

PARTICIPATIVE DECISION-MAKING, AUTONOMY, AND CREATIVE PERFORMANCE: EVIDENCE OF MATCH-UP EMPLOYEE RELATIONS BETWEEN ENGINEERS AND MANAGERS

**Jeniboy Kimpah^{a*}, Hazril Izwar Ibrahim^b, Sebastiaan Rothmann^a and
Amar Hisham Jaaffar^c**

^a*Optentia Research Unit, North-West University, 1174 Hendrick Van Eck Boulevard
Vanderbijlpark, 1900, South Africa*

^b*School of Management, Universiti Sains Malaysia, 11800 USM Penang, Malaysia*

^c*Institute of Energy Policy and Research, Universiti Tenaga Nasional, Jalan IKRAM-
UNITEN, 43000 Kajang, Selangor, Malaysia*

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Abstract

This study aimed to determine the associations between engineers' perceptions of participative decision-making and autonomy, and their creative performance. The study utilised a paired match-up technique, with engineers and managers as respondents. Managers were responsible for assessing engineers' creative performance. Due to the study match-up design, questionnaires measuring participative decision-making, autonomy, and creative performance were distributed to the electrical and electronic manufacturing firms. SmartPLS software was used to analyse the hypothesised relationships. The results indicated that engineers' participative decision-making significantly predicted autonomy dimensions (work schedule, work criterion, and work method). Engineers' autonomy regarding work schedule, work criterion, and work method had no positive relationship with creative performance. The results showed that engineers' work schedule, work criterion, and work method negatively mediated the relationships between participative decision-making and creative performance. The findings indicated an insignificant direct effect and negative mediation of engineers' work schedule, work criterion, and work method on creative performance, pointing to the structured nature of work. This situation leaves engineers with minimal opportunity to determine the work designs, time allocations, and multicriteria of job descriptions. The study recommends potential directions for studying the improvement of engineers' creative performance in future studies.

Keywords: decision-making, work method, work schedule, work criterion, creative performance, match-up pair approach, EEI

* Corresponding author: drjeniboy@icloud.com

1. INTRODUCTION

Policymakers, businesspeople, and consultants in government and non-government organisations have extensively discussed job performance from the human resource management perspective. This discussion has focused on job performance in terms of in-role and extra-role performances (Rubel et al., 2018). This study was conducted on employee extra-role behaviour instead of in-role performance due to the unknown manufacturing human resource management practices in Malaysia regarding extra-role performance, specifically from the perspective of employee creativity. The main focus was on employees' creativity, ranging from manufacturing operators (operational levels) to directors of manufacturing (management levels). To address this research gap regarding job performance, it was crucial to understand the effect of employees' extra-role behaviour in terms of employee creativity. Employee creativity is critical in increasing the ability of manufacturing firms to enhance efficiency, productivity, and cost-effectiveness. The electrical and electronic engineering industries (EEI) are a primary concern with regard to the economy of Malaysia because they are vital sources of employment. From January 2020 to June 2021 (during the COVID-19 pandemic), 112 410 potential jobs were created (MIDA, 2021).

However, the electrical and electronic engineering industry faces limitations owing to several circumstances such as a shortage of high-skilled personnel in advanced technologies, limited financial institution credit, and research and development competition with the United States of America, Japan, and China (European

Commission, 2022). Therefore, these limit the flexibility of human resource management and agility to compete globally (Kaveri & Prabakaran, 2013). To make progress, Malaysian EEI manufacturing firms must rely on internal human resource management strategies to allow employees to participate in decision-making and foster autonomy regarding creativity as an outcome of these practices. Managers are perceived as crucial in enhancing employees' creativity concerning understanding employee autonomy in determining work schedule, work criterion, and work method. Hocine and Zhang (2014) state that employers inspire creativity among the workforce by encouraging autonomy. Thus, employees' participative decision-making and autonomy are related to creative performance.

2. EMPLOYEE DECISION-MAKING, AUTONOMY, AND CREATIVE PERFORMANCE

This study examined employees' participative decision-making, autonomy, and creative performance. According to Kahnweiler and Thompson (2000), employee participative decision-making encompasses the actual and desired levels of engagement exhibited in ongoing work activities. Engaging individuals in participative decision-making fosters autonomy, increases responsibility, and enhances organisational productivity (Zulfqar et al., 2022). It is critical to respect the rights of organisational team members, as it facilitates participation and autonomy, safeguarding growth and learning within the workplace (Keith, 1996; Torlak et al., 2021). It has been shown that individuals find greater happiness in their work due to the

increased level of autonomy they are granted in decision-making and responsibility (Karlberg-Granlund, 2019; Thien & Lee, 2023).

