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Illuminating operational excellence in automotive manufacturing company (an empirical evidence from Indonesia)

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Abstract: This study examines the influence of organisational factors – employee compliance behaviour (ECB), positive attitude toward the job (PAT), empowerment leadership (ELD), teamwork self-efficacy (TSE), and performance-based evaluation (PBE) – on organisational commitment (OC) toward operational excellence (OX) in Indonesia's automotive manufacturing industry. OX was measured as a high order construct (HOC) comprising cultural enabler, continuous process improvement, and enterprise alignment. Using PLS-SEM with a disjoint two-stage approach, data from 517 respondents, selected via purposive sampling, revealed that four independent variables positively influence OC, with ECB showing the strongest effect ($\beta = 0.333$, $p < 0.001$). Notably, PBE negatively affects OC ($\beta = -0.081$, $p = 0.024$). OC positively impacts OX, with continuous process improvement being the most influenced dimension. These findings highlight the need for multidimensional measurement of OX to align efforts with operational targets, offering valuable insights for enhancing manufacturing performance.

Keywords: operational excellence; automotive manufacture; organisational commitment; employee compliance behaviour; teamwork self-efficacy; Indonesia.

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Biographical notes: Andrianto Iskandar earned his Engineering degree from Catholic Parahyangan University in 2001. With over 23 years of experience, he currently serves as the General Manager at one of the world's leading automotive brands, where he has demonstrated consistent leadership and expertise in the industry.

Ferdi Antonio completed his Medical Education at the Sriwijaya University Palembang. He has two Master's in General Management and Hospital Administration. He completed his Doctoral Education in Service Management in 2014. Currently, apart from being a consultant in management, he is also active as a Lecturer and Supervisor in the postgraduate program at Pelita Harapan University. His research is related to health and hospital management, as well as marketing. Currently, more than 30 papers of his research have been published in Scopus indexed international journals with a Scopus H-index of 6.

1 Introduction

Operational excellence (OX) has emerged as a critical objective for organisations globally, particularly within the competitive automotive industry. Achieving OX involves not only refining processes but also enhancing the behavioural and leadership dynamics within organisations (Carvalho et al., 2021). In emerging countries like Indonesia, where the automotive sector is a key driver of economic growth, the impact of employee behaviours – such as compliance, positive attitudes toward work, and leadership practices – on OX is underexplored. This study investigates how employee compliance behaviour (ECB), positive attitude toward job (PAT), empowerment leadership (ELD), teamwork self-efficacy (TSE), and performance-based evaluation (PBE), when mediated by organisational commitment (OC), influence OX in this context.

Given the rapid industrial growth in Indonesia, understanding these relationships is both relevant and urgent. Organisations in this sector must adapt to the evolving market demands, which necessitates a focus on leadership and employee engagement strategies that drive OX. Previous studies highlight the critical role of leadership and employee engagement in achieving OX (Singh and Singh, 2019; Gupta et al., 2021), yet few have examined these dynamics in the context of emerging markets like Indonesia. This research fills this gap, offering valuable insights that can guide strategic decisions in the automotive industry.

Previously many studies have extensively examined OX, most have done so through a unidimensional lens, focusing on isolated factors rather than a comprehensive, multidimensional approach (Pansare et al., 2024). This gap underscores the need for research that explores OX using a more holistic framework, as highlighted in the recent study by Saeed et al. (2022), which developed a multi-item OX scale through exploratory and confirmatory factor analysis. This study offers a more nuanced understanding of OX but leaves room for further exploration in diverse organisational contexts.

The choice to utilise the OX scale from Saeed et al. (2022) for this study is because it offers a comprehensive breakdown of OX into three dimensions, namely cultural enabler (OXCEB), continuous process improvement (OXCPI), and enterprise alignment (OXEAL). These dimensions hold particular relevance for the automotive manufacturing industry, as they embody essential principles for achieving sustainable excellence in a fiercely competitive sector.

Cultural enabler (OXCEB) fosters a culture where employees are empowered, motivated, and aligned with the organisation's excellence goals. This cultural foundation is crucial in the automotive industry, where innovation, teamwork, and adaptability are crucial drivers of long-term success.

Continuous process improvement (CPI) plays a pivotal role in the realm of automotive manufacturing. Its primary focus lies in the ongoing refinement of production processes to bolster efficiency, reduce waste, and uphold stringent quality standards, all of which are imperative for meeting the industry's precision and high-performance benchmarks. Enterprise alignment (OXEAL) is a critical process that ensures the congruence of goals and strategies across all departments and teams within an organisation. In the context of automotive manufacturing, this alignment plays a pivotal role in facilitating synchronised operations, enabling timely production, and ensuring the consistent delivery of high-quality vehicles.

This research contributes to the existing literature by choosing OC as a predictor of OX, a choice driven by OC's long-term, comprehensive, and sustainable impact compared to other variables like job satisfaction. While job satisfaction is often subject to fluctuations and short-term influences, OC provides a more stable foundation for predicting consistent OX outcomes, particularly in environments characterised by rapid change (Abu Orabi, 2024). By focusing on OC, this study aims to deliver insights into how commitment-driven behaviours can drive sustainable operational excellence, offering a more robust model for organisations aiming to maintain high performance over time.

While earlier research has extensively examined the external and internal elements that influence OC, there has been little emphasis on the function of TSE as a significant predictor of OC. According to Bandura's social cognitive theory, self-efficacy is not solely an individual attribute but can be extended to teams, reflecting a collective belief in the group's capabilities. This shared efficacy within teams is essential for fostering a strong organisational culture that drives consistent operational excellence (Bandura, 1986). The underexplored link between TSE and OC underscores the need for a multidimensional approach in assessing factors that contribute to OX.

2 Literature review and hypothesis development

The resource-based view (RBV) theory was chosen as the underpinning theory in this research. This theory is used because it is appropriate to the research context, where this theory posits that an organisation's competitive advantage is contingent upon its unique internal resources, particularly its human capital, which is challenging for competitors to replicate (Barney, 1991). Within the framework of OX, this theory underscores the essential role of human resources in addition to processes and technology. It emphasises that employee skills, capabilities, and commitment are pivotal in driving innovation and efficiency critical for achieving OX.

