is the most fitting frequency for using management control instruments? These questions, among others, should be rigorously addressed in future research projects, with greater emphasis placed on case studies to explore the phenomenon in depth.

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