The job characteristics model (JCM) defines motivation through the design of work as “which individuals will become internally motivated to perform effectively on their jobs” (Hackman & Oldham, 1976, p. 250). Expanding on the JCM, Breugh (1985) identifies three subcategories within work autonomy: work schedule, work criterion, and work method. These subdimensions empower employees at work. Work method refers to an individual’s ability to select the method employed for job completion. Work schedule involves managing the sequencing of tasks. Work criterion is the specific standards, qualifications, or requirements used to assess or evaluate work resources, including employees, projects, tasks, and deliverables. The first objective of this study was to examine the relationship between participative decision-making and the three subdimensions of autonomy: work method autonomy, work schedule autonomy, and work criterion autonomy.

Employee autonomy concerning work schedule, work criterion, and work method enhances extra-role job performance (Takaishi et al., 2019). Permata and Mangundjaya (2021) found that creativity and performance were perceived to improve after employers allowed a certain degree of autonomy regarding work schedule, work criterion, and work method. Creative performance refers to employee initiatives at work not listed or specified. According to George and Zhou (2001), employees’ creative performance is an initiative without a particular standard set by the organisation. The second study objective was to examine

the relationships between the three subdimensions of autonomy and creative performance.

Creative performance is the ability to generate novel ideas beneficial in solving problems regarding work assignments, introducing relevant knowledge that did not exist before, and highlighting an efficient and orderly approach to tasks (Rese et al., 2020). Hence, creative performance describes generating novel ideas, product problem-solving, processes, and procedures. The EEI manufacturing firms were considered relevant in terms of creative performance owing to the nature of these companies of being constantly changing with the development of cutting-edge technology. Managers and engineers play a role in producing effective organisational structures to enhance creativity. Human resource management must be efficient and continuous to increase creativity in organisations.

Self-efficacy theory explains that all employees have the autonomy to inspire themselves to be creative (Xie et al., 2020). Consequently, engineers’ autonomy regarding work schedule, work criterion, and work method is essential. Past studies have indicated that engineers who gain autonomy in work schedule, work criterion, and work method about jobs exhibit creative behaviour that enhances the creative performance of organisations (George & Zhou, 2001; Takaishi et al., 2019).

2.1. Relationship between participative decision-making and autonomy

According to Shahzad (2022), increasing job autonomy allows for greater freedom in decision-making, work scheduling, and work execution. As job autonomy levels rise,

managers encounter additional challenges in decision-making, work procedure, and maintaining work schedule, necessitating the utilisation of more psychological resources.

Brun and Cooper (2009) revealed that participative decision-making increased employees' sense of autonomy because it enabled employees to be informed and consulted and to participate in defining work tasks. Given this understanding, participative decision-making might explain employees' lack of interest in increasing the power or control of other employees. However, employees were keen on participating in decision-making and having a sense of autonomy.

Autonomy is defined as employees' discretion over when, where, and how they do their job (Charoensukmongkol & Phungsoonthorn, 2021; Zhou, 2020). Employee autonomy is the level of control over employees' choices in work such as method, timing, and criterion (Charoensukmongkol & Phungsoonthorn, 2021; Zhou, 2020). Breugh (1985) conceptualises autonomy in terms of work schedule, work criterion, and work method. It is to imbue employees with the sense of being in control of work tasks. Work schedule refers to employees' opportunity to allocate working time to a job (Breugh, 1985). Work criterion can be defined as the ability of employees to have a sense of control over the criteria such as employees having multiple choices to modify their approach to evaluating performance (Breugh, 1985). Work method can be called employees' decisions regarding work procedures that should be followed to complete tasks (Breugh, 1985).

Several studies (see Chandra (2011), Scott-Ladd and Marshall (2004), and Seymour and Peterman (2018)) have been

conducted to investigate the association between participative decision-making and autonomy. These studies have indicated that employees can be proactive in conforming to work roles and responsibilities. Seymour and Peterman (2018) revealed the significant link between individual participative decision-making and autonomy. Participating in decision-making encourages employees to be determined in work tasks. Chandra (2011) found that employee participation opportunities in decision-making were positively related to workplace autonomy. Scott-Ladd and Marshall (2004) discovered that high levels of employee participative decision-making increased workplace autonomy. Thus, the following hypotheses were proposed:

Hypothesis 1a: Participative decision-making is positively related to engineers' work method.

Hypothesis 1b: Participative decision-making is positively related to engineers' work schedule.

Hypothesis 1c: Participative decision-making is positively related to engineers' work criterion.

2.2. Relationship between autonomy and creative performance

This study adopted the EEI manufacturing firms as employers responsible for fostering a creative work environment. To give employees opportunities to be involved in creativity, employers should provide employees with the autonomy to make decisions in determining the work schedule, work criterion, and work method in the workplace. However, autonomy reluctance on the part of employers can hinder the implementation of a creative workplace (Berg et al., 2017; Xie

et al., 2020). To encourage creativity, employers assign intermediate managers to supervise subordinates. Managers' support and encouragement can empower subordinates to gain autonomy, leading to better job performance. Research has suggested that managers can assist employees at work in promoting autonomy, freedom, or flexibility at work (Putnam et al., 2014) through employee selection of work schedule, work criterion, and work method (Takaishi et al., 2019).

