

SIMONS LEVER OF CONTROLS, NATIONAL CULTURE AND R&D ENGINEERS' CREATIVITY FRAMEWORK FOR THE OMANI PETROLEUM SECTOR: A SYSTEMATIC LITERATURE REVIEW 1991-2026

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Abstract: Organisations operating in research and development (R&D)-intensive industries face the challenge of maintaining effective managerial control while fostering employee creativity and innovation. Simons' Levers of Control (LOC) framework provides a valuable theoretical perspective for understanding how organisations achieve this balance through belief, boundary, diagnostic, and interactive control systems. Although the LOC framework has been widely applied to examine organisational performance and managerial decision-making, limited attention has been given to its influence on individual creativity, particularly among R&D engineers. Furthermore, the potential moderating role of national culture in this relationship remains underexplored, especially within the petroleum sector. This study aims to develop a framework that explains how belief, boundary, and diagnostic control systems may influence the creativity of R&D engineers, while proposing national culture as a moderating variable. A systematic literature review was conducted using the PRISMA guidelines to identify and synthesise relevant studies published between 1991 and 2026. The review drew upon peer-reviewed literature indexed in Scopus, Web of Science, ScienceDirect, EBSCOhost, Emerald, and ProQuest. The selected studies were analysed to identify the theoretical and empirical relationships among management control systems, creativity, and national culture. The proposed conceptual framework suggests that belief, boundary, and diagnostic control systems shape engineers' creative behaviour by providing strategic direction, behavioural guidance, and performance feedback, while national culture may strengthen or weaken these relationships. The study contributes to the literature by extending Simons' LOC framework to individual-level creativity and integrating cultural perspectives within the context of R&D-intensive organisations. The proposed framework provides a theoretical foundation for future empirical research and offers practical insights for managers seeking to balance organisational control with creativity and innovation in the petroleum industry.

Keywords: R&D Engineer Creativity, Petroleum Development Oman, Simons Lever of Controls, Management Control System.

1. Introduction

Management control systems (MCS) play a central role in aligning organisational strategy with operational implementation. Among the most influential frameworks in this field is Simons' Levers of Control (LOC), which explains how organisations balance innovation and accountability

through four complementary control systems: belief, boundary, diagnostic, and interactive controls (Simons, 1995). While the LOC framework has been widely applied to examine strategic management, organisational performance, and managerial decision-making, its influence on individual-level outcomes, particularly employee creativity, remains insufficiently understood. This issue has become increasingly important in knowledge-intensive and research-driven industries, where organisational success depends on the ability to generate innovative ideas while maintaining effective organisational control.

Recent developments in management accounting and organisational behaviour have highlighted the need to understand how formal control systems influence employees' creative performance (Baird et al., 2024). The challenge is especially evident in research and development (R&D)-intensive sectors, such as the petroleum industry, where engineers are expected to develop innovative technological solutions while operating within highly regulated and performance-oriented environments. In the Omani petroleum sector, creativity among R&D engineers is particularly important because of the technical challenges associated with extracting heavy crude oil, improving production efficiency, and reducing operational costs. Engineers are required to develop innovative solutions that enhance productivity while maintaining safety, environmental compliance, and operational reliability. Creativity therefore represents a critical form of human capital through which employees generate novel and valuable ideas that contribute to organisational competitiveness (Amabile and Mueller, 2024; Hock-Doepgen et al., 2025).

Previous research has also demonstrated that employee creativity is shaped not only by individual characteristics but also by organisational factors, including leadership, organisational climate, and management control systems (Anderson, 2021; Shafique & Ali, 2026). Despite the growing body of research on creativity and management control, several important gaps remain. Existing studies have primarily examined the application of Simons' LOC framework at the organisational or managerial level, with relatively limited attention given to its influence on individual creativity, particularly among R&D engineers. Moreover, previous findings concerning the effects of different control systems on creativity have been mixed and, in some cases, contradictory. For example, while belief systems are generally viewed as encouraging innovation, the effects of diagnostic controls on creativity remain inconclusive (Bedford, 2020; Lill et al., 2021; Speckbacher, 2021; Bellora-Bienengräber et al., 2024). This suggests that organisational control mechanisms may function either as enablers or constraints, depending on organisational context and employee perceptions.

Another important limitation in the existing literature concerns geographical and cultural context. Most empirical studies have been conducted in Western countries or East Asian economies, with comparatively little research undertaken in Middle Eastern settings. Furthermore, scholars have argued that Simons' LOC framework places greater emphasis on formal organisational controls than on contextual factors such as organisational culture and broader socio-cultural influences (Al-Hattami, 2024). National culture may influence how employees perceive organisational controls, respond to managerial practices, and express creativity within the workplace (Alam, 2025;). Consequently, incorporating national culture into the LOC framework may provide a more comprehensive understanding of how management control systems influence employee creativity across different cultural contexts.

Against this background, this conceptual study proposes a framework that examines the relationships between belief, boundary, and diagnostic control systems and the creativity of R&D engineers, while positioning national culture as a moderating variable. By integrating management control systems, creativity, and cultural perspectives, the proposed framework extends the application of Simons' LOC theory to the individual level and provides a theoretical foundation for future empirical research within the petroleum sector. Figure 1 presents Simons' Levers of Control framework, which provides the theoretical foundation for this study.