The RBV elucidates that the fusion of OC and employee capabilities can yield sustainable OX (Podsakoff et al., 2000). The RBV contends that a company's competitive advantage hinges on its resources being distinct, valuable, difficult to imitate, and irreplaceable by other firms. In the context of OX and OC, RBV explicates that organisationally committed human resources are strategic assets capable of fostering OX. Therefore, the RBV can serve as the fundamental basis for modelling in this research.

Highly committed employees actively engage in continuous improvement and innovation, imperative for OX. The RBV demonstrates that businesses capable of fostering an organisational culture conducive to employee commitment, innovation, and operational efficiency can attain and sustain operational excellence (Antonio and Theresia, 2023). Competent and committed human resources are the primary drivers of achieving OX as they play a pivotal role in streamlining processes, reducing costs, and enhancing quality. Rhoades and Eisenberger (2002) found that perceived organisational support fosters greater employee commitment, leading to better overall performance. The studies suggest that engaged and committed employees play a critical role in organisational efficiency, innovation, and the continuous improvement required for OX. The aforementioned principle should be extended to encompass the manufacturing industry as well.

Undeniably, the organisational culture theory plays a crucial role in elucidating both OX and OC within the realm of human resources. Coined by Schein (2010), organisational culture encompasses the collective values, beliefs, and operational norms that influence employee conduct within an organisation. A robust culture engenders harmonisation of employee objectives with organisational goals, thereby enhancing commitment and engagement, thereby yielding consequential effects on operational outcomes.

In the context of OX especially in automotive manufacture, organisational culture nurtures a milieu of sustained improvement and efficacy. By highlighting quality, accountability, and collaboration, in organisation culture creates an atmosphere that motivates employees to execute tasks with precision and innovation – critical components of OX. For example, Cameron and Quinn (2011) advocate that a clan culture (emphasising teamwork and involvement) or an adhocracy culture (encouraging innovation) are more likely to drive operational success through empowered employees dedicated to the organisation's pursuit of excellence.

As for OC, organisational culture influences how employees assimilate the organisation's values, resulting in behaviours that transcend their formal job descriptions. When employees perceive a strong accord between their personal values and those of the organisation, they are more inclined to demonstrate OC, such as altruistic behaviour, sportsmanship, and civic virtue (Organ, 1988). This congruence augments long-term engagement, curtails turnover, and propels a workforce consistently committed to achieving organisational objectives, including OX.

Transformational leadership, developed by Bass and Riggio (2006), focuses on inspiring, motivating, and intellectually stimulating employees. It encourages employees to surpass their formal duties and adopt the organisation's vision, creating deep commitment and fostering OC. Research shows that transformational leaders foster trust and enthusiasm among employees, leading to higher performance standards and sustained OC. In the context of OX, transformational leadership ensures that employees continuously strive for quality improvements and innovation in processes.

In the manufacturing industry, transformational leadership has been found to significantly impact employee performance and organisational outcomes, including OX. A study conducted by Theresia and Antonio (2021) emphasises how transformational leadership in manufacturing environments enhances employee motivation and innovation, leading to continuous improvement in operational processes. This leadership style cultivates a culture of trust and collaboration, enabling employees to align their personal goals with organisational objectives, ultimately enhancing productivity and efficiency. The research indicates that organisations with transformational leaders experience higher organisational commitment (OC) levels, which is crucial for sustaining operational excellence, especially in industries such as automotive manufacturing that require ongoing process improvements due to rapid technological changes.

Bandura's (1986) social cognitive theory emphasises the role of self-efficacy in motivating behaviour and extends to TSE, where groups collectively believe in their capability to achieve shared goals. TSE is crucial in industries like manufacturing, where OX depends on collaborative efforts. Studies emphasise that TSE is a significant predictor of team performance, especially when supported by empowering leadership and a cohesive organisational culture.

In 1990, Allen and Meyer introduced a three-component model for organisational commitment theory, highlighting affective commitment, continuance, and normative commitment. Affective commitment involves employees' emotional connection with their organisation, motivating them to stay because they want to. Continuance commitment, however, is based on the perceived costs of leaving the organisation, resulting in employees staying out of necessity. Normative commitment reflects an obligation to remain with the organisation, leading employees to stay because they feel they should. This model is essential for understanding employee retention, motivation, and organisational behaviour.

2.1 The effect of employee compliance behaviour to organisational commitment

Employee compliance behaviour (ECB) plays a critical role in ensuring that individuals adhere to an organisation's norms, policies, and standards. It serves as the cornerstone for fostering OC. Research suggests that when employees consistently adhere to rules and guidelines, they are more likely to demonstrate higher levels of commitment due to their strong alignment with the organisation's goals (Rhoades and Eisenberger, 2002). This alignment strengthens their identification with the organisation, leading to a greater willingness to contribute to its success (Meyer and Allen, 1997). Furthermore, compliance helps reduce ambiguity in roles and expectations, thereby promoting higher engagement and job satisfaction (Robinson, 2021). In environments that promote ECB, employees tend to exhibit behaviours that extend beyond their job descriptions, such as assisting colleagues and supporting organisational objectives, which are key characteristics of OC. Based on these findings, the following hypothesis is proposed:

H1 ECB has a significant positive effect on OC.

2.2 The effect of positive attitude toward job to organisational commitment

Positive attitude toward job (PAT) is strongly correlated with increased levels of OC. It reflects an employee's satisfaction, engagement, and proactive mindset at work. Studies indicate that employees with a positive attitude toward their roles are more emotionally connected to their organisations, leading to greater commitment to organisational goals and values (Judge and Kammeyer-Mueller, 2012). This emotional connection fosters trust, loyalty, and a willingness to go beyond basic job requirements, all reflective of the core aspects of OC (Organ, 1997). Research suggests that employees with a positive job attitude are more likely to engage in supportive behaviours such as collaboration, assisting colleagues, and promoting a harmonious work environment, all of which contribute to enhanced OC (Podsakoff et al., 2000). Moreover, content employees often demonstrate a stronger identification with the organisation, resulting in long-term commitment and reduced turnover (Mowday et al., 1979). Based on these findings, the following hypothesis is proposed to enhance employee motivation and the overall success of the organisation:

H2 PAT has a significant positive effect on OC.