The measurement of employees' perceived workplace autonomy in the study conducted by Pattnaik and Sahoo (2021) utilised a scale consisting of three dimensions: work method autonomy, work scheduling autonomy, and work criterion autonomy. The study advocated that perceived workplace autonomy had a significant influence on creativity. The findings suggested that workplace autonomy fostered a thriving climate that promoted freedom of thought and decision-making, ultimately enhancing employee creativity.

Sia and Appu (2015) indicate that the degree of autonomy is positively related to creative performance. The degree of autonomy, freedom, or flexibility of employees enables strategies at work and the ability to implement other alternative ideas. De Spiegelare et al. (2016) point out that employees need autonomy to use alternative work method.

Hypothesis 2a: Work method is positively related to engineers' creative performance.

Genty et al. (2021) recommend maintaining a flexible work schedule to enable employees to perform their tasks conveniently, ultimately leading to increased effectiveness in performance. De Spiegelare et al. (2014) explain that employees have a sense of control through

freedom or flexible schedules, enabling them to adjust work to different demands. Moreover, the study by De Spiegelare et al. (2016) showed that work schedule and creative performance had a positive relationship. Brem and Utikal (2019) support the idea that work schedule has a positive impact on individual creativity and routine performance.

Hypothesis 2b: Work schedule is positively related to engineers' creative performance.

Research regarding the relationship between work criterion and creative performance is scarce. The study has significantly contributed to enrich understanding of the relationship between work criterion and creative performance. Sia and Appu (2015) explain that work criterion positively correlates with creativity. They found that employees could customise work criterion for enhancing creativity regarding employees' understanding of shortcomings and weaknesses related to performance. Khan (2022) states that performance is related to assessment by possible outcomes concerning work standards, target goals, and work criterion of a particular task in comparison to the actual outcomes achieved by an employee. These possible outcomes are predetermined and provided to employees as an agreement regarding a particular job.

Hypothesis 2c: Work criterion is positively related to engineers' creative performance.

2.3. The mediating role of autonomy

Employee autonomy has been studied since the 1980s and gained popularity from 1985 onwards (Breugh, 1985). It is crucial to note the potential mediating role of

autonomy in the relationship between participative decision-making and in-role performance. Existing research has highlighted the potential effects of participative decision-making on creative performance, with autonomy often being considered a potential mediating variable in this relationship. For example, Khan (2023) examined the mediating role of job autonomy in the relationship between transformational leadership, decision-making, and teacher work performance. The findings indicated the significant mediating role of job autonomy, supporting its influence on transformational leadership and teacher work performance.

Brun and Cooper (2009), Chandra (2011), and Scott-Ladd and Marshall (2004) found that participative decision-making had a significant positive relationship with autonomy, particularly work schedule, work criterion, and work method. They concluded that if employees participated in decision-making to enhance job performance, then they experienced a feeling of being empowered through autonomy. The benefit of participative decision-making, autonomy, and job performance was that employees could use these as a form of self-determination.

Breaugh (1985), Brem and Utikal (2019), De Spiegelare et al (2016), and Sia and Appu (2015) claim that creative performance can be enhanced through employees' sense of autonomy by being less restricted in terms of rules or regulations in the workplace. Employees easily create novel ideas and complete work tasks through the autonomy they receive from team members. Furthermore, employers have to consider the level of employees' participation, flexibility, and freedom from different perspectives to exert effort in having a creative impact while

completing work tasks.

Therefore, employees' autonomy allows them to participate in decision-making, having an impact on creativity and enhancing job performance. This study used the preceding discussion to examine the relationship between participatory decision-making and creative performance, with autonomy as the mediator. Consistent with the previous literature, the following hypotheses are presented.

Hypothesis 3a: Work method mediates the association between participative decision-making and engineers' creative performance.

Hypothesis 3b: Work schedule mediates the association between participative decision-making and engineers' creative performance.

Hypothesis 3c: Work criterion mediates the association between participative decision-making and engineers' creative performance.

3. METHODS

3.1. Research design

The study implemented a dyadic design, colloquially known as a match-up pair design. This matching approach involved creating a pair from each participant for an in-depth comparison. The matching techniques used to construct the sample for regression analysis involved employing regression specifications with matched pair fixed effects. This approach aimed to balance the treatment and control groups better (Bena et al., 2022). Engineers and managers were systematically paired in this specific study context to allow for a nuanced inter-role analysis. This design facilitated an introspective assessment of the managers

concerning their perception of the engineers' creative performance within their purview. Simultaneously, engineers were allowed to assess the degree of participative decision-making and the level of autonomy regarding experience in a professional environment. The efficacy of this dyadic design, in terms of its superior reliability, was contrasted with more traditional single-subject analysis methods. This design succeeded in bolstering the validity of the study outcomes and the credibility of its resultant conclusions.

