

Article

How Organizational Design Facilitates Team Outcomes: The Mediating Role of Knowledge-Creation Processes in Healthcare Organizations

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Abstract

Knowledge-intensive organizations rely on multidisciplinary collaboration, yet the organizational structures that convert specialized knowledge into collective capabilities remain insufficiently understood. This cross-sectional study examined whether knowledge-creation processes mediate the associations between group formality and contextual performance and perceived emotional synchrony in Japanese healthcare organizations. An anonymous online survey included 500 participants: 250 healthcare professionals and 250 medical administrative staff. Structural equation modeling showed that group formality was positively associated with knowledge-creation processes ($\beta = 0.420$), which were positively associated with contextual performance ($\beta = 0.635$) and perceived emotional synchrony ($\beta = 0.492$). The direct association between group formality and perceived emotional synchrony remained significant ($\beta = 0.159$), whereas its direct path to contextual performance could be omitted without worsening model fit. The revised model yielded RMSEA = 0.064 and SRMR = 0.055, although CFI = 0.890 and TLI = 0.886 remained slightly below the conventional 0.90 criterion. Multigroup analyses supported metric invariance, with no significant differences in focal structural paths between staff groups. These findings suggest that appropriately designed formal structures may support behavioral and affective team outcomes by facilitating knowledge creation rather than merely imposing control. Longitudinal and interventional studies are needed to assess temporal ordering and causal mechanisms.

Keywords: group formality; knowledge creation; contextual performance; perceived emotional synchrony; healthcare organizations; organizational design; multigroup structural equation modeling



Received: 7 August 2026

Revised: 12 October 2026

Accepted: 14 October 2026

Published: 16 October 2026

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1. Introduction

Organizations increasingly depend on the effective integration of specialized knowledge to remain adaptive, innovative, and competitive in rapidly changing environments (Boisot, 1998; Zahra & George, 2002).

As organizations become more specialized, individual expertise alone is insufficient to address the increasing complexity of tasks. Instead, organizational success depends on professionals with different knowledge, skills, and responsibilities integrating their expertise and generating new knowledge through collaboration. These challenges are particularly evident in professional organizations such as healthcare institutions, where physicians, nurses, pharmacists, rehabilitation specialists, medical administrative staff, and

other professionals must coordinate their activities under conditions of uncertainty, time pressure, and high responsibility. In these environments, effective collaboration is not only a requirement for operational efficiency but also a prerequisite for organizational learning, service quality, and sustainable organizational performance (Wu et al., 2022).

Healthcare organizations provide a particularly appropriate context for examining these issues because they represent one of the most knowledge-intensive organizational settings. Population aging, advances in medical technology, increasing specialization, and the growing prevalence of chronic diseases have substantially increased the complexity of healthcare delivery. Consequently, modern healthcare increasingly relies on multidisciplinary collaboration rather than the expertise of individual professionals. In Japan, these challenges have become even more pronounced following the implementation of physician work-style reform in 2024, which has accelerated task shifting and interprofessional collaboration while simultaneously increasing the need for effective coordination among healthcare professionals (Ministry of Health, Labour and Welfare, 2023). Simultaneously, many hospitals continue to face serious financial difficulties and workforce shortages, making the development of effective organizational management strategies an urgent priority. Recent reports have further indicated that communication failures remain one of the major contributors to medical incidents, highlighting the importance of organizational mechanisms that facilitate information sharing, mutual learning, and coordinated action. These practical challenges suggest that improving healthcare organizations requires not only highly skilled professionals but also organizational structures that enable knowledge to be effectively shared, integrated, and transformed into collective capabilities.

1.1. Why Knowledge Creation Matters in Professional Organizations

Although multidisciplinary collaboration has become essential in professional organizations, simply bringing together individuals with different levels of expertise does not necessarily improve organizational performance. Previous studies have consistently demonstrated that diversity alone is insufficient to produce effective collaboration unless organizations establish mechanisms that facilitate knowledge exchange, integration, and collective learning. In other words, organizational performance depends not only on the presence of specialized knowledge but also on the processes through which dispersed knowledge is transformed into shared organizational capability.

