INTERNATIONAL JOURNAL OF TRENDS IN ACCOUNTING RESEARCH

Journal homepage: https://journal.adai.or.id/index.php/ijtar/index

Performance Management in Practice: How Levers of Control and Autonomous Motivation Affect Work Role Performance

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ARTICLE INFO

Article history:
Received: 19 Nov 2025
Accepted: 28 Nov 2025
Published: 30 Nov 2025

Keywords:
Autonomous motivation,
Management control systems,
Self-determination theory,
Work role performance

ABSTRACT

This research explores how the practice of management control systems shapes employees' motivation and performance. It evaluates an integrated model of self-determination theory, the levers of control, and the work role performance framework. Data were collected via an online survey involving 333 employees in Indonesia from diverse sectors, and the analyses relied on structural equation modeling and ANOVA. The results indicate that using belief control systems or interactive control systems on their own, as well as combining diagnostic and interactive controls, enhances autonomous motivation. Conversely, boundary control systems and diagnostic control systems, when used independently, are associated with lower autonomous motivation. Autonomous motivation, in turn, contributes positively to work role performance, which covers proficiency, adaptivity, and proactivity. The study also finds that autonomous motivation serves as a partial mediator between the use of interactive controls, joint use of diagnostic and interactive controls, and work role performance. The findings emphasize the value of thoughtfully designing management control systems to support stronger motivation and better performance outcomes, and they highlight the importance of examining work role performance as a broader indicator of effectiveness, particularly in dynamic and interdependent work settings.

1. INTRODUCTION

The dynamic business world makes contextual issues such as uncertainty and interdependence of work systems keep increasing (Griffin et al., 2007). This encourages companies to increase their attention to employees, whose individual performance can affect organizational performance (Lepak et al., 2006), and push employee motivation to improve performance (Çetin & Aşkun, 2018).

Prior accounting research used various motivation theories, including Porter & Lawler's (1968) expectancy theory, which divides motivation into intrinsic and extrinsic. Motivation is intrinsic when an activity occurs autonomously due to interest or satisfaction and is extrinsic when it arises due to external results or consequences (Ryan & Deci, 2000b).

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Despite its wide use in research (e.g., Decoene & Bruggeman, 2006; Weibel et al., 2010; Stringer et al., 2011), just like prior theories, this theory still assumes motivation as additive, i.e., all motivations are treated the same, and predictions are taken based on total motivation (Gagné & Deci, 2005). Various studies debunked this additivity issue (e.g., Deci, 1971; Amabile et al., 1976; Lepper & Greene, 1975; Zuckerman et al., 1978), proving that different extrinsic sources affect intrinsic motivation differently.

Deci & Ryan (1985) created Self-Determination Theory (hereafter, SDT), assuming that extrinsic motivation has various sources with different degrees of autonomy (Ryan & Deci, 2000b; Gagné & Deci, 2005). SDT divides extrinsic motivations based on internalization, namely (autonomous) integrated and identified motivations and (controlled) introjected and external motivations. Hence, SDT-based motivation consists of autonomous and controlled motivation (Deci & Ryan, 2000). According to Deci & Ryan (2008), autonomous motivation provide the most desirable results related to behaviour, attitude, and affection, compared to other motivations.

Various research agree with the need to use a broader orientation like SDT (e.g., Gagné & Deci, 2005; Adler & Chen, 2011; Kunz & Linder, 2012; Kunz, 2015), but it has not received much attention in control systems literature (Kunz & Linder, 2012), although autonomy, one of SDT core aspects, is proven to be related to management control systems (e.g., Feldman, 1989; Robert, 2012; Langfred & Rockmann, 2016). Adler & Borys (1996) also prove that different control systems affect autonomy differently, and some research (e.g., Christ et al., 2012; Chen et al., 2020) finds that management control systems influence both behaviour and motivation.

It is also important to understand how autonomous motivation impacts performance. Much research focuses on task performance (e.g., Amabile, 1982; Grolnick & Ryan, 1987; McGraw & McCullers, 1979), which is no longer sufficient due to contextual issues. Hence, a broader focus on performance (i.e., work roles) is needed (Griffin et al., 2007). Work role is the total performance-related responsibilities, including core tasks and contextual behaviours (Murphy & Jackson, 1999). Considering this, Griffin et al. (2007) developed the work role performance model, which consists of proficiency, adaptivity, and proactivity.

This study investigates the relationships among management control systems using Simons' (1995) Levers of Control (LoC) framework, autonomous motivation using the Multidimensional Work Motivation Scale (MWMS; Gagné et al., 2015), and performance using the work role performance model by Griffin et al. (2007). This study also includes mediation analysis to complement prior studies (e.g., Chen et al., 2020).

The data were collected from employees of diverse organizations and industries via an online survey. The results support the predictions: the use of belief systems, interactive systems, and the joint use of diagnostic and interactive systems have positive effects on autonomous motivation, while boundary and diagnostic systems have adverse effects. Autonomous motivation positively influences work role performance and partially mediates the positive impact of both interactive systems and the joint use of diagnostic and interactive systems on work role performance.