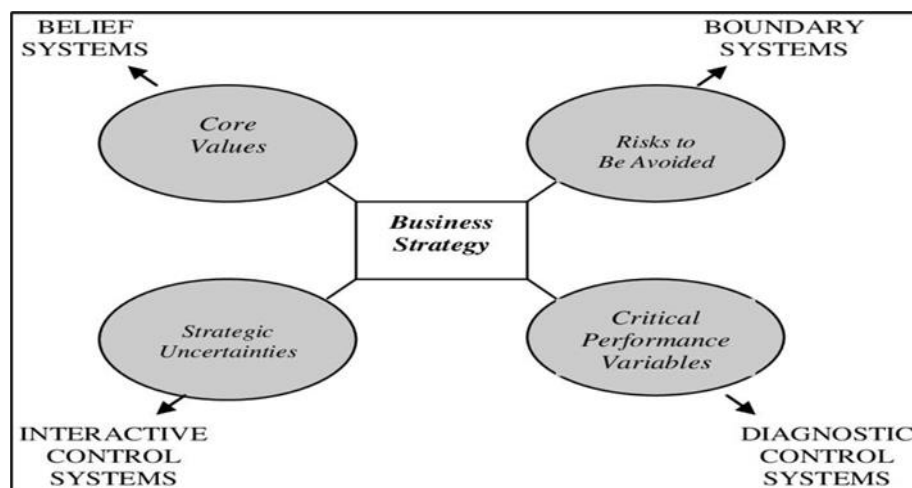


Figure 1. Simon Lever of Control Source Simon Lever of Control Article 1995

2. Research Gap and Problem Statement

Despite the extensive application of Simons' LOC framework in management control research, the relationship between management control systems and employee creativity remains inconclusive. Previous studies have reported inconsistent findings regarding the effects of belief, boundary, and diagnostic control systems on creative performance (Curtis & Sweeney, 2023; Phan et al., 2025). While some researchers argue that management controls provide strategic direction, motivation, and performance feedback that stimulate creativity, others contend that formal controls constrain employee autonomy, experimentation, and creative problem-solving. These contrasting findings indicate that the mechanisms through which management control systems influence individual creativity require further investigation.

A second limitation concerns the level of analysis adopted in existing studies. Much of the LOC literature has focused on organisational outcomes such as innovation, strategic performance, and organisational effectiveness, whereas relatively limited attention has been given to individual-level outcomes. This represents an important gap because organisational innovation originates from the creative ideas and problem-solving capabilities of individual employees, particularly those engaged in R&D activities. A further limitation relates to geographical and cultural context. Most empirical studies examining the relationship between LOC systems and creativity have been conducted in Western countries and East Asian economies. Consequently, there is limited understanding of whether these relationships operate similarly in Middle Eastern contexts, where organisational practices, leadership approaches, and cultural values may differ substantially.

Previous research suggests that employees' perceptions of organisational control and their responses to managerial practices are influenced by national culture. Nevertheless, empirical evidence examining the moderating role of national culture within the LOC–creativity relationship remains scarce. The Omani petroleum sector provides a particularly relevant context for addressing these research gaps. As a highly regulated, technology-intensive industry, it depends heavily on the creativity and problem-solving capabilities of R&D engineers to improve operational efficiency, optimise resource utilisation, and develop innovative technological solutions.

Understanding how belief, boundary, and diagnostic control systems influence engineers' creativity, and how these relationships are shaped by national culture, has important implications for both theory and practice. Accordingly, this study proposes a conceptual framework that examines the relationships between belief, boundary, and diagnostic control systems and the creativity of R&D engineers, while positioning national culture as a moderating variable. The proposed framework seeks to extend Simons' LOC theory by integrating management control, employee creativity, and cultural perspectives, thereby providing a foundation for future empirical research in the petroleum industry.

3. Literature Review

3.1 R&D Engineer's Creativity

Creativity is widely recognised as a critical capability within research and development (R&D) environments because it enables engineers to generate novel and valuable solutions to complex technical problems. While earlier studies primarily conceptualised creativity as an individual cognitive process (Ameen et al., 2022), more recent research adopts a multilevel perspective, recognising that creative performance is shaped by the interaction of individual, social, and organisational factors (Anderson, 2021; Hughes et al., 2025). Consequently, creativity is increasingly viewed as an organisational capability that emerges from supportive work environments rather than solely from individual talent.

A growing body of empirical research highlights leadership and knowledge management as important antecedents of R&D creativity. Transformational and ethical leadership have been shown to strengthen psychological safety, intrinsic motivation, and employee engagement, thereby encouraging creative behaviour (Shafique & Ali, 2026; Siyal et al., 2021). Likewise, knowledge-sharing practices, organisational learning, and absorptive capacity facilitate the exchange and integration of knowledge, enabling engineers to develop innovative ideas and improve problem-solving capabilities (Almashhadani & Almashhadani, 2022; Muñoz-Pascual & Galende, 2020).

Conversely, several organisational factors may inhibit creativity. Recent studies suggest that knowledge hiding, workplace envy, and excessive social comparison reduce collaboration and trust, thereby constraining creative performance (Breidenthal et al., 2020; Xiong et al., 2025). These findings indicate that creativity is influenced not only by organisational support but also by the way organisations structure work, manage employee relationships, and establish control mechanisms. Despite these insights, relatively limited research has examined how formal

management control systems influence the creativity of R&D engineers. This gap is particularly important in technology-intensive industries, where organisations must simultaneously encourage innovation and maintain operational control.