Therefore, knowledge creation has emerged as a central concept in organizational behavior and management research. Among the most influential theoretical frameworks, Nonaka's knowledge creation theory proposes that organizational knowledge develops through dynamic interactions between tacit and explicit knowledge (Nonaka & Takeuchi, 1995). The SECI model describes this continuous process through four modes of knowledge conversion: socialization, externalization, combination, and internalization. Rather than treating knowledge as an individual asset, this perspective emphasizes that organizational learning occurs through repeated interactions among organizational members, enabling individual experiences to become collective organizational knowledge.

Subsequent organizational learning theories have expanded this perspective. Crossan et al. (1999) proposed the 4I framework, which conceptualizes organizational learning as an iterative process of intuiting, interpreting, integrating, and institutionalizing across individual, group, and organizational levels. Similarly, the organizational learning mechanism framework emphasizes that organizations require formal systems and routines that enable knowledge to be acquired, shared, evaluated, and retained. These theoretical perspectives converge, suggesting that organizational effectiveness depends not only on individual competence but also on organizational processes that systematically facilitate knowledge creation and learning.

Collectively, these theoretical perspectives suggest that knowledge should be understood not only as an individual asset but also as an organizational capability that emerges through structured interactions, collective learning, and the integration of distributed expertise (Boisot, 1998; Zahra & George, 2002).

These theories are particularly relevant to healthcare organizations because much of the knowledge required for patient care is tacit, experience-based, and distributed across multiple professions. Clinical decision-making frequently depends on the integration of diverse professional perspectives rather than on standardized procedures alone. Consequently, healthcare organizations require mechanisms that enable professionals to externalize tacit knowledge, share clinical experiences, and collectively develop new solutions to complex problems (Wu et al., 2022). Without such processes, valuable expertise often remains embedded within individuals, limiting organizational learning and reducing the effectiveness of multidisciplinary collaboration.

1.2. From Organizational Structure to Knowledge Creation and Team Outcomes: The Role of Group Formality

Although knowledge-creation processes are widely recognized as critical for organizational learning, considerably less attention has been paid to the organizational conditions that enable their emergence. However, knowledge creation does not occur automatically when professionals collaborate. Rather, it depends on organizational environments that provide sufficient opportunities for communication, shared understanding, and coordinated action. From an organizational behavioral perspective, group formality is a structural factor that may facilitate these conditions. It refers to the extent to which organizational activities are guided by clearly defined procedures, role clarity, standardized work practices, and explicit coordination mechanisms (Arai, 2004).

Formal organizational structures are often viewed as constraints on creativity because standardized procedures may reduce flexibility and individual discretion. However, Adler and Borys (1996) distinguish between coercive formalization, which emphasizes compliance and control, and enabling formalization, which provides procedures and structures that help organizational members perform their work effectively. From this perspective, formalization can facilitate collaboration by reducing ambiguity, clarifying expectations, and establishing shared frameworks that enable professionals to coordinate their activities efficiently. Particularly in knowledge-intensive organizations, enabling formal structures may function as cognitive scaffolds that support communication and reduce coordination costs, thereby creating favorable conditions for knowledge integration rather than inhibiting innovation.

Specifically, enabling formalization may support the SECI process by structuring the conditions under which tacit and explicit knowledge are converted into explicit knowledge. Clear role boundaries and recurrent interprofessional routines can create stable socialization opportunities by increasing repeated interactions across these boundaries. Shared reporting formats, briefings, and case conferences can facilitate externalization by providing structured opportunities to articulate experiential and tacit judgments. Standardized documentation and coordination procedures may support combination by making explicit knowledge from different professional domains easier to compare, connect, and integrate. Finally, the repeated application of collectively developed routines may foster internalization by embedding this shared knowledge into everyday practice. Therefore, formal structures do not create knowledge directly; rather, when experienced as enabling, they may reduce interaction costs and provide a cognitive and procedural scaffold through which knowledge circulates more systematically (Adler & Borys, 1996; Nonaka & Takeuchi, 1995).