2.3 The effect of empowerment leadership to organisational commitment

Empowerment leadership (ELD) plays a critical role in fostering OC by promoting autonomy, confidence, and a sense of ownership among employees. Empowerment leadership, which encourages employees to take initiative and develop self-efficacy, has been found to positively impact OC by increasing employees' emotional attachment to their organisation (Ahearne et al., 2005). Leaders who empower their team members not only enhance individual job satisfaction but also cultivate a culture of trust and loyalty, which strengthens organisational commitment (Maynard et al., 2012). This leadership style aligns employees' personal goals with organisational objectives, fostering long-term dedication and alignment with the company's values. Moreover, empowered employees are more likely to exhibit behaviours that exceed formal job descriptions, contributing to the overall success of the organisation (Seibert et al., 2011). This increased commitment ultimately results in improved organisational effectiveness, as employees are motivated to act in ways that promote the organisation's best interests. Based on empirical evidence establishing a direct link between leadership style and the organisation's ability to achieve operational excellence, this paper proposes the following hypothesis:

H3 ELD has a significant positive effect on OC.

2.4 The effect of teamwork self-efficacy to organisational commitment

Teamwork self-efficacy (TSE) plays a crucial role in shaping OC by enhancing collective confidence and cooperation within teams. Teamwork self-efficacy (TSE) refers to a team's shared belief in its ability to accomplish tasks together (Bandura, 1986), fostering a strong sense of collaboration and unity. Research shows that higher levels of TSE lead to improved team cohesion, increased job satisfaction, and greater organisation commitment (Tasa et al., 2007). Employees who believe in their team's abilities are more likely to remain committed to their organisation because they feel that they are contributing meaningfully and effectively to the company's success. Moreover, TSE reinforces a supportive work environment where individuals trust their teammates and develop a deeper emotional attachment to their collective goals. This shared efficacy not only enhances job performance but also strengthens employees' commitment to organisational values (Chen et al., 2005). Based on these empirical findings suggesting that strong team dynamics can lead to higher levels of operational excellence, this paper proposes the hypothesis:

H4 TSE has a significant positive effect on OC.

2.5 The effect of performance-based evaluation to organisational commitment

Proactively integrating PBE is pivotal in bolstering OC by harmonising employees' endeavours with precise performance metrics and incentives. Performance-based evaluation (PBE) systems are designed to evaluate employees based on their job performance, fostering fairness and transparency in the workplace. Studies show that when employees perceive the evaluation process as fair and linked to tangible outcomes, they are more likely to be committed to the organisation (DeNisi and Murphy, 2017). Performance-based evaluation (PBE) provides employees with feedback on their

performance, helping them understand how their contributions align with organisational goals. This sense of alignment fosters higher levels of OC as employees feel valued and recognised for their efforts. Additionally, PBE enhances job satisfaction and organisational loyalty by promoting merit-based rewards, which can further strengthen employees' emotional attachment to the organisation (Brown et al., 2010). By creating an environment where employees see a direct link between their performance and career progression, PBE positively influences OC. Based on this literature, this paper proposes the hypothesis:

H5 PBE has a significant positive effect on OC, as employees.

2.6 The effect of organisational commitment to operational excellence

Organisational commitment (OC) is a crucial factor in achieving OX as it reflects employees' emotional and psychological attachment to their organisation. Employees with a high level of OC are more likely to align their behaviour with organisational goals, which in turn enhances overall performance. Research indicates that OC fosters a culture of accountability, productivity, and continuous improvement, all of which are vital components of OX (Meyer and Allen, 1991). Committed employees are instrumental in efficiently utilising resources and are more motivated to participate in initiatives that drive operational success (Podsakoff et al., 2000). Additionally, OC cultivates a cooperative environment where employees willingly exceed their formal roles, contributing to both incremental and breakthrough improvements crucial for OX (Organ, 1997). Various studies have confirmed the mediating role of OC and its positive impact on both individual and organisational performance metrics. Based on these insights, this paper proposes the hypothesis:

H6 OC has a significant positive effect on OX.

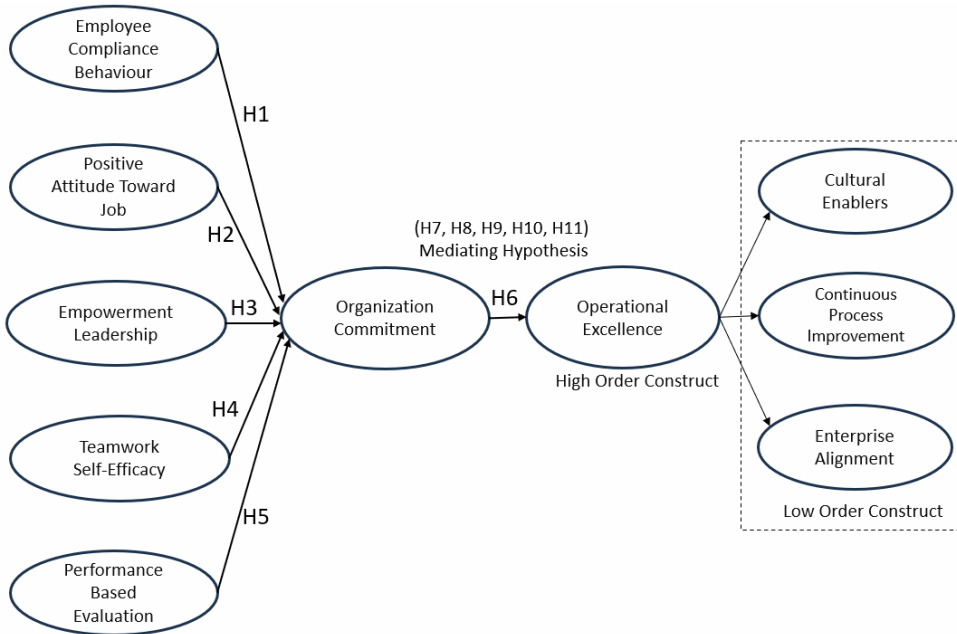
2.7 The role of OC mediates the influence of ECB, PAT, ELD, TSE, and PBE on OX

Organisational commitment (OC) acts as a crucial mediator in translating various employee behaviours and leadership practices into OX. Employee compliance behaviour (ECB) has consistently been correlated with organisational performance through its influence on OC. When employees adhere to organisational rules and expectations, they demonstrate higher commitment levels (Meyer and Herscovitch, 2001). Research indicates that compliance not only promotes adherence to organisational objectives but also nurtures a deeper emotional connection between employees and their work, thus augmenting OC. This commitment propels employees to surpass their job descriptions, thereby contributing to operational enhancements such as process efficiency, productivity, and overall organisational success (Sharma and Gupta, 2022).