3.2 Simons' Levers of Control (LOC)

Simons' LOC framework is one of the most influential models for understanding how organisations balance innovation with organisational control (Simons, 1995). The framework comprises four complementary control systems: belief, boundary, diagnostic, and interactive controls. Together, these levers create a dynamic tension that enables organisations to pursue strategic opportunities while maintaining operational discipline and organisational accountability. Recent studies have increasingly applied the LOC framework to examine organisational innovation and creativity. In general, belief and interactive control systems are associated with encouraging innovation by communicating organisational values, promoting strategic dialogue, and stimulating opportunity exploration (Curtis & Sweeney, 2023; Su et al., 2022). In contrast, boundary and diagnostic control systems primarily establish behavioural expectations, performance standards, and organisational discipline. Although these mechanisms may improve organisational efficiency and strategic alignment, their influence on employee creativity remains less clear.

Empirical evidence regarding boundary and diagnostic controls has produced mixed findings. Englund and Gerdin (2025) argued that diagnostic controls may constrain creativity by emphasising standardisation, performance measurement, and goal attainment. Conversely, Magnacca and Giannetti (2024) suggested that clearly defined control mechanisms can enhance creativity by reducing ambiguity, providing strategic direction, and enabling employees to focus their creative efforts more effectively. Similar inconsistencies have been reported for boundary controls, whose effects appear to depend on how organisational rules are designed, communicated, and perceived by employees.

These contrasting findings suggest that the relationship between management control systems and creativity is more complex than previously assumed. Moreover, existing studies have predominantly examined LOC at the organisational or managerial level, with comparatively limited attention given to individual behavioural outcomes, particularly among R&D engineers. This limitation provides an important rationale for the present study, which seeks to extend the application of Simons' LOC framework by examining its relationship with engineers' creativity while incorporating national culture as a contextual moderating factor.

3.3 National Culture

National culture plays an important role in shaping employees' perceptions of, and responses to, organisational practices and management systems. According to Hofstede's cultural dimensions, societal values influence how individuals perceive authority, uncertainty, organisational relationships, and workplace expectations (Hofstede et al., 2010). Consequently, management practices that are effective in one cultural context may produce different behavioural outcomes in another. Recent studies suggest that national culture moderates the effectiveness of management practices, including organisational control systems and creativity-

related initiatives (Alam, 2025). In particular, cultural dimensions such as power distance and uncertainty avoidance influence employees' acceptance of organisational authority, willingness to comply with formal controls, and tolerance for ambiguity and risk. These cultural characteristics may therefore affect how employees interpret and respond to different management control mechanisms.

Within Middle Eastern contexts, including Oman, cultural values such as collectivism, relatively high- power distance, and respect for organisational hierarchy are likely to shape employees' responses to belief, boundary, and diagnostic control systems. Depending on employees' cultural orientations, these control mechanisms may either encourage or constrain creative behaviour. Despite this potential influence, relatively few studies have examined national culture as a moderating factor in the relationship between management control systems and employee creativity. Existing research has been conducted predominantly in Western and East Asian contexts, leaving an important gap in understanding how cultural factors influence management control practices in Middle Eastern organisations. Accordingly, this study proposes national culture as a moderating variable that may strengthen or weaken the relationships between Simons' LOC and the creativity of R&D engineers within the Omani petroleum sector.

3.4 Theoretical Foundation

This study is underpinned by the Theory of Planned Behaviour (TPB) (Ajzen, 1991), which explains how individuals' attitudes, subjective norms, and perceived behavioural control influence behavioural intentions and subsequent behaviour. According to TPB, individuals are more likely to perform a particular behaviour when they hold favourable attitudes towards that behaviour, perceive social support for it, and believe they possess sufficient capability and opportunity to perform it. Although TPB has traditionally been applied to explain individual decision-making and behavioural intentions, recent studies have increasingly extended its application to organisational settings, including employee motivation, creativity, and management practices (Bouckennooghe et al., 2021; Sabbir & Taufique, 2022; Solimant et al., 2024). Within management control research, TPB provides a useful behavioural perspective for understanding how employees interpret organisational control mechanisms and how these perceptions influence their creative behaviour.

In the present study, Simons' Levers of Control represent the organisational control mechanisms, whereas TPB explains the behavioural processes through which employees respond to those controls. For example, belief systems may strengthen favourable attitudes towards organisational goals and innovation; diagnostic controls may influence employees' perceptions of expected performance; and boundary controls may shape employees' perceived behavioural freedom by defining acceptable limits for experimentation and decision-making. Together, these mechanisms influence employees' intentions to engage in creative problem-solving and innovative behaviour.

National culture provides an additional contextual influence because cultural values affect employees' attitudes, behavioural expectations, and responses to organisational control systems (Mitter et al., 2024; Rojas-Lema et al., 2021). Although Contingency Control Theory has frequently been adopted in management accounting research, TPB is particularly appropriate for

this study because the proposed framework focuses on individual behavioural outcomes rather than organisational performance alone. By integrating Simons' LOC with the Theory of Planned Behaviour, this study provides a more comprehensive explanation of how organisational control systems influence the creativity of R&D engineers while recognising the moderating influence of national culture.

3.5 Justification for Excluding the Interactive Control System

Simons' LOC framework comprises four complementary control systems: belief, boundary, diagnostic, and interactive controls (Simons, 1995). However, the present study deliberately excludes the interactive control system from the proposed conceptual framework based on its theoretical focus and analytical scope. Interactive control systems are primarily designed to facilitate strategic dialogue, organisational learning, and continuous management involvement in addressing strategic uncertainties. Their principal function is to support strategic adaptation by encouraging communication, knowledge exchange, and collaborative decision-making across organisational levels. Consequently, previous studies have generally examined interactive controls in relation to organisational-level outcomes, such as strategic renewal, organisational learning, innovation capability, and organisational performance. In contrast, the present study focuses on the individual-level creativity of R&D engineers.