These perspectives are especially relevant in healthcare organizations, where multidisciplinary collaboration requires continuous coordination among professionals with

different educational backgrounds, responsibilities, and cultures. Clinical care frequently involves uncertainty and interdependence, making role ambiguity and communication failures substantial barriers to effective teamwork. In such environments, clearly defined procedures, explicit role allocation, and standardized communication protocols may provide organizational stability while enabling professionals to exchange knowledge more effectively (Haynes et al., 2009; Rabkin & Frein, 2021). Simultaneously, formal structures are unlikely to support knowledge creation when rigid compliance replaces professional judgment. Therefore, the proposed positive role of group formality depends on formalization functioning as an enabling organizational resource that supports rather than constrains adaptive problem-solving and the use of tacit clinical knowledge.

The proposed mechanism includes important boundary conditions. Formalization is most likely to be enabling when coordination demands, task interdependence, uncertainty, or clinical risk make a minimum level of shared structure necessary, while professionals retain the discretion to adapt routines to case-specific information. In contrast, when procedures become excessively prescriptive, are detached from local work demands, or displace professional judgment in highly novel or non-routine situations, formalization may shift from an enabling platform to a coercive constraint. Accordingly, the relevant question is not whether more formality is universally beneficial but when and how formal structures preserve both coordination reliability and adaptive professional judgment. These boundary conditions are theoretical propositions that require empirical testing.

Despite these theoretical arguments, empirical evidence on the mechanisms by which group formality is associated with organizational outcomes remains limited. Previous studies have primarily focused on the direct effects of formalization on organizational performance or employee behavior, whereas relatively few have examined whether knowledge-creation processes mediate the relationships between formal organizational structures and behavioral or affective team outcomes. This gap is particularly evident in healthcare organizations, where organizational management research has traditionally emphasized leadership, psychological safety, and communication climate while paying comparatively less attention to the structural mechanisms that enable knowledge creation across professional boundaries.

1.3. Research Gap and Purpose of the Study

Considerable progress has been made in understanding the factors that contribute to effective teamwork in healthcare organizations. Previous research has demonstrated that leadership, psychological safety, trust, communication climate, and team diversity are important antecedents of team effectiveness and organizational performance (Edmondson, 1999; Newman et al., 2017; Sasaki et al., 2022). These studies have substantially advanced our understanding of interpersonal processes that promote collaboration among healthcare professionals. However, comparatively less attention has been devoted to organizational structures that enable these collaborative processes to emerge and be sustained over time.

Although knowledge creation is widely recognized as a critical organizational capability, relatively few empirical studies have examined how formal organizational structures facilitate the knowledge-creation processes that ultimately contribute to team effectiveness. Studies have often investigated formalization as a direct predictor of organizational outcomes. However, the underlying behavioral mechanisms through which formal organizational structures influence team performance remain poorly understood. Consequently, the organizational processes linking structural management practices to both behavioral and affective team outcomes have yet to be fully clarified.

Addressing this gap is particularly important for healthcare organizations, where effective teamwork depends on the integration of highly specialized knowledge distributed

across multiple professions. Understanding how organizational structures promote knowledge creation may provide managers with practical strategies for improving not only team performance but also collaborative experiences among healthcare professionals. Moreover, as similar challenges are increasingly observed across other knowledge-intensive professional organizations, examining these mechanisms may contribute more broadly to organizational behavior and management research beyond healthcare settings. Despite the growing importance of organizational design in knowledge-intensive organizations, little is known about how structural management practices facilitate collective knowledge creation that ultimately contributes to behavioral and affective team outcomes.

Therefore, this study proposes and tests an exploratory organizational behavior model in which knowledge-creation processes mediate the associations between group formality and two complementary team outcomes: contextual performance, representing behavioral contributions beyond formal role requirements, and perceived emotional synchrony, representing shared affective experiences during collaboration. By integrating organizational structure, knowledge creation, and team psychology into a single conceptual framework, this study seeks to extend the current understanding of how organizational design is associated with what professionals do and how they experience collaboration in knowledge-intensive organizations.