By using LoC framework, this study contributes to prior research that only focused on specific control systems (e.g., Wong-On-Wing et al., 2010; Kunz & Linder, 2012; Kunz 2015; Groen et al., 2017), and fits some suggestions (e.g., Chenhall, 2003; Malmi & Brown, 2008; Ferreira & Otley, 2009) to research multiple systems at once. This study focuses on the individual level, complementing prior LoC studies that focused on the organizational level (e.g., Bisbe & Otley, 2004; Henri, 2006; Widener, 2007; Bedford, 2015). The use of SDT-based motivation answers some suggestions (e.g., Adler & Chen, 2011; Kunz & Linder, 2012; Kunz, 2015) to examine broader motivation orientation. Also, by focusing on work role performance, this study enriches literature which mainly focus on task performance and other performance indicators separately (e.g., Amabile ,1982; Grolnick & Ryan, 1987; McGraw & McCullers, 1979; Gagné et al., 1997; Gagné & Deci, 2005; Gagné et al., 2015). This study also complements previous research by examining the role of autonomous motivation as a mediator in the model.

Practically, this research provides evidence regarding the importance of management control system design, which has impact on employees' motivation and performance. Based on the results, companies need to optimize the use of beliefs and interactive systems, then also need to consider an in-depth analysis of business opportunities and uncertainties to determine which control systems need to be implemented interactively to maximize their positive impact.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Self-Determination Theory (SDT)

SDT by Deci & Ryan (1985) is influenced by the expectancy theory of Vroom (1964) and Porter & Lawler (1968), which classify motivation into intrinsic and extrinsic but still assume that motivation is additive. SDT is also influenced by the Perceived Locus of Causality (Heider, 1958; De Charms, 1968), which assumes that individuals have control over their behaviour and its outcomes. SDT focuses on autonomous and controlled motivation (Deci & Ryan, 2000), where autonomous motivation occurs from choice or will, while controlled motivation is based on coercion.

SDT-based motivation consists of fully autonomous intrinsic motivation and a few extrinsic motivations (Ryan & Deci, 2000). The extrinsic motivations are integrated (activities occur because their values are integrated and assimilated with personal values), identified (activities occur because they are identified as important and valuable), introjected (activities arise from internal pressures such as guilt, anxiety, and ego involvement), and external motivation (activities arise due to external demands or consequences).

Autonomous motivation is analyzed using Ryan & Connell's (1989) framework, ranking motivation from highest autonomy: intrinsic, identified, introjected, and external. Integrated motivation is excluded because it is difficult to distinguish from identified and intrinsic motivation, and it does not yield new results beyond those of autonomous motivation (Gagné et al., 2015). These four motivations are combined into the Relative Autonomy Index (RAI; Ryan & Deci, 2000), which represents autonomous motivation.

Levers of Control (LoC)

Following previous literature (e.g., Gagné & Deci, 2005; Adler & Chen, 2011; Christ et al., 2012; Chen et al., 2020), this study examines how organizational factors, i.e. management control systems, influence employees' autonomous motivation. Simons' (1995) LoC is used because it contains four different systems (beliefs systems, boundary systems, diagnostic control systems, and interactive control systems), so the results can be more comprehensive than prior studies that only focused on one control system (e.g., Wong-On-Wing et al., 2010; Kunz & Linder, 2012; Kunz, 2015; Groen et al., 2017).

Work Role Performance

Performance measures need to capture all important behavioural aspects (Campbell et al., 1993). Aside from task performance, contextual performances consisting broader range of behaviours need to be included (Motowidlo et al., 1997). Thus, the focus shift from a job (fixed and formal tasks) to work roles that include all responsibilities, including dynamic tasks (Murphy & Jackson, 1999).

Improving prior performance models, Griffin et al., (2007) created a work role performance model that includes three behaviours, with proficiency refers to the fulfillment of formal roles' requirements, adaptivity refers to the adaptation of changes in systems or work roles, and proactivity refers to anticipation and initiation of changes. The combination of these three behaviours is required in most jobs (Neal et al., 2012) and produce superior performance in unstable work environments (Griffin et al., 2007). This model also fits SDT, which assumes that individuals achieve their optimal function by effectively integrating into their environment through performance regarding core tasks, adaptation, and proactivity in initiating change (Gagné & Deci, 2005).

Beliefs Control Systems and Autonomous Motivation

Beliefs systems provide core values, goals, and direction of the organization (Simons, 1995), aim to encourage employees to adopt these values and goals (Widener, 2007). The design is influenced by core values analysis, generally written in mission statements, value statements, creeds, and statements of purpose (Simons, 1994).

Belief systems, which communicate important things and emphasize goals, can increase employee internalization (Deci & Ryan, 2000) hence employees feel more competent to carry out important activities and achieve goals (Gagné, 2018). This system can help value alignment to encourage unattractive actions or tasks so individuals will no longer feel too controlled (Ryan, 1995). Adler & Chen (2011) state that beliefs systems positively influence identified motivation by internalizing values and goals. Furthermore, Chen et al., (2020) proved that belief systems could increase autonomous motivation. Hence, it is predicted that belief systems can affect autonomous motivation positively.