The proposed framework seeks to explain how employees' creative behaviour is influenced by formal management control mechanisms that directly shape work expectations, behavioural guidance, and performance evaluation. Belief systems influence employees' commitment to organisational values and innovation, boundary systems define acceptable behavioural limits, and diagnostic control systems establish performance expectations and feedback mechanisms. These three control systems therefore have a more immediate and direct relationship with employees' day-to-day work behaviour and creative performance. Including the interactive control system would broaden the scope of the study by introducing organisational learning and strategic communication processes that extend beyond the intended unit of analysis. To maintain conceptual clarity and theoretical consistency, the present study therefore focuses exclusively on belief, boundary, and diagnostic control systems. This narrower focus enables a more precise examination of the relationships between formal management controls and the creativity of R&D engineers while avoiding conceptual overlap with broader organisational-level constructs.

4. Proposed Conceptual Framework

Drawing upon Simons' LOC framework and the Theory of Planned Behaviour (TPB), this study proposes a conceptual framework to explain how management control systems influence the creativity of R&D engineers within the petroleum industry. The framework integrates organisational control mechanisms with individual behavioural processes to provide a more comprehensive understanding of creativity in research and development environments. The proposed model positions belief, boundary, and diagnostic control systems as the independent variables and R&D engineers' creativity as the dependent variable. National culture is proposed as a moderating variable that may strengthen or weaken the relationships between the three control systems and engineers' creative behaviour. This proposition recognises that employees'

responses to organisational controls are influenced not only by formal management practices but also by the cultural values that shape their attitudes, behavioural expectations, and perceptions of organisational authority.

The framework is primarily grounded in Simons' LOC (Simons, 1995), which explains how different management control systems influence organisational behaviour. The Theory of Planned Behaviour (Ajzen, 1991) complements this perspective by explaining the behavioural mechanisms through which employees interpret organisational controls and translate these perceptions into creative actions. Integrating these two theoretical perspectives enables the proposed framework to explain both the organisational and behavioural dimensions of creativity. Consistent with the theoretical scope established in Section 3.5, the framework focuses exclusively on belief, boundary, and diagnostic control systems because these mechanisms have the most direct influence on employees' day-to-day work behaviour and creative performance. National culture is incorporated as a contextual factor to acknowledge the influence of cultural values on employees' responses to organisational control systems within the Omani petroleum sector. The proposed conceptual framework is presented in Figure 2.

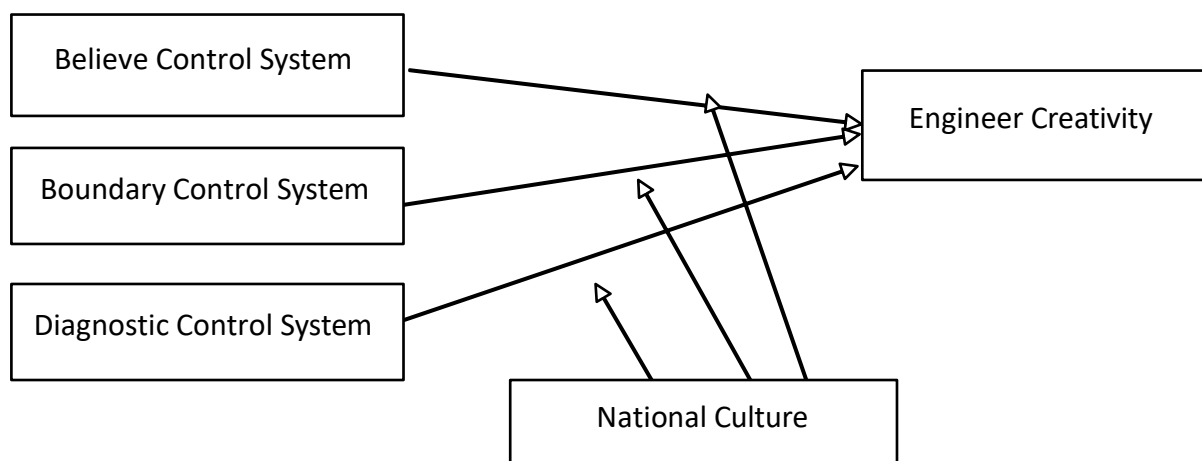


Figure 2. Conceptual framework of organisational and behavioural dimensions of creativity

4.1 Belief Control System and R&D Engineers' Creativity

Simons (1995) defines belief systems as formal organisational mechanisms that communicate core values, mission, and strategic purpose to employees. These systems guide employees' decision-making by encouraging them to pursue organisational goals while identifying opportunities for innovation and continuous improvement. Rather than functioning as restrictive control mechanisms, belief systems inspire employees to align their behaviours with organisational values and strategic priorities. Previous studies generally suggest that belief systems contribute positively to employee creativity by strengthening organisational commitment, encouraging knowledge sharing, and fostering intrinsic motivation (Cheffi et al., 2023; Curtis et al., 2024; Dimes & de Villiers, 2024; Hermawan et al., 2021; Kaveski & Beuren, 2020; Mikalef and Krogstie, 2020). By providing a clear sense of purpose and shared organisational vision, belief systems create an environment in which employees are more willing

to explore new ideas, solve complex problems, and contribute innovative solutions. Such conditions are particularly important in research and development (R&D) environments, where creativity depends on employees' willingness to experiment and generate novel approaches.