2. Theoretical Framework

2.1. Hypotheses Development

Building on the theoretical perspectives discussed above, this study conceptualizes group formality as an organizational structural resource that facilitates knowledge creation by providing clear roles, standardized procedures, and shared expectations among team members (Adler & Borys, 1996; Arai, 2004; Mukahi, 2009). Rather than assuming that formalization directly improves organizational outcomes, this study proposes that formalization's primary contribution lies in creating an enabling environment in which knowledge can be effectively exchanged, integrated, and transformed into collective organizational capabilities. Accordingly, group formality is expected to be positively associated with knowledge-creation processes.

Knowledge-creation processes are expected to contribute to both behavioral and affective team outcomes. Organizations that continuously create, share, and integrate knowledge are more likely to develop shared understanding, adaptive problem-solving capabilities, and effective collaboration among professionals. From a behavioral perspective, these processes should support contextual performance by facilitating cooperation, initiative, and mutual support beyond formal job requirements (Ikeda & Furukawa, 2008). From an affective perspective, repeated knowledge exchanges and coordinated interactions may strengthen shared emotional experiences among team members, contributing to perceived emotional synchrony (Włodarczyk et al., 2020).

Accordingly, knowledge creation is expected to function as an organizational mechanism through which group formality is associated with contextual performance and perceived emotional synchrony. The empirical analysis also evaluates whether direct associations between group formality and each outcome remain after accounting for knowledge-creation processes, thereby distinguishing complete from partial mediation, where appropriate.

Based on these theoretical considerations, the following hypotheses were proposed:

Hypothesis H1. *Group formality is positively associated with knowledge-creation processes.*

Hypothesis H2a. *Knowledge-creation processes are positively associated with contextual performance.*

Hypothesis H2b. *Knowledge-creation processes are positively associated with perceived emotional synchrony.*

Hypothesis H3a. *Knowledge-creation processes mediate the association between group formality and contextual performance.*

Hypothesis H3b. *Knowledge-creation processes mediate the association between group formality and perceived emotional synchrony.*

Figure 1 illustrates the conceptual model used in this study.

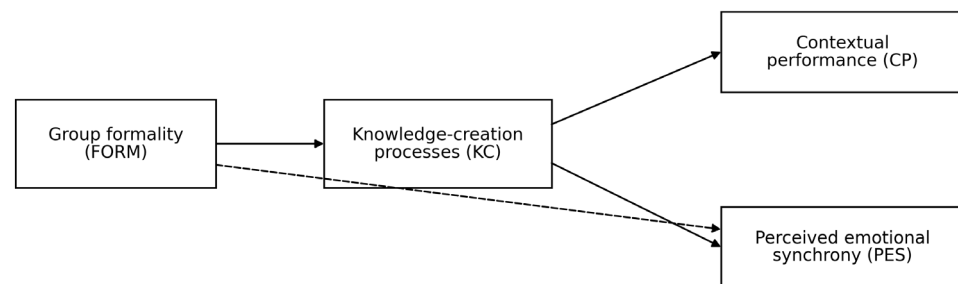


Figure 1. Revised conceptual model of organizational design, knowledge creation, and team outcomes. Solid arrows indicate the pathways through knowledge creation, and the dashed arrow indicates the direct association between group formality and perceived emotional synchrony evaluated in the revised model.

2.2. Theoretical and Practical Contributions

This study makes three primary contributions to organizational behavior and management research. First, it extends the research on formal organizational structures by identifying knowledge creation as a potential mechanism through which group formality is associated with behavioral and affective team outcomes. Rather than treating formalization solely as a direct source of control or efficiency, the proposed model positions formalization as a structural condition that may help professionals exchange, integrate, and institutionalize dispersed knowledge.