Alongside ECB, PAT significantly shapes OC by enhancing employee engagement and motivation, both integral to fostering organisational commitment (Mowday et al., 2013). Empowerment leadership (ELD) further fortifies OC by endowing employees with autonomy and decision-making capabilities, cultivating a sense of ownership and accountability (Seibert et al., 2011). Additionally, TSE and PBE play pivotal roles. Teamwork self-efficacy (TSE) boosts the collective confidence of team members, essential for building trust and collaboration, culminating in a stronger commitment to

organisational objectives (Bandura, 1997). Performance-based evaluation (PBE) ensures alignment between individual performance and organisational goals, motivating employees to excel in their roles and contribute to OX through heightened commitment (Brown and Peterson, 1994).

Figure 1 Conceptual framework



These empirical findings give rise to the following proposed hypotheses:

- H7 OC significantly mediates the effect of ECB on OX.
- H8 OC significantly mediates the effect of PAT on OX.
- H9 OC significantly mediates the effect of ELD on OX.
- H10 OC significantly mediates the effect of TSE on OX.
- H11 OC significantly mediates the effect of PBE on OX.

Based on the eleven directional hypotheses, the conceptual framework depicted in Figure 1 illustrates the relationships between five independent variables – ECB, PAT, ELD, TSE, and PBE – and their effect on OC. These independent variables are hypothesised to significantly impact OC, where ECB fosters adherence to organisational policies, PAT enhances personal job satisfaction, ELD cultivates leadership empowerment, TSE strengthens team efficacy, and PBE drives performance improvement.

Organisational commitment (OC) serves as the mediator in this model, playing a pivotal role in channelling the effects of these variables toward OX. The influence of OC is expected to facilitate a more committed workforce, ultimately improving organisational performance.

Operational excellence (OX) is further broken down into three low-order constructs: cultural enablers (OXCEB), representing the organisational culture that supports continuous improvement; continuous process improvement (OXCPI), focusing on ongoing enhancements in processes; and enterprise alignment (OXEAL), which ensures that the organisation's strategies and goals are aligned across different levels. This framework provides a structured approach to understanding how employee behaviour, leadership, and evaluation practices contribute to OX when mediated by OC (Saeed et al., 2022).

3 Methodology

The research is framed within a quantitative survey design and involves the utilisation of a structured questionnaire as the primary instrument for data collection. The study is specifically situated within the automotive manufacturing industry in Indonesia, focusing on Toyota Indonesia. This selection is predicated on Toyota's standing as the largest car producer in both the Indonesian and global contexts. The research centres on the individual direct labour operators as the focal point of analysis, given their pivotal role in driving production performance.

The population includes team members from the vehicle plant division, specifically those involved in welding, painting, and assembly. The sampling technique employed is purposive sampling. As per the power analysis conducted by Hair et al. (2018, 2019), a minimum of 400 respondents is necessary, with an f -square of 0.15 and a 95% power requirement. Additionally, respondents are required to have at least one year of work experience.

The study gathered data using validated research questionnaire scales. The items were measured on a five-point Likert scale, with 1 indicating 'strongly disagree' and 5 indicating 'strongly agree'. The measurement items were adapted from the work of Saeed et al. (2022), who developed a multi-item operational excellence scale. To ensure cultural and linguistic accuracy, expert linguists translated the questionnaire into Indonesian. Face validity was checked by an expert panel of four academics and three practitioners. Content validity was confirmed by calculating the Aiken's value, which was greater than 0.4, and the content validity index, which exceeded 0.8 as recommended.

Data was collected online from June 2024 to July 2024. Respondents were grouped based on their shop processes and work shifts to ensure a representative sample. The questionnaire was self-administered by the respondents under the coordination of their supervisors to maintain data reliability. This allowed the participation of all direct labour operators with over one year of experience and ensured efficient data collection across different shifts.

Due to the explanatory and predictive orientation of the proposed research model, as well as its complexity, partial least squares-structural equation modelling (PLS-SEM) was chosen as the data analysis approach (Hair et al., 2018). It is suitable for estimating higher-order constructs (HOC) and lower-order constructs (LOC) using a disjoint two-stage approach, particularly when mediation variables, such as OC, are involved. The use of the disjoint method is essential for handling complex models with mediating variables, ensuring accurate interpretation and reliable results in line with contemporary research practices (Hair et al., 2019).

4 Results

4.1 Demographic results

The demographic data for the study's participants is presented in Table 1, and it encompasses 517 individuals. This demographic profile indicates a predominantly male, relatively young, and experienced workforce, with the majority of participants holding permanent positions and evenly distributed across various workshops and shifts. This data will play a pivotal role in comprehending workforce dynamics and contextualising the study's findings.

Table 1 Demographic data of participants (total 517 participants)

<i>Criteria characteristic</i>		<i>n</i>	<i>%</i>
Gender	Female	6	1
	Male	511	99
Age	18–21 year	133	26
	22–31 year	209	40
	32–41 year	167	32
	>41 year	8	2
Employment status	Contract	184	36
	Permanency	333	64
Working service year	1–2 year	114	22
	2–3 year	78	15
	>3 year	325	63
Working shop	Welding plant#1	67	13
	Painting plant#1	106	21
	Assembly plant#1	101	20
	Welding plant#2	127	25
	Painting plant#2	40	8
	Assembly plant#2	76	15
Working shift	Morning	239	46
	Afternoon	278	54

4.2 Reliability and validity test

Ensuring the reliability and validity of research instruments is essential for accurately measuring the concept being studied. In this research, reliability is assessed using Cronbach's alpha and composite reliability (ρ_c), while validity is evaluated by examining the outer loadings of each indicator on the measured variable.

Cronbach's alpha is used to measure the internal consistency of the instrument, with a value above 0.7 indicating good reliability. For example, the ECB variable demonstrates a Cronbach's alpha value of 0.890, signifying strong reliability, aligning with the literature. It states that a Cronbach's alpha value above 0.7 is a good indicator of instrument reliability (Hair et al., 2019).

In order to assess the reliability of the construct, composite reliability (ρ_c) was utilised, with values exceeding 0.7 considered acceptable and those surpassing 0.8

deemed excellent (Henseler et al., 2015). Within this study, all variables demonstrated a composite reliability value above 0.8, indicating consistent and reliable measurement. For example, the ELD variable exhibited a composite reliability value of 0.936, signalling a high level of consistency in measurement.