However, the relationship between belief systems and creativity is not universally consistent. Barros et al. (2026) argued that belief systems may be less effective when organisational values are ambiguous or insufficiently translated into everyday managerial practices. Furthermore, the effectiveness of belief controls appears to depend on organisational and cultural contexts (Alam, 2025). In cultures characterised by relatively high-power distance and collectivist values, belief systems may function not only as strategic guidance mechanisms but also as cultural instruments that shape employees' attitudes, behavioural expectations, and organisational commitment. Within the context of Petroleum Development Oman, belief systems are expected to reinforce engineers' commitment to organisational values, strengthen their identification with organisational objectives, and encourage behaviours that support innovation and continuous improvement.

From the perspective of the Theory of Planned Behaviour (Ajzen, 1991), belief systems contribute to the formation of favourable attitudes and behavioural intentions, thereby increasing employees' willingness to engage in creative problem-solving. Integrating this behavioural perspective with Simons' Levers of Control suggests that belief systems can create an organisational environment that encourages creativity while maintaining strategic alignment. Accordingly, the following hypothesis is proposed:

H1: Belief control systems have a significant positive effect on the creativity of R&D engineers.

4.2 Boundary Control Systems and R&D Engineers' Creativity

Simons (1995) defines boundary control systems as formal mechanisms that establish acceptable limits for organisational behaviour by specifying rules, policies, codes of conduct, and operational constraints. While these systems are often viewed as restrictive, their primary purpose is not to suppress initiative but to clarify the boundaries within which employees can exercise discretion and pursue organisational objectives. By defining acceptable behaviours and reducing uncertainty, boundary control systems provide a structured environment that enables employees to explore opportunities while managing organisational risk.

In research and development (R&D) settings, clearly defined boundaries may facilitate creativity by allowing employees to experiment and solve complex problems within established safety, regulatory, and operational requirements. This function is particularly relevant in the petroleum industry, where engineers are expected to develop innovative technical solutions while complying with stringent environmental, operational, and safety standards. Rather than limiting creativity, appropriately designed boundary control systems may direct employees' creative efforts towards organisationally relevant challenges.

Empirical evidence regarding the relationship between boundary control systems and creativity remains inconclusive. Some studies suggest that rigid control mechanisms may discourage experimentation and increase employees' risk aversion, thereby reducing creative performance (Curtis & Sweeney, 2023; Lill et al., 2021). In contrast, other researchers argue that

clearly communicated and flexible boundaries reduce ambiguity, enhance employees' confidence, and encourage innovation within acceptable organisational limits (Bollinger, 2023; Nani & Safitri, 2021). These contrasting findings indicate that the effectiveness of boundary control systems depends not only on the existence of organisational rules but also on how those rules are designed, communicated, and implemented.

The influence of boundary control systems may be particularly significant in high-risk industries such as oil and gas, where innovation must be balanced with operational safety and regulatory compliance (Khudhair et al., 2022; Umuteme and Adegbite, 2020). Within Petroleum Development Oman, clearly defined operational boundaries may provide R&D engineers with sufficient guidance to pursue creative solutions while ensuring adherence to organisational and industry requirements. From the perspective of the Theory of Planned Behaviour (Ajzen, 1991), clearly communicated behavioural expectations enhance employees' perceived behavioural control by reducing uncertainty and clarifying acceptable courses of action. Consequently, engineers may be more willing to engage in creative problem-solving when they understand the scope within which innovation is encouraged.

Accordingly, the following hypothesis is proposed:

H2: Boundary control systems have a significant positive effect on the creativity of R&D engineers.

4.3 Diagnostic Control Systems and R&D Engineers' Creativity

Simons (1995) defines diagnostic control systems as formal performance measurement and feedback mechanisms used by management to monitor organisational objectives, evaluate performance, and identify deviations from planned targets. These systems typically include key performance indicators (KPIs), balanced scorecards, performance reviews, and other formal monitoring processes that enable organisations to assess operational effectiveness and strategic goal achievement. Diagnostic control systems are generally associated with improved organisational efficiency, accountability, and resource utilisation (Braumann et al., 2024). By establishing clear performance expectations and providing regular feedback, these systems help employees understand organisational priorities and align their efforts with strategic objectives. However, the literature also suggests that excessive reliance on performance measurement may discourage experimentation and reduce employees' willingness to engage in creative problem-solving (Ahrens et al., 2021; Henri et al., 2020). When employees focus primarily on meeting predefined performance targets, opportunities for innovation may be constrained.

Empirical evidence regarding the relationship between diagnostic control systems and creativity remains mixed. Several studies argue that strong emphasis on KPIs and formal performance evaluation reduces employees' intrinsic motivation and autonomy, thereby limiting creativity (Bandiyono and Al Fikri, 2020; Chen et al., 2020). Conversely, other researchers suggest that diagnostic controls can support creativity when they are implemented as developmental rather than punitive mechanisms. Constructive performance feedback, clear organisational objectives, and supportive managerial guidance may enable employees to direct their creative efforts towards solving organisational problems while maintaining strategic alignment (Bedford, 2020; Bellora-Bienengräber et al., 2022; Müller and Montag, 2024).

Within Petroleum Development Oman, engineers' performance is evaluated using formal performance indicators, including KPIs and balanced scorecards. Although these mechanisms provide accountability and operational discipline, they may also influence employees' willingness to experiment with new ideas. From the perspective of the Theory of Planned Behaviour (Ajzen, 1991), diagnostic control systems influence employees' behavioural intentions by shaping performance expectations and reinforcing organisational priorities. When performance measurement is accompanied by constructive feedback and managerial support, employees may perceive greater confidence in pursuing innovative solutions while remaining aligned with organisational objectives. Accordingly, this study proposes that diagnostic control systems can positively influence the creativity of R&D engineers.