3.2. Population and sampling

The population for this study consisted of all employees working in the electrical and electronic (E&E) firms. According to the Department of Statistics Malaysia (2016), the total number of employees in these firms is 508 542. These employees are employed across 274 E&E manufacturing firms in Malaysia, as reported by the Federation of Malaysian Manufacturers (FMM) in 2016. The FMM report of 2016 contains a comprehensive list of employees and firms, categorised based on the products manufactured. The categorisation includes five product groups: (1) office, accounting and computing, and machinery; (2) domestic equipment; (3) radio, television, and communication equipment; (4) electrical machinery and apparatus; and (5) medical, precision, and optical instruments such as watches and clocks.

This study was conducted using non-probability sampling to gain the most accessible information from the target participants. Moreover, the study utilised a judgement sampling technique, choosing managers and engineers according to pairing suitability. Kenny and Winquist (2001) recommend that paired analysis between

employees and superiors can be the appropriate approach for extracting and investigating precise information. Participants included managers and engineers with direct one-to-one relationships at work. A manager of a particular department was identified and matched with an engineer. Human Resources (HR) department assistance was obtained for identifying the manager-engineer pairings to ensure that the data collected would be reliable and valid for the study.

To estimate the minimum sample size, select the sample size, and conduct power analysis (Faul et al., 2007), this study utilised G*Power. G*Power requires the power level ($1-\beta$), the prespecified significance level α , and the population to be decided with probability ($1-\beta$) in order to determine the sample size with regard to a medium effect of 0.15, α error probability of 0.05, and minimum power of 0.80. The result showed that a minimum sample size of 98 respondents was required for this study, which was deemed sufficient. However, this study was efficacious in collecting 173 match-up paired responses (i.e., 173 managers and 173 engineers).

The sample involved in this study was, thus, 173 match-up pairs of managers and engineers, employed in 73 electrical and electronic international and local manufacturing firms in Malaysia. Individuals who worked for these manufacturing firms were selected as participants. Managers and engineers had to have been working together for at least one year. The role of the managers was to respond with regard to the engineers' creative performance, while the engineers had a self-assessment regarding participative decision-making, autonomy, and creative performance.

3.3. Instrument and data collection procedure

This study utilised two questionnaires, denoted as Sets A and B, to assess different constructs. Set A was designed for managers to evaluate creative performance and incorporated a 13-item instrument adapted from Zhou and George (2001). Each item in the questionnaire was measured using a five-point Likert scale, ranging from 1 (is not at all characteristic) to 5 (is very characteristic).

Set B focused on evaluating engineers' participative decision-making and autonomy. The participatory decision-making instrument used in Set B comprised five items and was developed by Lam et al. (2002). Participants were asked to rate their agreement level on a scale ranging from 1 (strongly disagree) to 7 (strongly agree). Regarding autonomy, the scale used in Set B was work and encompassed three constructs: work method, work schedule, and work criterion, based on Breugh (1985). The scale consisted of nine items, each rated on a seven-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree).

The data collection procedure of this study involved using a self-administered questionnaire method. This method supported understanding the conceptual framework of the study and reduced social desirability bias when collecting sensitive data. The data was collected from managers and engineers in E&E manufacturing firms through the "walk-in, drop-off, and collect" approach and Pos Laju services. HR managers were contacted to secure their co-operation in identifying relevant participants, and a cover letter was sent to explain the study purpose and obtain permission from the HR department of each firm. Out of the 274 firms contacted, 73 agreed to participate.

The questionnaires were distributed, and gentle reminders were sent to increase the response rate. Pos Laju services were used for firms in Sabah and Sarawak.

To ensure accuracy and efficiency, the data collection procedure included the distribution of paired questionnaires based on matching colours for managers and their corresponding engineers. In cases where more than one matched pair wished to participate, additional same-pair-coloured questionnaires were provided. The responsibility for collecting responses from managers and engineers lay with the HR managers themselves. This structured and well-defined procedure facilitated the systematic collection of data from the targeted population, enabling comprehensive and reliable information to be obtained for analysis.

3.4. Evaluation of reflective measurement model

The internal consistency reliability and validity of the measures were assessed using factor loading, average variance extracted (AVE), and composite reliability (CR). According to Hair et al. (2011), factor loadings above 0.708 are considered acceptable. The AVE values, recommended to be above 0.500, demonstrated adequate convergent validity (Hair et al., 2012). The CR values exceeding 0.700 indicated satisfactory internal consistency reliability (Hair et al., 2016). No items were deleted from the analysis. Refer to Table 1 for a comprehensive overview of the statistical results.

To assess the discriminant validity (DV), the heterotrait-monotrait ratio of correlations (HTMT) was employed in this study, following the methodology proposed by

Henseler et al. (2015). Specifically, the HTMT was used to measure the degree of uncorrelation between constructs. The study applied HTMT.85, HTMT.90, and HTMT inference criteria to evaluate the discriminant validity. The results indicated that the square root of the average variance extracted (AVE)

for each construct did not exceed 0.85, 0.90, or 1. Among the constructs, this study had the highest square root value of 0.81, which satisfied the threshold value recommended (Franke & Sarstedt, 2019). Refer to Table 2 for a comprehensive overview of the statistical results.