H1*: The use of belief control systems positively affects employees' autonomous motivation.*

Boundary Control Systems and Autonomous Motivation

Boundary systems define the acceptable domains of organizational activity (Simons, 1995), in the form of code of business ethics, strategic planning, and operational directions, influenced by risk analysis (Simons, 1994). This system tends to constrain behaviour (Simons, 2000; Bedford, 2015), preventing dysfunctional behaviour, excessive innovation (Frow et al., 2010), and wasting organizational resources (Mundy, 2010).

Christ et al. (2012) proved that preventive-type control systems tend to reduce intrinsic motivation. Ryan & Deci (2017) show that this system reduces autonomy. This system can lead to extrinsic and introjected motivation through behavioural restrictions, punishment, guilt, and anxiety. But, in supportive situations, these boundaries can show organizational identity and goals to be internalized (Adler & Chen, 2011). Meanwhile, Chen et al. (2020) concluded no significant effect on autonomous motivation. This study predicts its effect on autonomous motivation to be negative, considering its behaviour restriction through rules and consequences (Simons, 1995, 2000), which are closely related to factors that cause controlled motivation.

H2**:** The use of boundary control systems negatively affects employees' autonomous motivation.

Diagnostic Control Systems and Autonomous Motivation

Diagnostic systems aim to monitor results and correct deviations from performance standards (Simons, 1995) through business plans and budgets, which were made based on critical performance variables analysis (Simons, 1994). Diagnostic systems are used to compare actual performance against targets (Simons, 1995), essential for coordinating and monitoring strategy (Frow et al., 2010). Through transparent goals and achievement, this system can foster joint commitment and coordinated action toward the desired results (Adler & Chen, 2011; Widener, 2007).

This system focuses on unfavorable variants and potential misappropriation of strategies (Bedford, 2015) and may focus only on minimizing deviations in the short term, since it is related to targets and external rewards that can reduce intrinsic motivation (Deci & Ryan, 1985; Simons, 1995). Several studies have shown that external factors, such as tangible rewards (Deci, 1971; Amabile et al., 1976) or surveillance (Lepper & Greene, 1975), lower autonomy and intrinsic motivation. This system also restricts behaviour, reduces autonomy (Ryan & Deci, 2017), and negatively affects autonomous motivation (Chen et al., 2020). Hence, it is predicted that this system is associated with lower autonomous motivation.

H3: The use of diagnostic control systems negatively affects employees' autonomous motivation.

Interactive Control Systems and Autonomous Motivation

Interactive systems facilitate communication within the organization regarding strategic opportunities and uncertainties, to focus attention and encourage dialogue and learning (Simons, 1995). This includes any system that becomes top management's attention (Simons, 1994), which can affect vision and goals (Bisbe & Otley, 2004).

Interactive systems are organic, constructive, and learning-oriented (Ferreira & Otley, 2009), empowering information sharing and decision making, thereby increasing a sense of will (Millette & Gagné, 2008). It encourages organizational goals' identification and acceptance (Wong-On-Wing et al., 2010), boosts autonomous motivation by breaking down functional and hierarchical challenges, and stimulates learning and innovation (Adler & Chen, 2011). The interactive communication and performance feedback process helps meet competency needs and improve internalization (Groen et al., 2017). Chen et al. (2020) also prove that this system affects autonomous motivation positively. These studies suggest that an interactive system is related to higher autonomous motivation.

H4: *The use of interactive control systems positively affects employees' autonomous motivation.*

Joint Use of Diagnostic and Interactive Systems on Autonomous Motivation

According to Simons (1995), different LoCs can create dynamic tensions when two contradictory systems complement each other. When companies use diagnostic and interactive systems simultaneously, benefits arise from a balance between monitoring, evaluation, and learning (Simons, 1995; Mundy, 2010).

Prior studies stated that dynamic tensions positively affect organizational variables such as learning, entrepreneurship, and performance, help direct attention, encourage engagement and empowerment, and also improve understanding (Henri, 2006; Bedford, 2015). The use of both systems enables communication about key performance indicators, which increases understanding and engagement of mission achievement (Ryan & Deci, 2017), increases employee awareness and commitment, and increases autonomous motivation (Chen et al., 2020). These studies indicate that the joint use of these two systems can increase autonomous motivation.

H5: *The joint use of diagnostic and belief control systems positively affects employees' autonomous motivation.*