Accordingly, the following hypothesis is proposed:

H3: Diagnostic control systems have a significant positive effect on the creativity of R&D engineers.

4.4 National Culture as a Moderating Variable

National culture has long been recognised as an important contextual factor influencing employees' attitudes, behaviours, and responses to organisational practices. Hofstede (1980, 2001) defined national culture as the collective programming of the mind that distinguishes members of one society from another and identified key cultural dimensions, including power distance, uncertainty avoidance, and individualism–collectivism. These dimensions' shape how employees perceive authority, respond to organisational rules, and engage with workplace challenges. An increasing body of research suggests that national culture influences the effectiveness of management practices and employees' creative behaviour. Cross-cultural studies have demonstrated that creativity and related psychological processes vary across cultural contexts (Gip et al., 2022), while other researchers have argued that cultural influences should be incorporated more explicitly into creativity research (De Barros et al., 2025; Stephan, 2022).

Although previous studies have frequently examined the role of organisational culture in management control systems (Alharbi et al., 2023; Nakandala et al., 2024), comparatively limited attention has been given to national culture as a contextual factor shaping employees' responses to organisational controls (Einhorn et al., 2023). Recent evidence further suggests that national culture moderates the relationships between management practices and employee outcomes. Mitter et al. (2024) and Tran (2026) argued that cultural values significantly influence employees' behavioural responses to organisational policies and managerial practices. Similarly, Phan et al. (2024) reported that cultural dimensions such as power distance, uncertainty avoidance, and individualism affect how employees interpret management control systems and express creativity.

Employees operating within collectivist and relatively high power-distance cultures may respond more positively to clearly communicated organisational values and behavioural expectations, whereas employees in more individualistic cultures may perceive the same controls as limiting autonomy and creative freedom (Kremer, 2023; Zhu et al., 2022). The Omani petroleum sector provides a relevant context for examining these relationships because organisational practices operate within a national cultural environment characterised by shared

societal values and behavioural norms. Rather than assuming that all employees hold identical cultural orientations, this study recognises that the broader national cultural context may influence how engineers perceive and respond to belief, boundary, and diagnostic control systems. Consequently, national culture is expected to strengthen or weaken the effects of these management control systems on the creativity of R&D engineers.

Accordingly, the following hypotheses are proposed:

H4a: National culture moderates the relationship between belief control systems and the creativity of R&D engineers.

H4b: National culture moderates the relationship between boundary control systems and the creativity of R&D engineers.

H4c: National culture moderates the relationship between diagnostic control systems and the creativity of R&D engineers.

5. Methodology for the Systematic Literature Review

This conceptual study employed a systematic literature review (SLR) following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The PRISMA framework provides a transparent and rigorous procedure for identifying, screening, assessing, and selecting relevant literature, thereby enhancing the credibility and reproducibility of the review process. Figure 3 illustrates the PRISMA flow diagram adopted in this study. The literature search was conducted using six major academic databases: Scopus, Web of Science (WoS), ScienceDirect, EBSCOhost, Emerald, and ProQuest. To improve the comprehensiveness of the review and minimise publication bias, additional studies were identified through reference list searches, citation tracking, and Google Scholar. This search strategy resulted in the identification of 198 records, comprising 186 articles retrieved from the electronic databases and 12 additional records identified through complementary sources.

Following the removal of duplicate records, 162 articles remained for the screening stage. Titles and abstracts were examined to assess their relevance to Simons' LOC, employee creativity, R&D engineers, and national culture. Articles that did not address these themes or were clearly outside the scope of the study were excluded. The remaining 47 articles were subsequently subjected to a full-text review. The full-text assessment evaluated each article according to its theoretical relevance, methodological quality, and contribution to understanding the relationships among belief, boundary, and diagnostic control systems, R&D engineers' creativity, and national culture. Articles focusing primarily on organisational-level outcomes, providing limited discussion of the LOC framework, or lacking relevance to the conceptual objectives of the study were excluded.

Following the eligibility assessment, 16 studies satisfied the inclusion criteria and formed the evidence base for the systematic literature review. From these, 12 highly relevant studies were selected for the final conceptual synthesis because they provided the strongest theoretical and empirical support for developing the proposed framework. These studies informed the conceptual relationships among belief, boundary, and diagnostic control systems, R&D engineers' creativity, and the moderating role of national culture within the context of the Omani petroleum industry.