Second, this study integrates organizational design, organizational learning, and team psychology within a single conceptual framework. It simultaneously considers the structural, behavioral, and affective dimensions of collaboration by linking group formality to knowledge-creation processes, contextual performance, and perceived emotional synchrony. This integrated perspective may provide a more comprehensive explanation of how organizational arrangements are associated with professionals' contributions beyond their formal roles and how they experience collective interaction.

Third, this study examines healthcare organizations as empirically relevant examples of knowledge-intensive professional organizations. Healthcare teams operate under conditions of high interdependence, professional specialization, uncertainty, and time pressure, making them a particularly suitable context for investigating the relationship between organizational structure and knowledge integration. Although the empirical setting is healthcare, the proposed framework may also be relevant to other professional organizations in which expertise is distributed across occupational boundaries.

From a practical perspective, the model suggests that managers should not rely exclusively on interpersonal interventions such as improving trust, communication climate,

or psychological safety. These factors remain important; however, their effects may be strengthened when organizations clarify roles, standardize critical coordination procedures, and create routines through which tacit knowledge can be articulated and shared. Accordingly, the present study may inform the design of team briefings, handover systems, case conferences, role-allocation practices, and knowledge-sharing routines intended to support effective team functioning (Haynes et al., 2009; Rabkin & Frein, 2021).

Collectively, these contributions position this study at the intersection of organizational design, organizational learning, and team psychology.

3. Materials and Methods

3.1. Study Design

This study employed a cross-sectional questionnaire survey to examine the relationships between group formality, knowledge-creation processes, contextual performance, and perceived emotional synchrony in healthcare organizations. Based on organizational behavior theory and organizational learning research, a conceptual model was developed in which knowledge-creation processes mediated the associations between group formality and behavioral and affective team outcomes. Structural equation modeling (SEM) was used to evaluate the proposed conceptual model because it enables the simultaneous examination of multiple latent constructs and their interrelationships.

3.2. Participants and Procedure

Participants were recruited through a professional web-based survey company that maintains a nationwide panel of healthcare professionals and medical administrative staff in Japan. To obtain comparable perspectives from clinical and administrative professionals, the survey targeted 250 healthcare professionals and 250 medical administrative staff, resulting in a total sample of 500 participants. Equal representation of healthcare professionals and administrative staff was intentionally adopted to ensure a balanced examination of organizational processes across clinical and administrative functions rather than to estimate population prevalence. The healthcare professionals included physicians, nurses, pharmacists, rehabilitation professionals, medical technologists, and licensed healthcare practitioners. Medical administrative staff comprised personnel engaged in hospital and clinic administration whose organizational roles can be important for coordinated team-based care (Solimeo et al., 2016).

The data were collected anonymously using an online questionnaire. Before participation, all respondents received information regarding the purpose of the study, the voluntary nature of participation, confidentiality of responses, and protection of personal information. Informed consent was obtained electronically before participants completed the questionnaire. The study protocol was reviewed and approved by the Research Ethics Committee of the University of Tsukuba (Approval No. 25-46).

Responses containing substantial missing data or demonstrating response patterns indicative of insufficient engagement were excluded prior to statistical analysis in accordance with the predefined data screening procedure. The final dataset comprised 500 valid responses.

3.3. Measures

All constructs were assessed using previously validated self-reported questionnaires. The ancillary measures reported in the correlation matrix included psychological safety, collaborative work orientation, and organizational citizenship behavior (Nagahama et al., 2009; Sasaki et al., 2022; Tanaka, 2002). Unless otherwise indicated, all items were rated on

a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Higher scores indicated higher levels of each construct.