Autonomous Motivation and Work Role Performance

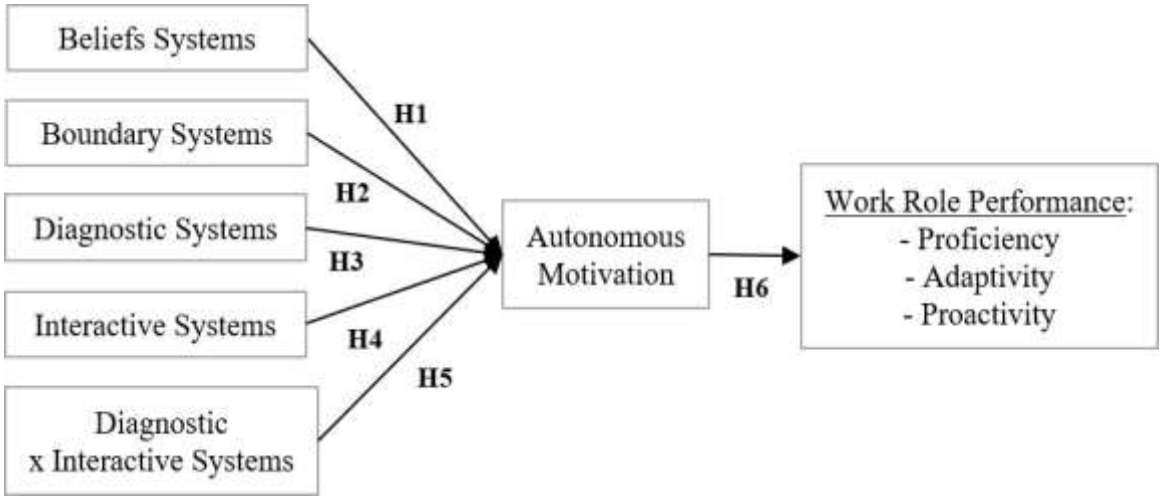
Various studies show that intrinsic or autonomous motivation has a positive impact on each aspect of work role performance. Regarding proficiency, autonomous motivation can provide performance benefits on different tasks (e.g., Amabile, 1982; Grolnick & Ryan, 1987; McGraw & McCullers, 1979; Koestner & Losier, 2002 in Gagné & Deci, 2005). Autonomy and intrinsic motivation can influence career adaptivity (e.g., Ito & Brotheridge, 2005; Shin & Lee, 2017) and adaptive work behaviour (e.g., Gagné et al., 2015; Bande et al., 2016; Wu et al., 2017). Autonomy and autonomous motivation can also increase employees' proactive behaviour (Frese et al., 1996; Crant, 2000; Den Hartog & Belschak, 2012; Gagné et al., 2015; Bande et al., 2016).

Hence, it is predicted that autonomous motivation will positively affect work role performance.

H6: *Autonomous motivation positively affects employees' work role performance.*

The research model is shown in Figure 1 below.

Figure 1. Research Model



3. RESEARCH METHOD

Research Design

The research uses a quantitative method. Data collection is carried out via anonymous online surveys using a questionnaire that was already revised based on a pilot test from 34 postgraduate students of Universitas Gadjah Mada in various study programs with at least one year of work experience. The questionnaire was sent via e-mail and social media to the target respondents. To increase the response rate and to test for non-response bias, after two weeks, respondents who had not filled out the survey were given a reminder. For almost four weeks, the data collection process was carried out, resulting in 333 valid responses.

Samples and Respondents

The research sample is permanent employees with various positions who have worked in various organizations and industries in Indonesia for more than one year. The use of employees from various positions has been carried out by several studies, for example, related to the performance measurement system (e.g., Drake et al., 2007; Ho et al., 2014; Demeré et al., 2016), and related to LoC (e.g., Matsuo & Matsuo, 2017; Chen et al., 2020), which provide empirical evidence from employees at various levels.

Responses from employees in companies that rarely implement management control systems (Small and Medium Enterprises (SMEs), Non-Governmental Organizations (NGOs), and community organizations), were excluded. There are 333 valid responses, which met the minimum sample guidance based on the rules of Cohen (1992) and Hair et al. (2013).

Out of 333 respondents, 54% are female. The average age is 31.8 years old with 6.6 years average working period in various fields. Respondents consist of senior and junior staff (36% each), assistant managers (10%), supervisors (9%), managers (8%), and directors (1%). Respondents work in various organizational types, especially non-profit private companies (34%), public sector organizations (30%), and public-private companies (17%). Regarding industry types, 30% of respondents work in the public sector, followed by trade, services, and investment (22%), miscellaneous industries (13%), financial (12%), and infrastructure (8%).

Non-response bias, which exists when participants' responses differ from non-participant responses (Cooper & Schindler, 2014), was tested through an independent samples t-test using SPSS 25 by comparing data between groups of respondents based on

response time. The results show no significant difference, meaning that this bias is not a problem in this study.

Definition and Measurement of Variables

The independent variable in this study is the Levers of Control (LoC), a framework for managing organizational strategy based on core values, risks, critical performance variables, and strategic uncertainties (Simons, 1994). LoC comprises four components of how organizations regulate behavior: the beliefs system, which articulates values, purpose, and direction; the boundary system, which specifies the acceptable domain of organizational activities; the diagnostic control system, which monitors outcomes and corrects deviations; and the interactive control system, which facilitates ongoing communication among organizational members regarding emerging opportunities and strategic uncertainties.

Autonomous motivation functions as the mediating variable and is grounded in Self-Determination Theory (SDT). SDT categorizes motivation according to the degree of internalization underlying an individual's actions. Motivation is considered autonomous when behaviors arise from personal choice or volition, whereas controlled motivation emerges when individuals feel pressured to perform certain actions (Deci & Ryan, 2000). Autonomous motivation comprises intrinsic, identified, and integrated motivation, while external motivation and introjected motivation represent controlled motivation.