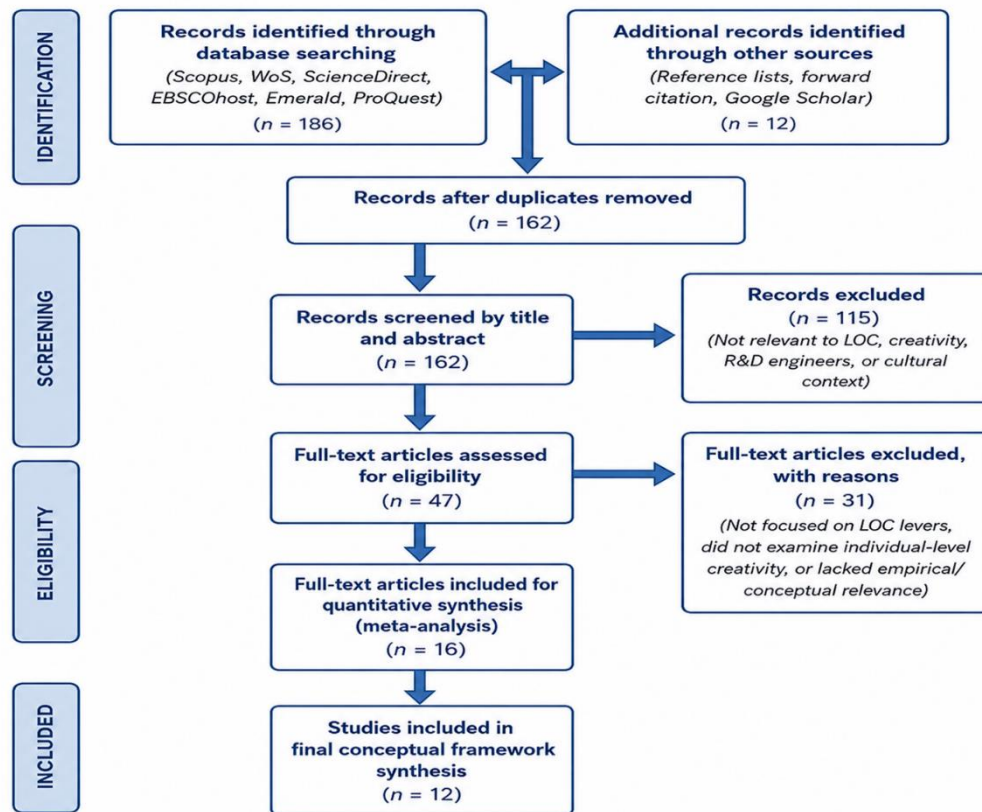


Figure 3. The article selection process for Simons Lever of Controls and R&D Engineers: Creativity in PDO: A Conceptual Framework

5.1 Classification of the Selected Studies

Table 2 presents the classification of the selected studies according to the principal constructs examined, theoretical perspectives, research contexts, methodologies, and key findings. This classification provides a systematic overview of the existing literature and highlights the major areas of scholarly attention within research on Simons' LOC, employee creativity, and national culture. The review indicates that previous studies have predominantly examined the relationships between management control systems and organisational-level outcomes, including organisational performance, innovation, and strategic effectiveness. Comparatively fewer studies have investigated the influence of individual LOC dimensions on employee creativity, particularly within research and development (R&D) environments. Moreover, empirical research examining R&D engineers as the unit of analysis remains limited.

The review further reveals that national culture has received relatively little attention as a moderating variable in studies examining the relationship between management control systems and creativity. Existing evidence has been derived largely from Western and East Asian contexts, with comparatively limited research undertaken in Middle Eastern settings. These findings highlight an important gap in the literature and provide the rationale for integrating national culture into the proposed conceptual framework. Accordingly, the systematic review establishes a strong theoretical foundation for the present study by identifying the key

constructs, highlighting inconsistencies in previous findings, and demonstrating the need for further investigation into the relationships among belief, boundary, and diagnostic control systems, national culture, and the creativity of R&D engineers.

Table 1: Classification of Selected Articles Related to LOC, Creativity, and National Culture

	Author and Year	Journal	Main Variables	Context	Theory and Framework	Key Findings and Contribution
1	Simons (1995)	Harvard Business School Press	Belief, Boundary, Diagnostic, Interactive Controls	General organizations	LOC Framework	Introduced the Levers of Control framework to balance creativity and organizational control.
2	Henri et al. (2020)	Management Accounting Research	Diagnostic Control Systems	Mechanistic organizations	MCS / LOC	Diagnostic controls improve efficiency but may reduce flexibility and creativity.
3	Bedford (2020)	Accounting, Organizations and Society	Boundary & Diagnostic Controls, Creativity	Organizational settings	LOC Framework	Reported inconsistent effects of management controls on creativity outcomes.
4	Curtis & Sweeney (2023)	Journal of Management Control	Belief, Boundary Controls & Creativity	High-uncertainty organizations	LOC Framework	Belief systems stimulate creativity, whereas rigid boundaries may inhibit exploration.
5	Lill et al. (2021)	International Journal of Project Management	Boundary Control Systems	Project environments	LOC Framework	Boundary controls negatively influenced project creativity and performance.

6	Magnacca & Giannetti (2024)	Management Decision	Control Mechanisms & Creativity	Organizational context	MCS	Clearly defined controls can reduce uncertainty and facilitate creativity.
7	Anderson (2021)	Journal of Organizational Behavior	Organizational Factors & Creativity	Knowledge-intensive firms	Creativity Theory	Organizational support and environment strongly influence creativity.
8	Shafique & Ali (2026)	Leadership & Organization Development Journal	Leadership & Employee Creativity	Organizational context	Organizational Behaviour	Ethical and transformational leadership positively affect creativity.
9	Breidenthal et al. (2020)	Journal of Knowledge Management	Knowledge Hiding & Creativity	R&D environments	Knowledge Management Theory	Knowledge hiding and workplace envy reduce creative performance.
10	Zhang et al. (2026)	International Journal of Cross-Cultural Management	National Culture & Organizational Control	Cross-cultural organizations	Cultural Theory	National culture shapes employee reactions toward control systems.
11	Ajzen (1991)	Organizational Behavior and Human Decision Processes	Planned Behaviour	Individual behaviour	Theory of Planned Behaviour (TPB)	Behaviour is influenced by attitudes, subjective norms, and perceived behavioural control.
12	Mitter et al. (2024)	European Management Journal	National Culture & Employee Behaviour	Organizational settings	TPB / Culture Theory	National culture significantly influences employees' behavioural responses to organizational controls.