Table 2 1st stage construct reliability and validity

<i>Variable</i>	<i>Codes</i>	<i>Indicator</i>	<i>OL</i>	<i>CA</i>	<i>CR</i>		<i>AVE</i>
					<i>rho_a</i>	<i>rho_c</i>	
ECB	ECB1	The company encourages me to participate in shared decision making.	0.730	0.890	0.897	0.919	0.695
	ECB2	I received a good explanation regarding the company's work policies and procedures.	0.860				
	ECB3	I am willing to accept input or feedback if it appears that I am not complying with work procedures.	0.857				
	ECB4	The company communicates why I must comply with these work procedures.	0.880				
	ECB5	I am voluntarily willing to comply with work procedures for the common good.	0.834				
PAT	PAT1	I am proud of the quality of the work I provide.	0.748	0.807	0.835	0.865	0.565
	PAT2	I feel that the physical condition of the work equipment and facilities where I work is good.	0.645				
	PAT3	I feel appreciated for the work I have done.	0.816				
	PAT4	I like working at this company because my income is proportional to my performance as an employee.	0.854				
	PAT5	I am willing to do work outside of my responsibilities to help the company become better.	0.674				

Notes: Notes for abbreviations: employee compliance behaviour (ECB); positive attitude toward job (PAT); empowerment leadership (ELD); teamwork self-efficacy (TSA); performance-based evaluation (PBE); organisational commitment (OC); operational excellence-cultural enablers (OXCEB); operational excellence-continuous process improvement (OXCPI); operational excellence-enterprise alignment (OXEAL).

Table 2 1st stage construct reliability and validity (continued)

<i>Variable</i>	<i>Codes</i>	<i>Indicator</i>	<i>OL</i>	<i>CA</i>	<i>CR</i>		<i>AVE</i>
					<i>rho_a</i>	<i>rho_c</i>	
ELD	ELD1	My linehead supports me to achieve my goals at work.	0.878	0.915	0.917	0.936	0.746
	ELD2	My linehead listens to my difficulties at work.	0.832				
	ELD3	My lineheads recognise my strengths as well as weaknesses.	0.848				
	ELD4	My linehead provides an example of how I can improve my performance.	0.894				
	ELD5	My linehead gives praise or reprimand at the right time and situation.	0.865				
TSE	TSE1	I feel like I fit in and am part of the teamwork at this company.	0.901	0.894	0.901	0.927	0.760
	TSE2	I feel confident in having the ability to contribute to a team to achieve common goals.	0.890				
	TSE3	I am able to support other members in my work team.	0.891				
	TSE4	I didn't find it difficult to follow the advice of other members	0.800				
PBE	PBE1	I realised that I was judged according to my achievements.	0.895	0.886	0.903	0.917	0.690
	PBE2	I feel I am assessed based on my performance in completing work within the specified time.	0.904				
	PBE3	So far I have been praised for never making a mistake in my work.	0.727				
	PBE4	My leader does not assess the achievements of his subordinates based on personal closeness (e.g., similarity of ethnicity, regional origin, surname, etc.) but according to their achievements.	0.775				

Notes: Notes for abbreviations: employee compliance behaviour (ECB); positive attitude toward job (PAT); empowerment leadership (ELD); teamwork self-efficacy (TSA); performance-based evaluation (PBE); organisational commitment (OC); operational excellence-cultural enablers (OXCEB); operational excellence-continuous process improvement (OXCPI); operational excellence-enterprise alignment (OXEAL).

Table 2 1st stage construct reliability and validity (continued)

<i>Variable</i>	<i>Codes</i>	<i>Indicator</i>	<i>OL</i>	<i>CA</i>	<i>CR</i>		<i>AVE</i>
					$\frac{\rho_a}{\rho_c}$	$\frac{\rho_a}{\rho_c}$	
PBE	PBE5	I feel that promotions and salary increases are assessed based on my measurable performance (example: number of kaizen ideas, number of production defects, etc.).	0.837	0.886	0.903	0.917	0.690
OC	OC1	I have an emotional attachment to this company (for example: I will be happy if the company gets an award).	0.829	0.936	0.938	0.950	0.758
	OC2	So far I am proud to be part of this company.	0.886				
	OC3	I wish to continue working at this company.	0.838				
	OC4	I feel that I have progressed in my individual skills after being part of this company	0.871				
	OC5	I am driven to give my best to the company.	0.908				
	OC6	I feel responsible for maintaining the good name of the company.	0.891				
OXCEB	OXCEB1	The company has valued each of its employees fairly (both management and non-management).	0.795	0.922	0.927	0.942	0.765
	OXCEB2	The company has established good cooperation with the surrounding community or people outside companies such as governments, universities, community organisations, vendors, suppliers, contractors, etc.	0.886				
	OXCEB3	The company has paid attention to the safety and health of its employees.	0.881				

Notes: Notes for abbreviations: employee compliance behaviour (ECB); positive attitude toward job (PAT); empowerment leadership (ELD); teamwork self-efficacy (TSA); performance-based evaluation (PBE); organisational commitment (OC); operational excellence-cultural enablers (OXCEB); operational excellence-continuous process improvement (OXCPI); operational excellence-enterprise alignment (OXEAL).

Table 2 1st stage construct reliability and validity (continued)