Table 1. Result of the measurement model

Construct	Loadings	AVE	CR
SET A: Managers			
Creative performance (CP)		0.708	0.969
CP1	0.869		
CP2	0.856		
CP3	0.841		
CP4	0.812		
CP5	0.838		
CP6	0.820		
CP7	0.835		
CP8	0.828		
CP9	0.809		
CP10	0.833		
CP11	0.869		
CP12	0.862		
CP13	0.863		
SET B: Engineers			
Participative decision-making (PDM)		0.736	0.933
PDM1	0.856		
PDM2	0.874		
PDM3	0.866		
PDM4	0.884		
PDM5	0.808		
Work method (WM)		0.795	0.921
WM1	0.987		
WM2	0.873		
WM3	0.905		
Work schedule (WS)		0.833	0.937
WS1	0.900		
WS2	0.912		
WS3	0.926		
Work criterion (WC)		0.867	0.952
WC1	0.906		
WC2	0.958		
WC3	0.930		

Note: Indicator loading > 0.708; AVE > 0.5; and CR > 0.700.

Table 2. Heterotrait-monotrait ratio of correlations (HTMT)

Variables	CP	WC	WM	WS
CP				
WC	0.575			
WM	0.619	0.810		
WS	0.490	0.777	0.763	
PDM	0.679	0.719	0.835	0.599

Note: HTMT must be lower than .85; CP is creative performance; WC is work criterion; WM is work method; WS is work schedule; PDM is participative decision-making.

3.5. Evaluation of structural model

SmartPLS is variance-based software selected to conduct structural equation modelling (SEM) in this study because of the unique features of the study. SEM is widely recognised and used in behavioural and social sciences for analysing latent or unobservable constructs (Sharma & Kim, 2013). This method provides a complete model fit assessment and simplifies the examination of individual parameter estimates. SEM is particularly efficient for testing hypotheses and investigating relationships among multiple dependent variables (Byrne, 2002). Due to its flexibility and suitability for reflective model data analyses, SmartPLS was utilised for the visual study of relationships among the following variables: participative decision-making, autonomy, and creative performance. The widespread use of this software spans many study fields, including human resource management.

4. FINDINGS

The study employed SmartPLS and conducted bootstrapping analysis with a substantial sample size of 5 000 to comprehensively investigate the conceptual model within the EEI manufacturing firms. The direct effect test results, presented in

Table 3, provided robust support for Hypotheses 1a, 1b, and 1c. Participative decision-making demonstrated a significant positive effect on the specific organisational aspects of work method ($\beta = 0.765$, $p < 0.01$), work schedule ($\beta = 0.603$, $p < 0.01$), and work criterion ($\beta = 0.664$, $p < 0.01$). These findings highlighted the impactful role of involving employees in decision-making processes in improvements across these dimensions within the EEI manufacturing firms. Participative decision-making enhanced work method, promoting greater efficiency, innovation, and effectiveness in task execution. Additionally, it contributed to establishing fair and meaningful performance criteria, instilling a sense of equity, transparency, and alignment with organisational goals. These significant outcomes underlined the importance of implementing participative decision-making practices in the EEI manufacturing firms to facilitate positive changes in work method, work schedule, and work criterion.

In terms of the direct effect relationship between employee autonomy constructs and creative performance, we investigated the constructs of work method ($\beta = 0.137$, $p > 0.10$), work schedule ($\beta = 0.031$, $p > 0.10$), and work criterion ($\beta = 0.101$, $p > 0.10$). Contrary to the initial hypotheses (H2a, H2b, and H2c) positing a positive association between employee autonomy and creative performance, the results indicated a lack of

Table 3. Direct effect test

H	Relationship	β	Std error	t-values	p-values	R ²	Decision
H1a	PDM→WM	0.765	0.054	14.120***	0.000	0.585	Supported
H1b	PDM→WS	0.603	0.062	9.784***	0.000	0.364	Supported
H1c	PDM→WC	0.664	0.066	10.029***	0.000	0.441	Supported
H2a	WM→CP	0.137	0.112	1.217	0.112	0.437	Not supported
H2b	WS→CP	0.031	0.079	0.392	0.347	0.437	Not supported
H2c	WC→CP	0.101	0.106	0.954	0.170	0.437	Not supported

Note: $n = 173$; *** $p < 0.01$; 5 000 resampling bootstrapping; SmartPLS one-tailed procedure.

support for these hypotheses. Statistical analysis revealed that none of the examined constructs exhibited a significant impact on creative performance, as indicated by p-values exceeding the threshold of 0.10. Consequently, the findings suggested that increasing employee autonomy regarding work method, work schedule, or work criterion did not lead to improved creative performance. Refer to Table 3 for a comprehensive overview of the statistical results.