6. Discussion and Conclusion

6.1 Theoretical Contribution

This conceptual study contributes to the literature on management control systems by extending the application of Simons' LOC framework to the individual level. Previous studies have predominantly examined the effects of LOC on organisational outcomes such as strategic performance, innovation, and organisational effectiveness. Comparatively limited attention has been given to understanding how individual control mechanisms influence employees' creative behaviour, particularly among research and development (R&D) engineers. By focusing on engineers' creativity, this study broadens the application of the LOC framework and highlights employee creativity as an important behavioural outcome of management control systems. A second contribution lies in integrating national culture into the LOC framework. Simons' original model primarily focuses on formal organisational control mechanisms and pays limited attention to contextual influences that shape employees' responses to those controls.

This study proposes that national culture moderates the relationships between belief, boundary, and diagnostic control systems and R&D engineers' creativity. By incorporating cultural context into the framework, the study recognises that employees' perceptions of organisational controls and their creative responses may differ across national settings, thereby extending the explanatory power of the LOC framework. Third, this study strengthens the theoretical connection between management control systems and creativity by integrating Simons' Levers of Control with the Theory of Planned Behaviour (TPB). While the LOC framework explains how organisations employ formal control mechanisms, TPB provides a behavioural perspective for understanding how employees interpret these controls and translate them into creative actions. The integration of these complementary theories offers a more comprehensive explanation of the mechanisms through which organisational controls influence individual creativity.

The study also contributes to the ongoing debate regarding the role of belief, boundary, and diagnostic control systems in fostering creativity. Previous research has reported inconsistent findings concerning whether formal controls encourage or constrain creative behaviour. By synthesising the existing literature, this study proposes a conceptual explanation that reconciles these divergent findings, suggesting that the effectiveness of management control systems depends on both behavioural processes and cultural context, particularly within highly regulated and technology-intensive industries. Finally, this study contributes to the relatively limited body of research on management control systems within the Middle Eastern petroleum sector. By positioning Petroleum Development Oman as the contextual setting for the proposed framework, the study extends the geographical scope of the literature and provides a theoretical foundation for future empirical research in contexts that have received comparatively little scholarly attention. Consequently, the proposed framework contributes not only to the advancement of management accounting and organisational behaviour research but also to a broader understanding of how organisational control systems can support creativity in knowledge-intensive industries.

6.2 Practical Implications

This study offers several practical implications for managers, policymakers, and organisational leaders responsible for designing management control systems within research and development (R&D)-intensive organisations. In industries characterised by rapid technological change, operational complexity, and high levels of uncertainty, creativity among engineers represents an important organisational capability for improving operational performance, enhancing innovation, and maintaining long-term competitiveness. The proposed conceptual framework suggests that management control systems should not be viewed solely as mechanisms for monitoring performance and ensuring compliance. Rather, belief, boundary, and diagnostic control systems can be designed to support creativity by providing strategic direction, clarifying behavioural expectations, and delivering constructive performance feedback. Achieving an appropriate balance between organisational control and employee autonomy is particularly important in highly regulated industries such as the petroleum sector, where innovation must be pursued without compromising operational safety, regulatory compliance, or environmental responsibility.

The study also highlights the practical importance of recognising national culture when implementing management control systems. Employees' responses to organisational controls are influenced by the cultural values and behavioural norms that shape workplace interactions. Consequently, managers should avoid adopting standardised control practices without considering the cultural context in which employees operate. Designing culturally responsive management control systems may enhance employee engagement, strengthen organisational commitment, and encourage greater creativity within R&D environments. Although the proposed framework is developed within the context of the Omani petroleum industry, its practical implications may also be relevant to other knowledge-intensive and technology-driven organisations seeking to balance effective organisational control with creativity and innovation. By integrating management control systems with behavioural and cultural perspectives, the framework provides managers with a strategic approach to fostering creativity while maintaining organisational discipline and performance.

7. Limitations and Directions for Future Research

Despite its theoretical and practical contributions, this conceptual study has several limitations that provide opportunities for future research. First, the proposed conceptual framework is developed within the context of the Omani petroleum industry, with particular reference to Petroleum Development Oman (PDO). Consequently, the framework reflects the characteristics of a highly regulated, research-intensive environment and may not be directly generalisable to other industries, organisational settings, or national contexts. Future studies should examine the proposed relationships across different sectors and countries to assess the broader applicability of the framework.

Second, the study focuses specifically on R&D engineers because of their central role in organisational creativity and innovation. Future research may extend the framework to other employee groups, managerial levels, or functional areas to determine whether the influence of management control systems varies across organisational hierarchies, occupations, and

professional contexts. Third, the proposed framework incorporates only three components of Simons' LOC belief, boundary, and diagnostic control systems. The interactive control system was intentionally excluded because the study focuses on individual-level creativity rather than organisational-level strategic processes. Future research could investigate the influence of interactive control systems on organisational learning, innovation capability, and strategic adaptation, or explore how interactive controls complement the three control systems examined in the present framework. Furthermore, this study is conceptual in nature and therefore does not provide empirical evidence to validate the proposed relationships.

Future research should empirically test the conceptual framework using quantitative, qualitative, or mixed-methods approaches. Longitudinal studies would also provide valuable insights into how management control systems influence employee creativity over time and how these relationships evolve under changing organisational conditions. Finally, although national culture is proposed as the moderating variable, other contextual and behavioural factors may also influence the relationship between management control systems and creativity. Future studies could examine the moderating or mediating roles of organisational culture, leadership style, psychological empowerment, knowledge sharing, employee engagement, and organisational learning. Comparative research across different cultural and industrial settings would further enhance understanding of the contextual applicability of Simons' Levers of Control and contribute to the continued development of management control theory.

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