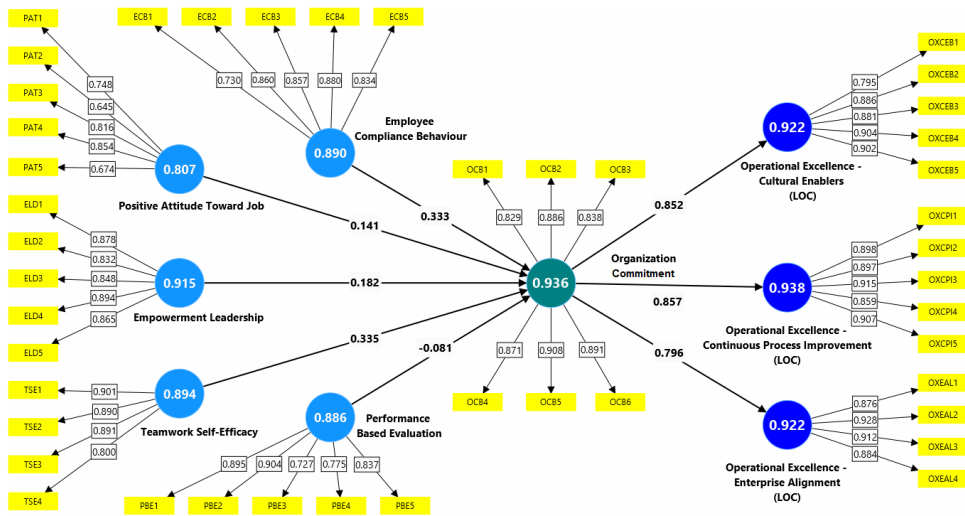
<i>Variable</i>	<i>Codes</i>	<i>Indicator</i>	<i>OL</i>	<i>CA</i>	<i>CR</i>		<i>AVE</i>
					<i>rho_a</i>	<i>rho_c</i>	
OXCEB	OXCEB4	The company considers training as capital and investment to improve human resources in the future.	0.904	0.922	0.927	0.942	0.765
	OXCEB5	The company has been actively involved in protecting the environment through various activities such as SMK3, ISO14001, carbon neutral, CO ₂ , reduction, etc.	0.902				
OXCPI	OXCPI1	The company has produced quality products that meet customer demands.	0.898	0.938	0.940	0.953	0.801
	OXCPI2	The company has produced quality products that can compete with other brands.	0.897				
	OXCPI3	The company has succeeded in encouraging me not to make defects in any production process.	0.915				
	OXCPI4	The company has given me the courage to stop the line when it finds abnormalities in the work process.	0.859				
	OXCPI5	The company has taken corrective action to prevent the recurrence of defects in the process.	0.907				
OXEAL	OXEAL1	The company has routinely given awards to employees who excel at every level.	0.876	0.922	0.923	0.945	
	OXEAL2	The company has synergised all divisions and departments in determining work policies.	0.928				
	OXEAL3	The company has encouraged me to adapt my personal values to achieve shared goals.	0.912				
	OXEAL4	The company has collaborated with external partners or vendors to achieve common goals.	0.884				

Notes: Notes for abbreviations: employee compliance behaviour (ECB); positive attitude toward job (PAT); empowerment leadership (ELD); teamwork self-efficacy (TSA); performance-based evaluation (PBE); organisational commitment (OC); operational excellence-cultural enablers (OXCEB); operational excellence-continuous process improvement (OXCPI); operational excellence-enterprise alignment (OXEAL).

Table 3 Discriminant validity HT/MT ratio

Construct	ECB	PAT	ELD	TSE	PBE	OC	OXCEB	OXCPi	OXEAL
ECB									
PAT	0.917 (CI: 0.877–0.951)								
ELD	0.841 (CI: 0.795–0.880)	0.930 (CI: 0.893–0.964)							
TSE	0.931 (CI: 0.898–0.958)	0.949 (CI: 0.909–0.982)	0.893 (CI: 0.829–0.942)						
PBE	0.776 (CI: 0.720–0.824)	0.917 (CI: 0.877–0.955)	0.906 (CI: 0.867–0.940)	0.827 (CI: 0.772–0.876)					
OC	0.878 (CI: 0.831–0.912)	0.854 (CI: 0.803–0.897)	0.811 (CI: 0.761–0.851)	0.887 (CI: 0.848–0.918)	0.713 (CI: 0.650–0.769)				
OXCEB	0.886 (CI: 0.842–0.921)	0.871 (CI: 0.823–0.914)	0.860 (CI: 0.819–0.895)	0.873 (CI: 0.817–0.916)	0.791 (CI: 0.739–0.837)	0.914 (CI: 0.881–0.939)			
OXCPi	0.861 (CI: 0.814–0.898)	0.828 (CI: 0.775–0.874)	0.788 (CI: 0.735–0.833)	0.859 (CI: 0.812–0.897)	0.689 (CI: 0.620–0.750)	0.912 (CI: 0.881–0.939)	0.922 (CI: 0.890–0.948)		
OXEAL	0.855 (CI: 0.813–0.890)	0.876 (CI: 0.834–0.915)	0.861 (CI: 0.821–0.897)	0.863 (CI: 0.802–0.912)	0.809 (CI: 0.753–0.858)	0.855 (CI: 0.814–0.889)	0.932 (CI: 0.902–0.956)	0.891 (CI: 0.856–0.920)	

Figure 2 1st stage outer model (see online version for colours)



Furthermore, this study assessed the outer loadings of each indicator to evaluate convergent validity. According to Ringle et al. (2023), values above 0.7 indicate a substantial contribution to the construct being measured. The table presented demonstrates that the majority of indicators had outer loadings above 0.7, suggesting commendable convergent validity. Notably, the ELD1 indicator for the empowerment leadership (ELD) variable exhibited an outer loading of 0.878, indicating a robust relationship with the variable.

In summary, these results pertaining to reliability and validity furnish a robust foundation for further analysis of the relationship between the variables examined in the context of OX within the automotive manufacturing industry. The instruments utilised can be deemed as reliable and valid, thereby empowering researchers to obtain dependable and statistically significant findings (Kline, 2020). The results of the reliability and validity tests on the conceptual research framework are delineated in Table 2 and Figure 2. All 44 indicators used in the analysis met the requirements for indicator reliability, construct reliability, and convergent validity.

This research used the heterotrait-monotrait (HTMT) ratio test to assess discriminant validity. This method is commonly employed in human resource management research to determine if distinct constructs are also empirically different. According to Henseler et al. (2015), an HTMT value of less than 0.85 or 0.90 indicates sufficient discriminant validity. If the HTMT value exceeds 0.90, discriminant validity can still be acceptable if the confidence interval (CI) for each pair of constructs does not include the value 1. Our study revealed that most HTMT values are below the threshold of 0.90, signifying good discriminant validity. Moreover, for values surpassing the threshold, each pair of constructs has a confidence interval (CI) that does not include the value 1, further supporting the conclusion that discriminant validity has been achieved, as depicted in Table 3.

4.3 CVPAT

To measure predictive validity, the cross-validated predictive ability test (CVPAT) was employed as recommended by Hair et al. (2018). The results demonstrate the model’s predictive ability, particularly in the case of OX. The model outperformed the IA model across constructs, affirming its predictive capability. The PLS-SEM model exhibited superior performance compared to the linear model (LM), especially in the OX construct, providing further evidence of its robustness. These findings validate the model’s effectiveness in predicting dependent variables across the constructs.