3.3.1. Group Formality

Group formality was measured using a six-item scale assessing the extent to which work procedures, professional roles, responsibilities, and coordination mechanisms were clearly defined within the organization (Arai, 2004). This construct reflects the degree to which organizational activities are guided by explicit structures that facilitate coordinated action among team members. Although the scale was originally developed outside highly regulated healthcare settings, the functional content of its items maps onto structural features common to both clinical and administrative work: clarity of role expectations, explicit allocation of responsibilities, shared procedural rules, and coordination routines. Therefore, we interpreted the measure as assessing perceived structural formality at a general organizational level rather than compliance with healthcare-specific protocols. This distinction is important because the scale captures the perceived degree and clarity of formal structure but does not directly differentiate whether formalization is experienced as enabling or coercive. The enabling interpretation in the present study is therefore theoretically grounded in Adler and Borys (1996), whereas the direct measurement of enabling versus coercive formalization remains a priority for future validation. Higher scores indicated greater perceived group formality. Nevertheless, the transfer of this measure to healthcare settings should be treated cautiously and discussed as a limitation of this study.

3.3.2. Knowledge-Creation Processes

Knowledge-creation processes were assessed using a four-item scale based on organizational learning theory (Nonaka & Takeuchi, 1995). The scale evaluates the extent to which professionals exchange experiences, integrate diverse knowledge, and collaboratively generate new ideas to improve organizational practices. Higher scores represent greater knowledge-creation activities within the organization.

3.3.3. Contextual Performance

Contextual performance was assessed using an eight-item scale measuring discretionary behaviors that contribute to organizational effectiveness beyond formal job requirements, including cooperation, initiative, and organizational support (Ikeda & Furukawa, 2008).

3.3.4. Perceived Emotional Synchrony

Perceived emotional synchrony was measured using the Japanese version of the Perceived Emotional Synchrony Scale (PES) (Włodarczyk et al., 2020). This scale evaluated the extent to which individuals perceived shared emotional experiences, emotional unity, and collective emotional resonance during collaborative activities. Higher scores indicated stronger perceived emotional synchrony among team members.

3.4. Statistical Analysis

Descriptive statistics, reliability analyses, correlation analyses, and SEM were used to evaluate the proposed conceptual model. Descriptive statistics and Pearson's correlation coefficients were calculated using IBM SPSS Statistics (version 29). Internal consistency was evaluated using Cronbach's alpha and McDonald's omega coefficients.

SEM was performed using IBM SPSS Amos (version 28) to examine the hypothesized relationships among the latent constructs. Model fit was evaluated using the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), and chi-square divided by

degrees of freedom (CMIN/DF). As the proposed model included indirect relationships, mediation was evaluated using structural paths and nested model comparisons, with bootstrap procedures used where applicable. Statistical significance was set at $p < 0.05$.

Convergent and discriminant validity were examined using average variance extracted (AVE), composite reliability (CR), and the heterotrait–monotrait ratio (HTMT) (Fornell & Larcker, 1981; Henseler et al., 2015). These diagnostics were used to evaluate the empirical distinctiveness of knowledge-creation processes and previously specified high-performance team constructs.

Common method variance was assessed using Harman’s single-factor test as a diagnostic procedure (Podsakoff et al., 2003). Because the sample deliberately included equal numbers of healthcare professionals and medical administrative staff, a multigroup SEM was also conducted to examine configural, metric, and scalar invariance and the equality of the focal structural paths. Changes in CFI were considered alongside chi-square difference tests because the latter are sensitive to sample size (Cheung & Rensvold, 2002).

4. Results

4.1. Participant Characteristics

The demographic characteristics of the participants are presented in Table 1. The final sample consisted of 500 respondents, including 250 healthcare professionals and 250 medical administrative staff. The participants represented a broad range of healthcare occupations and professional experiences, providing a heterogeneous sample suitable for examining organizational processes across multidisciplinary healthcare settings.

Table 1. Participant characteristics (N = 500).