This study investigated the potential mediating effects of work method, work schedule, and work criterion on the relationship between participative decision-making and creative performance within the context of EEI manufacturing firms. Regression analysis was employed to examine the associations, with β coefficients and p-values serving as indicators of the magnitude and significance of the effects, respectively. The results revealed that none of the examined mediators, namely, work method ($\beta = 0.104, p > 0.10$), work schedule ($\beta = 0.019, p > 0.10$), and work criterion ($\beta = 0.067, p > 0.10$), exhibited significant mediating effects on the relationship between participative decision-making and creative performance. Refer to Table 4 for a comprehensive overview of the statistical results.

5. DISCUSSION

This study was designed to provide new insights into engineers' participative decision-making and autonomy in relation to the work schedule, work criterion, and work method. The findings revealed a positive relationship between participative decision-making and active engagement in discussions about work schedule, adherence to work criterion, and utilisation of work method. Thus, hypotheses 1a, 1b, and 1c were supported, demonstrating engineers' optimism and willingness to actively participate in discussions pertaining to work schedule, work criterion, and work method. The findings of this study are supported by those of Seymour and Peterman (2018), Chandra (2011), and Scott-Ladd and Marshall (2004).

Despite low thoughtlessness levels, the study failed to find any significant relationship between engineers' autonomy and creative performance, leading to the rejection of hypotheses 2a, 2b, and 2c. There can be several reasons for this unexpected result, including the complexity of engineering tasks (Shi et al., 2020) and the EEI manufacturing firms encountered varying levels of operational complexity of tasks encountered within real-world organizational settings, in addition to varying levels of operation among engineers. These

Table 4. Indirect effect test

H	Relationship	β	Std error	t-values	p-values	Decision	Lower confidence limit	Upper confidence limit
H3a	PDM→EEWM→CP	0.104	0.087	1.201	0.230	Not supported	-0.057	0.291
H3b	PDM→EEWS→CP	0.019	0.048	0.390	0.696	Not supported	-0.073	0.118
H3c	PDM→EEWC→CP	0.067	0.068	0.981	0.327	Not supported	-0.071	0.197

Note: $n = 173$; 5 000 resampling bootstrapping; SmartPLS two-tailed procedure.

tasks exhibited work schedule, criterion, and method differences. The limited involvement of managers in determining work schedule, work criterion, and work method reflected a decentralised decision-making approach that acknowledged engineers' specialised expertise. Moreover, managers tended to evaluate creative performance in a qualitative manner rather than using previous evaluation metrics (Brem & Utikal, 2019), emphasising the subjective nature of assessing engineering work. These findings highlighted that autonomy alone did not prove to be the sole driver of creative performance; they also highlighted the need for further investigation of factors such as collaboration, resource accessibility, and organisational culture to achieve a more comprehensive understanding of creativity in engineering settings.

Moreover, engineers exhibited a tendency to resist autonomy in efforts to enhance creative performance, attributable to prevailing management policies within the EEI manufacturing firms, particularly concerning work schedule, work criterion, and work method. These policies were established primarily through top management directives, entailing strict monitoring measures and inflexible guidelines for employee (Fallman et al., 2019; He et al., 2022; Maqsoom et al., 2021) s. Furthermore, engineers often felt constrained due to predetermined job descriptions and rigid structures, originating from top management and managed managers. This situation provided compelling evidence of a lack of effective empowerment granted to engineers in decision-making processes regarding work schedule, work criterion, and work method. Consequently, engineers' creative performance might be hindered within a

highly structured work environment. Additionally, it could be due to a lack of trust in employees' abilities to exercise autonomy, apprehension towards potential risks or failures associated with autonomy, and a preference for maintaining hierarchical control over decision-making processes. Hence, it is of the utmost importance to further investigate the intricate dynamics surrounding the impact of work schedule, work criterion, and work method on creative performance. Such study endeavours hold promise in yielding valuable insights to inform the development of strategies aimed at fostering greater autonomy within these domains.

The insignificant mediating effect between participative decision-making and creative performance through autonomy of work method, work schedule, and work criterion, resulting in the rejection of Hypotheses 3a, 3b, and 3c within the EEI manufacturing firms, was attributed to several engineering-specific factors. These included the constraints of limited technical and financial resources (Usman & Vanhaverbeke, 2017). Limited necessary technical resources or support hinder autonomy, undermining the expected positive impact. Autonomy often requires access to appropriate technical resources, tools, or support systems. It could be that employees in the study lacked access to the necessary resources or faced technical constraints that limited autonomy, which could have hindered the expected positive relationship between participative decision-making, autonomy, and creative performance.

In engineering environments, hierarchical structures towards openness are common. An organisation with a strict hierarchical structure is not conducive to self-organising agile teams because the hierarchy enforces a

lack of openness (Šmite et al., 2020). In the case of EEI manufacturing firms with a strong hierarchical culture that discourages or hinders autonomy in work method, work schedule, or work criterion, the potential positive effects of participative decision-making on creative performance could be overshadowed.