The dependent variable is work role performance, which captures the full scope of performance responsibilities associated with an employee's job. Beyond task-related performance linked to the technical execution of core duties, work role performance also encompasses contextual aspects involving organizational, social, and psychological contributions (Murphy & Jackson, 1999). This study adopts the framework proposed by Griffin, Neal, and Parker (2007), which conceptualizes work role performance through three dimensions: proficiency, adaptivity, and proactivity.

To ensure robustness and account for potential confounding effects, several control variables are included in the analysis. These consist of gender, age, tenure, job position, work unit or department, type of organization, and industry classification.

Instruments and Data Analysis

As an independent variable, LoC, which consists of beliefs, boundary, diagnostic, and interactive control systems, was analyzed using an 18-question instrument from Bedford (2015), which is based on the research of Henri (2006), Widener (2007), Bisbe et al. (2007), and Simons (1994, 1995, 2000). To analyze autonomous motivation as the mediating variable, this study uses MWMS by Gagné et al. (2015), with 16 items that measure motivation according to Ryan & Connell (1989) framework. Autonomous motivation is reflected in RAI (Ryan & Deci, 2000), which combines intrinsic, identified, introjected, and external motivation weighted +2, +1, -1, and -2, respectively. The higher the value, the more autonomous the motivation is. As the dependent variable, work role performance was analyzed using Griffin et al. (2007) 9 items instrument.

Data Analysis

This study employed multivariate analysis using Partial Least Squares-Structural Equation Modeling (PLS-SEM) with WarpPLS software. PLS-SEM was selected because it is suitable for complex models, supports prediction-oriented research, and does not require strict assumptions related to sample size, normality, or homoscedasticity (Hair et al., 2011; Sholihin & Ratmono, 2013). The analysis followed the standard two-step SEM procedure: evaluation of the measurement (outer) model followed by the structural (inner) model. In addition, descriptive statistics and non-response bias tests were conducted using SPSS 25.

Before hypothesis testing, non-response bias was assessed to ensure that early and late respondents did not differ systematically (Bisbe & Otley, 2004; Henri, 2006), by comparing responses from early and late groups through independent sample t-tests, also by comparing the earliest and latest quartile groups was also performed.

The measurement model was evaluated through tests of convergent validity, discriminant validity, and reliability. Convergent validity was assessed using indicator loadings and Average Variance Extracted (AVE), while discriminant validity was verified by comparing the square root of a construct's AVE and its correlations with other constructs, and also by cross-loading comparisons. Reliability was confirmed through Cronbach's Alpha and composite reliability values. Model fit was then evaluated using the goodness-of-fit indices provided by WarpPLS, such as APC, ARS, AARS, AVIF, AFVIF, and Tenenhaus GoF, to ensure that the structural model met the required thresholds. (Hair et al., 2011; Sholihin & Ratmono, 2013; Kock, 2020)

Hypothesis testing relied on path coefficients (β), p-values, R-squared values, effect size (F-square), and predictive relevance (Q-square). The significance and direction of the path coefficients determined whether each hypothesis was supported. Mediation analysis was conducted using both the Baron and Kenny (1986) procedure and the Variance Accounted For (VAF) method to determine whether the mediating effects were full, partial, or absent (Hair et al., 2011; Sholihin & Ratmono, 2013). These combined analytical steps ensured a rigorous examination of the relationships proposed in the research model.

4. RESULTS

Descriptive Statistics

Table 1 shows 5-point Likert scale descriptive statistics. On average, respondents work in intensive and evenly distributed control systems, although the focus varies. RAI is calculated at 1.42, indicating that employees' motivation tends to be autonomous. Finally, the average respondent assessed their work roles' performance at a high level.

Table 1. Descriptive Statistics (N =333)

Construct	Mean	Median	St. Dev	Min.	Max.
Beliefs systems	4.10	4.00	0.741	1.00	5.00
Boundary systems	3.83	3.75	0.574	2.00	5.00
Diagnostic Systems	3.88	4.00	0.639	1.60	5.00
Interactive Systems	3.87	4.00	0.655	1.00	5.00
External Motivation	3.48	3.50	0.787	1.00	5.00
Introjected Motivation	4.15	4.00	0.693	1.00	5.00
Identified Motivation	4.32	4.33	0.590	2.00	5.00
Intrinsic Motivation	4.11	4.00	0.757	1.00	5.00
Proficiency	4.35	4.00	0.494	2.00	5.00
Adaptivity	4.22	4.00	0.525	2.00	5.00
Proactivity	4.21	4.00	0.565	2.00	5.00

Measurement Model Analysis

Table 2. Convergent Validity for Reflective Construct

Construct	N Indicator	Loading Range	P-value	AVE
Beliefs Systems	4	0.817-0.899	< 0.001	0.731
Boundary Systems	4	0.722-0.758	< 0.001	0.549
Diagnostic Systems	5	0.776-0.831	< 0.001	0.650
Interactive Systems	5	0.805-0.849	< 0.001	0.689
External Motivation	6	0.696-0.786	< 0.001	0.539
Introjected Motivation	4	0.797-0.847	< 0.001	0.692
Identified Motivation	3	0.886-0.926	< 0.001	0.812
Intrinsic Motivation	3	0.897-0.944	< 0.001	0.850
Proficiency	3	0.872-0.917	< 0.001	0.792
Adaptivity	3	0.833-0.911	< 0.001	0.776
Proactivity	3	0.840-0.891	< 0.001	0.764

This analysis deals with validity and reliability. Convergent validity exists when a construct can be explained by its indicators (Kock, 2020), with loading indicators > 0.7, significant p-value (Hair et al., 2011; Sholihin & Ratmono, 2013; Sarstedt et al., 2017), and average variance extracted (AVE) ≥ 0.5, meaning 50% of the variance is due to the indicator, not from errors (Hair et al., 2011; Sarstedt et al., 2017). Details shown on Table 2.