Characteristic	Category	n	%
Profession	Healthcare professionals	250	50.0
	Medical administrative staff	250	50.0
Sex	Male	151	30.2
	Female	348	69.6
	Other/No response	1	0.2
Age	20–29 years	37	7.4
	30–39 years	83	16.6
	40–49 years	152	30.4
	50–59 years	133	26.6
	60–69 years	76	15.2
	≥70 years	18	3.6
	No response	1	0.2
Occupation	Physician	54	10.8
	Nurse	76	15.2
	Pharmacist	40	8.0
	Rehabilitation professional	30	6.0
	Medical technologist	37	7.4
	Medical administrative staff	250	50.0
	Other	13	2.6

Table 1. *Cont.*

Characteristic	Category	n	%
Years of experience	<10 years	131	26.2
	10–19 years	154	30.8
	20–29 years	116	23.2
	30–39 years	68	13.6
	≥40 years	26	5.2
	No response	5	1.0

4.2. Descriptive Statistics and Correlations

Pearson's correlation coefficients among the study variables are presented in Table 2. All study variables demonstrated acceptable internal consistency and reliability. Group formality was positively associated with knowledge-creation processes, contextual performance, and perceived emotional synchrony. Knowledge-creation processes also showed significant positive associations with both behavioral and affective team outcomes, providing preliminary support for the revised conceptual model.

Table 2. Correlations among main study variables (N = 500).

Variable	1	2	3	4	5	6	7
1. Psychological safety	—	0.406 ***	0.538 ***	0.536 ***	0.536 ***	0.452 ***	0.492 ***
2. Group formality		—	0.457 ***	0.404 ***	0.257 ***	0.344 ***	0.345 ***
3. Collaborative work orientation			—	0.488 ***	0.395 ***	0.412 ***	0.359 ***
4. Knowledge-creation processes				—	0.602 ***	0.638 ***	0.564 ***
5. Contextual performance					—	0.660 ***	0.443 ***
6. Organizational citizenship behavior						—	0.463 ***
7. Perceived emotional synchrony							—

Note. *** $p < 0.001$.

4.3. Measurement Validity and Model Respecification

Convergent and discriminant validity were examined to evaluate the empirical distinctiveness of the constructs. The knowledge-creation processes demonstrated satisfactory convergent reliability (AVE = 0.609; CR = 0.859). By contrast, the previously specified high-performance team construct showed weaker empirical distinctiveness. When contextual performance, organizational citizenship behavior, and perceived emotional synchrony were used as indicators, AVE was 0.527, CR was 0.767, and the HTMT value for knowledge creation was 0.897. After organizational citizenship behavior was removed, the two-indicator specification yielded AVE = 0.477, CR = 0.645, and HTMT = 0.945 (Table 3).

Table 3. Convergent and discriminant validity diagnostics for the previous high-performance team specification.

Construct/Specification	AVE	CR	HTMT with Knowledge Creation
Knowledge-creation processes	0.609	0.859	—
High-performance team: CP, OCB, and PES indicators	0.527	0.767	0.897
High-performance team: CP and PES indicators	0.477	0.645	0.945

These results, together with the previously observed standardized path of $\beta = 0.900$ from knowledge creation to high-performance team functioning, indicated insufficient

empirical separation between the two constructs in the final specification. Rather than retaining a psychometrically weak intermediate factor, a structural model was used to examine the direct associations between knowledge-creation processes, contextual performance, and perceived emotional synchrony. This is theoretically consistent with the revised hypotheses and demonstrates improved transparency in the model development process.

4.4. Revised Structural Model and Indirect Associations

The revised structural model showed RMSEA = 0.064 and SRMR = 0.055, indicating a substantially improved absolute fit compared with the previous specification. The CFI (0.890) and TLI (0.886) remained slightly below the conventional 0.90 criterion and were, therefore, interpreted cautiously. The overall model fit was $\chi^2(1425) = 4332.64$, $\chi^2/df = 3.04$. Group formality was positively associated with knowledge-creation processes ($\beta = 0.420$, $p < 0.001$), which were positively associated with contextual performance ($\beta = 0.635$, $p < 0.001$) and perceived emotional synchrony ($\beta = 0.492$, $p < 0.001$). Group formality also had a direct positive association with perceived emotional synchrony ($\beta = 0.159$, $p < 0.001$) (Table 4).

Table 4. Revised structural equation model results.