Additionally, there may be skill or knowledge gaps among employees, particularly in balancing technical expertise to run an engineering firm (Wijesinghe et al., 2020) and innovative thinking to engage in a kind of creative performance (Taylor et al., 2020). Creative engineering performance hinges on combining technical expertise and innovative thinking. Without the necessary skills or knowledge to effectively utilise the autonomy granted through participative decision-making, the relationship between these variables and creative performance may weaken. To bolster this mediating effect, it is essential to implement training and development programmes that address skill gaps, enhance employee capabilities, and empower employees to use autonomy more effectively.

The complexity and interdependencies of engineering tasks limit the direct influence of individual autonomy on creative performance. Engineering projects can be highly complex, requiring co-ordination and collaboration among various team members. The interdependencies among tasks and the need for co-ordination may limit the extent to which individual autonomy in work method, work schedule, or work criterion can directly influence creative performance. In such cases, the relationship between participative decision-making, autonomy, and creative performance may be influenced with regard to other factors related to team dynamics and co-ordination.

6. THEORETICAL IMPLICATIONS

The results of this study suggested valuable theoretical insights into organisational behaviour, specifically focusing on the perspective of engineers, managers, and organisations. The study investigated the relationship between participative decision-making, autonomy, and creative performance in engineering-oriented environments. It expanded understanding by highlighting the positive impact of participative decision-making on engineers' active involvement in the work schedule, adherence to the work criterion, and utilisation of the work method.

Interestingly, these findings challenge established theories that propose a strong regression between autonomy (work schedule, work criterion, and work method) and creative performance. The study revealed that thoughtlessness levels were low, and the expected significant relationship was not supported. This unexpected outcome suggested the need for further investigation, particularly in the context of work schedule autonomy. According to Brem and Utikal (2019) laboratory study with 233 participants, the results indicated that schedule autonomy did not have a statistically significant impact on average routine performance. However, the influence of schedule autonomy on creative performance was found to be dependent on the individual's level of impulsiveness.

Furthermore, the study observed a lack of significant mediation by autonomy on the relationship between participative decision-making and creative performance. This highlighted the presence of engineering-specific barriers, including technical constraints, hierarchical cultures, and knowledge or skill deficiencies.

Consequently, developing comprehensive theories that consider these specific constraints and offer potential solutions has become necessary. The study discussion highlighted the importance of additional factors such as collaboration and resource accessibility in influencing creative performance.

7. PRACTICAL IMPLICATIONS

The EEI manufacturing firms endeavoured to optimise creative performance within engineering teams. The findings highlighted the potential benefits of endorsing participative decision-making. This approach seemed to have sparked engineers' active engagement and heightened autonomy. Hence, the EEI manufacturing firms were encouraged to establish initiatives fostering participative decision-making. The initiatives included respectful dialogue and transparent communication. The initiatives were voluntarily undertaken to follow the meeting rules strictly and called for a respectful dialogue among participants and a comprehensive exploration of all viewpoints before finalising a decision (Goethel et al., 2019). Furthermore, in an uncertain environment, human resource managers should be able to employ frequent and transparent communication, ensure quick decision-making, and have autonomy (Tasavori et al., 2021).

The results proposed that granting autonomy was not universally effective for boosting creative performance. Managers were advised to recognise task complexities and calibrate the degree of autonomy given to engineers. Considerations included individual competencies, task specifics, and

practical limitations. Training and development programmes had proven crucial. The EEI manufacturing firms had provided engineers with the necessary skills to effectively utilise autonomy and foster innovative thinking.

The study outcomes highlighted the importance of empowering engineers within decision-making processes. These processes are related to work schedule, work criterion, and work method. The EEI manufacturing firms are urged to support equilibrium by striking a balance between imposing directives and providing engineers with the freedom to exercise their discretion.

According to Fischer and Barabasch (2021), the appearance of creative performance causes the evolution of new work patterns, which tend to exhibit significant individualization and complexity. New work patterns lead to structural changes within the workplace in organisations such as decreased hierarchical structures, new management perspectives, and team-based organisational structures. The study recommends a strategic reassessment of deep-seated hierarchical structures, new management perspectives, and team-based organisational structures. This recommendation is underpinned by the understanding that exiting structures may have inhibited the realisation of autonomy.

8. LIMITATIONS

This study focused on engineers' participative decision-making, autonomy, and creative performance. However, it failed to consider other issues such as the capability approach that strongly highlights engineers' participative decision-making, autonomy, and creative performance. Since the start of

the 21st century, economic development has established the capability approach as a concern for humans, including the engineers in this study. In focusing on the engineer capability approach through self-determination in the workplace, workplace precarity and precariousness have been improving gradually. Nussbaum (1997) asserts that self-determination enables individuals to decide to work on specific tasks. The capability approach allows people daily questions to specify “What am I able to do and be?” (Nussbaum, 2011, page 29). Capabilities can be defined as a person’s freedom, autonomy, or opportunities to maximise functions (Nussbaum, 1997).