As for the formative construct (work role performance), each indicator's weight must have a significant p-value and Variance Inflation Factor (VIF) < 3.3 (Kock, 2020). Table 3 shows that all criteria have been met.

Table 3. Convergent Validity for Formative Constructs

Construct	Loading	Weight	P-value	VIF
Proficiency	0.897	0.378	< 0.001	2.409
Adaptivity	0.898	0.378	< 0.001	2.411
Proactivity	0.875	0.368	< 0.001	2.100

Discriminant validity, representing how far a construct differs from other constructs (Kock, 2020), fulfilled when the construct's square roots of AVE is higher than the correlation value between constructs, and each indicator loading to the construct is higher than the cross-loading (Hair et al., 2011; Sholihin & Ratmono 2013; Hair et al., 2014). Table 4 shows the fulfillment of first criteria. The second criteria is also fullfilled because each loading in Table 2 is greater than its cross-loading (not shown).

Table 4. Square Roots of Average Variances Extracted (AVE)

	BLS	BOS	DIS	INS	EXT	ITJ	IDN	INT	PRF	ADP	PRC
Belief (BLS)	0.86	0.46	0.54	0.65	0.17	0.19	0.36	0.40	0.41	0.40	0.47
Boundary (BOS)	0.49	0.74	0.66	0.55	0.43	0.27	0.14	0.05	0.24	0.23	0.26
Diagnostic (DIS)	0.54	0.66	0.81	0.77	0.36	0.16	0.11	0.17	0.28	0.25	0.28
Interactive (INS)	0.65	0.55	0.77	0.83	0.24	0.16	0.30	0.38	0.42	0.38	0.41
External (EXT)	0.17	0.43	0.36	0.24	0.73	0.33	0.12	0.12	0.10	0.12	0.09
Introjected (ITJ)	0.19	0.27	0.16	0.16	0.33	0.83	0.52	0.26	0.26	0.26	0.30
Identified (IDN)	0.36	0.14	0.11	0.30	0.12	0.52	0.90	0.48	0.45	0.45	0.52
Intrinsic (INT)	0.40	0.05	0.17	0.38	0.12	0.26	0.48	0.92	0.34	0.36	0.36
Proficiency (PRF)	0.41	0.24	0.28	0.42	0.10	0.26	0.45	0.34	0.89	0.72	0.67
Adaptivity (ADP)	0.40	0.23	0.25	0.38	0.12	0.26	0.45	0.36	0.72	0.88	0.67
Proactivity (PRC)	0.47	0.26	0.28	0.41	0.09	0.30	0.52	0.36	0.67	0.67	0.87

Reliability, related to how different respondents can understand the instrument in a similar perception (Kock, 2020), is reflected by Cronbach's Alpha and composite reliability > 0.7 (Hair et al., 2011; Sholihin & Ratmono, 2013). Table 5 shows the criteria details.

Table 5. Construct Reliability Test

Construct	N Indicator	Cronbach's Alpha	Composite Reliability
Beliefs Systems	4	0.877	0.916
Boundary Systems	4	0.726	0.830
Diagnostic Systems	5	0.865	0.903
Interactive Systems	5	0.887	0.917
External Motivation	6	0.829	0.875
Introjected Motivation	4	0.851	0.900
Identified Motivation	3	0.884	0.928
Intrinsic Motivation	3	0.912	0.944
Proficiency	3	0.868	0.919
Adaptivity	3	0.855	0.912
Proactivity	3	0.845	0.906

Structural Model Analysis

This analysis is related with goodness of fit and hypotheses testing. Goodness of fit has several indicators as shown in table 6. The result shows that the model is fit and ideal.

Table 6. Goodness of Fit

Indicator	Value	Criteria (Kock 2020)	Conclusion
Average path coefficient (APC)	0.311***	P significant	Accepted
Average R-squared (ARS)	0.171***	P significant	Accepted
Average adjusted R-squared (AARS)	0.164***	P significant	Accepted
Average block VIF (AVIF)	2.068	Acceptable if ≤ 5, Ideal if ≤ 3.3	Ideal
Average full collinearity VIF (AFVIF)	2.164	Acceptable if ≤ 5, Ideal if ≤ 3.3	Ideal
Tenenhaus GoF (GoF)	0.363	Small if ≥ 0.1, Medium if ≥ 0.25, Large if ≥ 0.36	Large

Notes: *** p < 0.001

The results of the hypotheses testing are shown in Figure 2 and Table 7 below.