Table 4 Predictive ability test

Construct	PLS-SEM vs. indicator average (IA)				PLS-SEM vs. linear model (LM)			
	PLS loss	IA loss	Average loss difference	p value	PLS loss	LM loss	Average loss difference	p value
Operational excellence	0.319	1.004	−0.685	0.000	0.319	0.290	0.029	0.027
Organisation commitment behaviour	0.208	0.459	−0.251	0.000	0.208	0.210	−0.001	0.727
Overall model	0.245	0.641	−0.396	0.000	0.245	0.236	0.009	0.134

Figure 3 Inner model 2nd stage (see online version for colours)

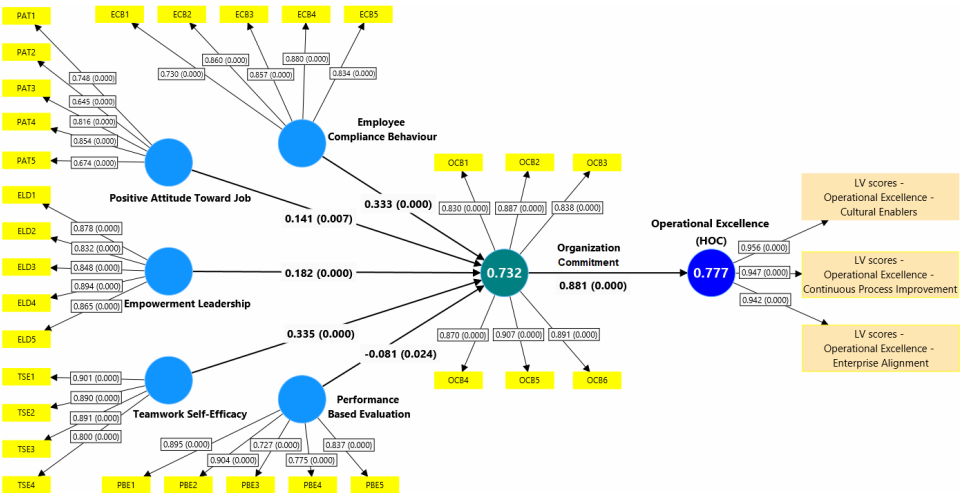


Figure 3 depicts the outcomes of the second-stage bootstrapping in the PLS-SEM inner model. The bootstrap results present path coefficients, p-values, and R-squared values for each relationship. The number shown on the line, such as 0.333 from ECB to OC, represents the coefficient of the relationship. Meanwhile, the number in the bracket indicates the p-value, which reflects the statistical significance of the relationship. In this figure, all paths have p-values ≤ 0.05 , signifying that the structural relationship between variables is statistically significant at $\alpha = 0.05$.

The model showcases strong predictive power, with an R-squared value of 0.732 for OC and 0.777 for OX. These findings substantiate the importance of OC as a mediator in enhancing operational performance.

Table 5 Hypothesis result

<i>Hypothesis</i>		<i>Std. coefficient</i>	<i>P values</i>	<i>Confidence interval</i>		<i>Result</i>
				<i>5.0%</i>	<i>95.0%</i>	
H1	ECB -> OCB	0.333	0.000	0.243	0.418	Supported
H2	PAT -> OCB	0.141	0.007	0.050	0.238	Supported
H3	ELD -> OCB	0.182	0.000	0.099	0.260	Supported
H4	TSE -> OCB	0.335	0.000	0.238	0.426	Supported
H5	PBE -> OCB	-0.081	0.024	-0.145	-0.011	Not supported
H6	OCB -> OX (HOC)	0.881	0.000	0.849	0.907	Supported
H7	ECB -> OCB -> OX	0.293	0.000	0.212	0.372	Supported
H8	PAT -> OCB -> OX	0.124	0.007	0.044	0.209	Supported
H9	ELD -> OCB -> OX	0.160	0.000	0.087	0.228	Supported
H10	TSE -> OCB -> OX	0.295	0.000	0.209	0.377	Supported
H11	PBE -> OCB -> OX	-0.071	0.024	-0.128	-0.010	Not supported

The findings from the hypothesis presented in Table 5 provide valuable insights into the impact of various employee behaviours and leadership styles on OX, with OC serving as a mediator.

Hypothesis 1 (H1) reveals a positive and significant relationship between ECB and OC ($\beta = 0.333$, p -value = 0.000), suggesting that adherence to organisational norms fosters a stronger commitment, which is crucial for enhancing performance. Similarly, PAT in H2 positively influences OC ($\beta = 0.141$, p -value = 0.007), indicating that a positive job outlook contributes to higher organisational commitment.

Empowerment leadership (ELD) in H3 positively impacts OC ($\beta = 0.182$, p -value = 0.000), emphasising the role of leadership in empowering employees to enhance commitment. TSE, as seen in H4, has the highest positive impact on OC ($\beta = 0.335$, p -value = 0.000), suggesting that team confidence plays a critical role in driving commitment.

Surprisingly, PBE negatively affects OC in Hypothesis 5 (H5) ($\beta = -0.081$, p -value = 0.024), indicating that such evaluations may decrease commitment, potentially due to perceived inequity or stress.

In H6, OC strongly influences OX ($\beta = 0.881$, p -value = 0.000), confirming that a committed workforce is essential for achieving high performance. The mediation analysis in H7–H10 supports that ECB, PAT, ELD, and TSE positively impact OX through OC, underscoring the importance of nurturing these behaviours and leadership styles.

However, H11 shows that PBE negatively affects OX through OC ($\beta = -0.071$, p -value = 0.024), emphasising the need to re-evaluate performance-based evaluation mechanisms to prevent adverse effects on commitment and performance outcomes.

In conclusion, fostering positive employee behaviours and leadership styles significantly enhances OC, which in turn drives OX. It is important to manage PBE carefully to avoid negative effects on commitment and performance outcomes.

5 Discussion and implications

The aim of this research is to investigate the impact of organisational factors on operational excellence, with a focus on the mediating role of OC. Specifically, OX is analysed as HOC with three reflective dimensions: cultural enable (OXCEB), continuous improvement (OXCPI), and entrepreneur (OXEAL). This research model was empirically tested on direct labour operators in Japanese automotive company located in Indonesia.