This study recognises the limitations of the methodology used to develop the instrument by Lam et al. (2002), George and Zhou (2001), and Breugh (1985). These limitations highlight the ongoing need to address the gaps in previous studies pertaining to participative decision-making, autonomy, and creative performance within the EEI manufacturing firm context. To fill these gaps and enhance scholarly understanding, further investigation was conducted. Considering the limited prior studies and building on them, this study endeavoured to contribute valuable understandings and advance the existing knowledge in this domain, thereby enriching the academic discourse surrounding participative decision-making, autonomy, and creative performance in the EEI manufacturing firms.

9. RECOMMENDATION AND FURTHER STUDY

To better understand engineers' working methods, schedules, criteria, and creative

performance, the capability approach and self-determination were recommended. Future researchers need to explicitly include the capability approach and self-determination in their theoretical research frameworks. The study briefly mentioned the potential contribution of the capability approach and self-determination to addressing workplace precariousness. To further investigate these issues, future studies can delve deeper into the subject matter regarding mitigating factors for precarious employment conditions.

The study identified limitations in the methodology used to develop the instrument, it was referencing relevant studies conducted by Lam et al. (2002), George and Zhou (2001), and Breugh (1985). The instrument should be revised by enhancing the scale with further items in future research to overcome limitations. In this way, engineers' participative decision-making, autonomy, and creative performance will be further measured.

Future studies be able to include qualitative methods such as interviews or focus group discussions to better understand engineers' perceptions and experiences regarding participative decision-making, work method, work schedule, and work criteria. An in-depth analysis of the factors that influence engineers' capabilities and performance in the engineering industry can be achieved using qualitative methods.

Taking these recommendations into account for future studies, the study highlighted the importance of integrating the capability approach and self-determination as a theoretical framework, the importance of developing methodology instruments, and the need to propose qualitative methods. In the future, researchers will gain a deeper understanding of engineers' participative

decision-making, work method, work criteria, work schedule, and creative performance. This will provide a valuable resource for practitioners, policymakers, and researchers alike.

10. CONCLUSION

The study examined participative decision-making, autonomy, and creative performance in the EEI manufacturing firms. The results indicated that engineers participating in decisions had positive relationships with work schedule, work criterion, and work method. However, the study found that engineers' work schedule, work criterion, and work method had limited influence on creative performance due to task complexity. To enhance creative performance, manufacturing firms can encourage participative decision-making by considering individual task complexity, competency, and practical limitations. Fostering innovative thinking, training, and development programs aligned with collaboration, resource availability, and supportive organizational cultures were significant factors in innovation. Future studies should address methodological limitations by integrating a capability-based approach as a theoretical framework and utilizing qualitative methods. This will provide valuable insights for practitioners, policymakers, and researchers exploring engineering into the complex dynamics between engineers' decision-making, autonomy, and creative performance.

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- De Spiegelaere, S., Van Gyes, G., & Van

ПАРТИЦИПАТИВНО ДОНОШЕЊЕ ОДЛУКА, АУТОНОМИЈА И КРЕАТИВНИ УЧИНАК: ДОКАЗ О УСКЛАЂЕНОСТИ ОДНОСА ИЗМЕЂУ ЗАПОСЛЕНИХ ИНЖЕЊЕРА И МЕНАѢРА

Jeniboy Kimpah, Hazril Izwar Ibrahim, Sebastiaan Rothmann, Amar Hisham Jaaffar

Извод

Ова студија је имала за циљ да утврди повезаност између перцепције инжењера о партиципативном доношењу одлука и аутономије и њиховог креативног учинка. Студија је користила технику упаривања, са инжењерима и менаџерима као испитаницима. Менаџери су били одговорни за процену креативног учинка инжењера. Због дизајна подударана студије, упитници који су мерили партиципативно доношење одлука, аутономију и креативни учинак су дистрибуирани фирмама за производњу електричне и електронске опреме. За анализу претпостављених односа коришћен је софтвер SmartPLS. Резултати су показали да партиципативно доношење одлука инжењера значајно предвиђа димензије аутономије (распоред рада, критеријум рада и начин рада). Аутономија инжењера у погледу распореда рада, критеријума рада и метода рада није имала позитивну везу са креативним учинком. Резултати су показали да распоред рада инжењера, критеријум рада и начин рада негативно утичу на односе између партиципативног одлучивања и креативног учинка. Налази су указивали на незнатан директан утицај и негативно посредовање радног распореда инжењера, критеријума рада и начина рада на креативни учинак, указујући на структурисану природу посла. Ова ситуација оставља инжењерима минималну могућност да одреде дизајн рада, распоред времена и више критеријума описа послова. Студија препоручује потенцијалне правце за проучавање побољшања креативних перформанси инжењера у будућим студијама.

Кључне речи: доношење одлука, начин рада, распоред рада, критеријум рада, креативни учинак, приступ парова, EEI

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