Figure 2. Structural Model Analysis Results

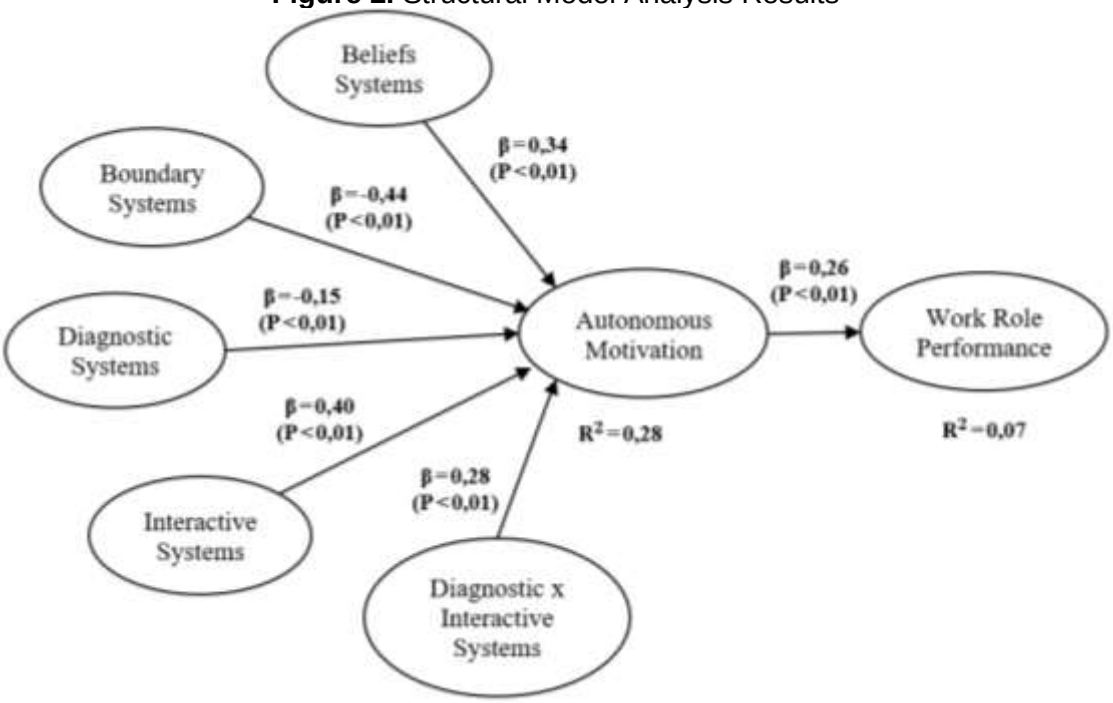


Table 7. Summary of Structural Model Analysis Results

Construct	Path to- (*β* and *p*-value)	
	Autonomous Motivation	Work Role Performance
Beliefs Systems	0.34***	
Boundary Systems	-0.44***	
Diagnostic Systems	-0.15***	
Interactive Systems	0.40***	
Diagnostic x Interactive Systems	0.28***	
Autonomous Motivation		0.26***
R^2 (Adjusted)	0.26	0.06

Notes: N = 333; *** p < 0.01

Hypotheses testing can be concluded from the β or path coefficient and p-value. Toward autonomous motivation, beliefs systems show positive effect (β = 0.34; p <0.01), boundary systems show negative effect (β = -0.44; p <0.01), diagnostic control systems show negative effect (β = -0.15; p <0.01), interactive control systems show positive effect (β = 0.40; p <0.01), and joint use of diagnostic and interactive control systems shows positive effect (β = 0.28; p <0.01), all significant. Last, autonomous motivation shows significant positive effect on work role performance (β = 0.26; p <0.01).

Control variables (gender, age, tenure, position, function, organization type, industry type) were analyzed, resulting that autonomous motivation still positively affects work role performance (β = 0.23; p < 0.01). Control variable with significant result, i.e., position (β = 0.15; p < 0.01), then analyzed with ANOVA, showing significance on autonomous motivation (F = 2.471; p < 0.05) and work role performance (F = 2.500; p < 0.05). Industry type was also tested, considering the unique nature of each industry. The ANOVA show significance related to LoC (belief system with F = 2.821, p < 0.01; boundary system with F = 2.206, p < 0.05; diagnostic system with F = 3.241, p < 0.01; interactive system with F = 3.359, p < 0.01) and autonomous motivation (F = 2.547; p < 0.01).

Table 8. Mediation Analysis Using Baron and Kenny's (1986) Method

Construct	Path to Work Role Performance (*β; P*-value*)*	Conclusion
Direct Model without Autonomous Motivation (c)		
Beliefs Systems	0.40***	Next step
Boundary Systems	-0.00	No mediation
Diagnostic Systems	0.09	No mediation
Interactive Systems	0.29***	Next step
Diagnostic x Interactive Systems	0.12**	Next step
Simultaneous Mediation Model (c")		
Beliefs Systems	0.07**	Partial mediation (βc" < βc, p < 0.05)
Interactive Systems	0.08**	Partial mediation (βc" < βc, p < 0.05)
Diagnostic x Interactive Systems	0.05	Full mediation (βc" < βc, p insignificant)