The main findings of this study reveal the presence of 11 hypotheses in the model. Among these, nine hypotheses were supported, while two hypotheses lacked sufficient evidence to be conclusively supported.

The findings of the research reveal that OC has a substantial direct impact on OX with a beta coefficient of 0.881 and a p-value of 0.000. Among the five independent variables examined, 4 were found to exert a significant positive influence. The most influential factors were TSE ($\beta = 0.335$; p-value = 0.000) and ECB ($\beta = 0.333$; p-value = 0.000), which exhibited similar strengths. Additionally, ELD ($\beta = 0.182$; p-value = 0.000) and PAT ($\beta = 0.141$; p-value = 0.007) were also identified as having significant positive impacts.

These results affirm that the organisational culture theory proposed by Schein (2010) can be applied to comprehend operator behaviour within the RBV perspective by Barney (1991), focusing on company performance through employee performance in the automotive manufacturing industry. The findings suggest that manufacturing operators should be viewed as dynamic human resources and can be guided to enhance performance and achieve company goals. Furthermore, the findings imply that operators can be evaluated based on their commitment to the company in accordance with the OC concept of Allen and Meyer (1990). An increase in OC is associated with greater support from operators and a stronger drive to achieve OX. Therefore, effective communication from management is crucial to gauge the majority of operators' commitment levels. These research findings are in line with previous empirical studies by Podsakoff et al. (2022) and Organ (1997), which also demonstrate the direct influence of OC on company performance.

The research presents a new finding: OC can predict superior performance in the OX format from the operator's perspective. It emphasises the importance of measuring OX multi-dimensionally, as exemplified by OXCEB, OXCPI, and OXEAL as LOC. The study confirms that the most significant dimension is OXCPI, as illustrated in Figure 2, although all three dimensions are deemed reliable and valid. This finding aligns with the culture and practice of kaizen in automotive manufacturing, such as Toyota's continuous improvement under the Toyota Way value. This practice fosters incremental, continuous improvements across all organisational levels to enhance operational efficiency and achieve long-term excellence (Liker, 2004).

As a result, this approach should be embraced by other manufacturing industries to achieve OX, which can positively impact business growth by enhancing performance, reducing defects and errors, and delivering quality products that meet customer expectations. These enhancements are reflected in indicators related to OXCPI.

Another noteworthy dimension of OX is OXCEB (Figure 2), encompassing indicators that mirror the culture of workplace safety and the preservation of worker health.

The findings regarding the impact of fostering a positive work culture are consistent with previous research, demonstrating that employees who are compliant, responsible,

and committed significantly influence company performance (Saeed et al., 2022). This is pertinent as the company aims to eliminate accidents and reduce absenteeism, while also emphasising the importance of considering environmental impacts in the manufacturing process. Consequently, these findings offer new insights, suggesting that the performance of the manufacturing industry should be evaluated based on its environmental and employee well-being outcomes. Manufacturers are also obligated to adhere to environmental regulations established by the government or certified independent organisations.

An unexpected discovery in this study is the negative correlation between PBE and OC, which should ideally be positive. This may be attributed to the profiles of respondents with shorter work periods who tend to be more critical. This finding can be explained using Festinger's theory of cognitive dissonance. According to Festinger (1957), cognitive dissonance occurs when individuals experience conflicting beliefs and behaviours, leading to discomfort. In this study, employees with shorter tenures may perceive performance evaluations as misaligned with their efforts or expectations, creating dissonance between their beliefs about fairness and the organisational practices. This dissonance can decrease their organisational commitment, as they become more critical of leadership and performance evaluations.

These findings demonstrate the importance of fostering commitment among workers through collective work and behaviour. The TSE variable indicates that manufacturing operators are trained and accustomed to working together in line with the work culture of Japanese manufacturing companies, as outlined in the Toyota Way (Liker, 2004). This collective effort to meet production goals and enhance operational efficiency aligns with Bandura's (1997) findings that teamwork efficacy predicts performance and strengthens a sense of belonging in the company. In the context of manufacturing industrial factory workers, teamwork efficacy is more relevant for evaluating organisational factors compared to self-efficacy, which is more individual in nature. Management should therefore encourage and make efforts to maintain and enhance team collaboration amidst environmental influences that often promote egocentric behaviour.

This study has also highlighted some limitations in performance-based evaluation and respondent profiles, particularly the lack of exploration into local cultural factors affecting manufacturing workers. Therefore, it is essential to take into account local cultural factors and social norms in future research. Moreover, this research should incorporate sustainability aspects from the perspective of workers on operational excellence, such as monitoring the reduction of carbon emissions in factories over time. The study was conducted with manufacturers whose organisational culture closely resembled Toyota's well-known organisational culture and structured work system. As a result, it is advisable to test the model on local manufacturers without a firmly established organisational culture to ensure external validity and broader generalisability.

6 Conclusions

The study's findings provide new insights into the relationship between organisational factors and operational excellence, particularly through the influence of organisational commitment (OC). Unlike previous studies that focused on operational performance, this research demonstrates the multi-dimensional nature of operational excellence (OX),

especially within the context of automotive manufacturing. The study demonstrates that four independent variables – teamwork self-efficacy (TSE), employee commitment behaviour (ECB), empowerment leadership (ELD), and positive attitude toward the job (PAT) – have a significant positive influence. Moreover, it reveals a negative impact of performance-based evaluation (PBE) on organisational commitment (OC), suggesting that younger employees may perceive performance evaluations differently than expected. Additionally, the study highlights the substantial direct impact of OC on OX. The study illuminates the important role of cultural enablers and continuous improvement in achieving OX, further indicating the significant practice of kaizen and teamwork in this industry. These findings not only enhance the existing literature but also provide practical recommendations for enhancing operational excellence by promoting teamwork and aligning performance systems with employee values.

Declarations

This research adhered to institutional and ethical guidelines and received approval from the university's ethics committee (No. 038/MM/EC/VII/2024). All participants were provided with detailed information regarding the study's objectives, procedures, and potential risks and benefits through an information sheet accompanying the survey link. Digital informed consent was obtained prior to participation, ensuring respondents understood their right to withdraw at any stage without repercussions. To maintain anonymity and confidentiality, no personally identifiable information was collected.

All authors declare that they have no conflicts of interest.

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