Notes: N = 333; *** p < 0.01; ** p < 0.05

Table 9. Mediation Analysis Using Hair et al.'s (2013) Method

Construct	Path to Work Role Performance (*β* and *P*-value*)*	Conclusion
Direct Effect without Autonomous Motivation (AUM) (P13)		
Beliefs Systems (BLS)	0.40***	Next step
Boundary Systems (BOS)	-0.00	No mediation
Diagnostic Systems (DIS)	0.09	No mediation
Interactive Systems (INS)	0.29***	Next step
DIS x INS	0.12**	Next step
Indirect Effect (P12 . P23)		
BLS-AUM x AUM-WRP	0.344 x 0.194 = 0.067***	Next step
INS-AUM x AUM-WRP	0.400 x 0.194 = 0.077***	Next step
DISxINS-AUM x AUM-WRP	0.277 x 0.194 = 0.054***	Next step
VAF [(P12 . P23) / (P12 . P23 + P13)]		
BLS-AUM-WRP	0.067/(0.067+0.40) = 0.145	No mediation (VAF<20%)
INS-AUM-WRP	0.077/(0.077+0.29) = 0.212	Partial med. (20%<VAF<80%)
DISxINS-AUM-WRP	0.054/(0.054+0.12) = 0.308	Partial med. (20%<VAF<80%)

Notes: N = 333; *** p < 0.01, ** p < 0.05

The mediation analysis was done in WarpPLS using Baron & Kenny (1986) and Hair et

al. (2013) methods. Table 8 shows result using Baron & Kenny (1986), and table 9 using VAF (Variance Accounted For) by Hair et al. (2013). Analysis shows that autonomous motivation acts as a partial mediator in the use of interactive systems and in the joint use of diagnostic and interactive systems.

Additional Analysis

The relationship between each motivation types and work role performance aspects is also examined. Result shows that intrinsic and identified motivation, which are autonomous, have greater significance on all work role performance indicators compared to the controlled motivations.

Table 10. Analysis of the Relationship between Motivation and Work Role Performance

Construct	Path to- (*β* and *p*-value)		
	Proficiency	**Adaptivity**	**Proactivity**
Intrinsic Motivation	0.22***	0.27***	0.16***
Identified Motivation	0.30***	0.27***	0.36***
Introjected Motivation	0.07	0.04	0.06
External Motivation	0.07	0.11**	0.11**
R^2 (Adjusted)	0.29	0.30	0.31

Notes: N = 333; *** p < 0.01, ** p < 0.05.

Analysis concluded that all hypotheses are supported, confirming prior studies' results. Beliefs and interactive systems positively affect autonomous motivation because they encourage internalization of organizational goals (H1 and H4 are supported). Boundary and diagnostic systems negatively affect autonomous motivation because they restrict behaviour and are closely related to external factors (H2 and H3 are supported). The joint use of diagnostic and interactive systems positively impacts autonomous motivation due to dynamic tensions of each system's benefits (H5 is supported). Autonomous motivation is proven to positively affect work role performance (H6 is supported).

Several additional analyses were done. Mediation analysis concluded that autonomous motivation partially mediates the effect of the use of interactive systems and the joint use of diagnostic and interactive systems on work role performance. ANOVA shows that some control variables, i.e. position and industry type, need to be examined further to understand the impact on LoC implementation and autonomous motivation.

5. CONCLUSION

This study aims to analyze the relationship between management control systems, individual motivation, and performance, using SDT-based autonomous motivation, LoC framework, and the work role performance model. 333 responses were collected from an online survey of Indonesian permanent employees with a minimum one year of working experience.

The results prove that beliefs and interactive systems positively affect autonomous motivation (H1 and H4 are supported), boundary and diagnostic systems negatively affect autonomous motivation (H2 and H3 are supported), joint use of diagnostic and interactive systems positively affect autonomous motivation (H5 is supported), and autonomous motivation positively affects work role performance (H6 is supported). Autonomous motivation partially mediates the effect of the use of interactive systems and the joint use of diagnostic and interactive systems on work role performance.

All the results support SDT assumption that motivation's autonomy level varies depending on the source or certain organizational factors (i.e., management control systems). This study also supports other SDT assumptions that individuals achieve their optimal function

by integrating into their environment, shown in the workplace by high proficiency, adaptivity, and proactivity (Gagné & Deci, 2005).

This study enriches the literature by researching at the individual level, examining several systems at once using LoC, and using rarely used SDT-based autonomous motivation in management control systems studies. This study provides new evidence by linking LoC and autonomy with work role performance, and gives evidence about the mediating role of autonomous motivation. This study also shows the practical importance of autonomous motivation and how managements need to design the right management control systems. Specifically, data show that the communication and use of core values are still low, so managements need to boost the communication of values, goals, and direction.

To overcome this study limitation, future research can try other methods to provide more results, and also can add other variables, e.g., position and industry type as noted above, or other variables such as leadership style or organizational culture. This is important because the mediation analysis shows partial results; hence, further research with more variables may better explain the research model.

Limitation

This study has several limitations. First, performance measurement is based on self-assessment, so the actual performance cannot be confirmed. Second, the online survey makes it unclear if the dependent variable is only influenced by this model's independent variables. Lastly, other important variables may not have been studied, considering that the mediating effect of autonomous motivation is only partial for certain constructs.

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