Structural Path	Standardized Coefficient (β)	p
Group formality → Knowledge-creation processes	0.420	<0.001
Knowledge-creation processes → Contextual performance	0.635	<0.001
Knowledge-creation processes → Perceived emotional synchrony	0.492	<0.001
Group formality → Perceived emotional synchrony	0.159	<0.001

The combination of acceptable RMSEA and SRMR values with CFI and TLI values just below 0.90 indicates that the absolute residual fit was more favorable than the incremental fit. This pattern may reflect localized measurement strain, including residual covariation or item cross-loadings within a relatively complex multidimensional model. Because additional post hoc modifications made solely to improve the global fit could capitalize on sample-specific characteristics, no further data-driven respecification was undertaken, and structural estimates were interpreted cautiously.

The nested model comparisons further clarified the mediation patterns. Removing the direct path from group formality to contextual performance did not significantly worsen model fit, $\Delta\chi^2(1) = 0.176$, $p = 0.675$, whereas removing the direct path from group formality to perceived emotional synchrony significantly worsened fit, $\Delta\chi^2(1) = 13.252$, $p < 0.001$. The standardized indirect associations through knowledge creation were approximately 0.267 for contextual performance and 0.207 for perceived emotional synchrony. These results are consistent with the complete mediation of contextual performance and partial mediation of perceived emotional synchrony.

4.5. Common Method Bias and Multigroup Invariance

Harman's single-factor test was conducted using the items included in the revised focal model. The first unrotated factor accounted for 40.78% of the total variance, which is below the commonly used 50% criterion. Although this result did not indicate that a single common factor dominated the covariance among the focal measures, common method variance could not be ruled out in a single-source cross-sectional design.

Therefore, the Harman result was treated only as a limited diagnostic of single-factor dominance and not as evidence that common method variance, reverse causality, omitted variable bias, or structural endogeneity had been ruled out.

Multigroup SEM was used to compare 250 healthcare professionals and 250 medical administrative staff. The configural model yielded $\chi^2(2850) = 6577.69$, CFI = 0.864, TLI = 0.858, and RMSEA = 0.051. Constraining factor loadings to equality produced the metric-invariance model, $\chi^2(2901) = 6638.19$, CFI = 0.864, TLI = 0.861, and RMSEA = 0.051. The difference was not statistically significant, $\Delta\chi^2(51) = 60.50$, $p = 0.170$, and the change in CFI was negligible ($\Delta\text{CFI} \approx -0.0004$), thus supporting metric invariance. The scalar-invariance model yielded $\chi^2(2952) = 6730.43$, CFI = 0.862, TLI = 0.861, and RMSEA = 0.051. Although the chi-square difference was significant, $\Delta\chi^2(51) = 92.24$, $p < 0.001$, the change in CFI was only approximately -0.0015 , indicating little practical deterioration in fit (Table 5).

Table 5. Multigroup measurement invariance analysis.

Model	χ^2 (df)	CFI	TLI	RMSEA	$\Delta\chi^2$ (df)	p	ΔCFI
Configural	6577.69 (2850)	0.864	0.858	0.051	—	—	—
Metric	6638.19 (2901)	0.864	0.861	0.051	60.50 (51)	0.170	≈ -0.0004
Scalar	6730.43 (2952)	0.862	0.861	0.051	92.24 (51)	<0.001	≈ -0.0015

Note. $\Delta\chi^2$ and ΔCFI compare each more constrained invariance model with the immediately preceding model.

Finally, constraining the four focal structural paths to equality across occupational groups did not significantly worsen model fit, $\Delta\chi^2(4) = 3.62$, $p = 0.460$. The group-specific standardized coefficients were 0.431 versus 0.408 for group formality $\rightarrow$ knowledge creation, 0.669 versus 0.597 for knowledge creation $\rightarrow$ contextual performance, 0.576 versus 0.404 for knowledge creation $\rightarrow$ perceived emotional synchrony, and 0.110 versus 0.209 for group formality $\rightarrow$ perceived emotional synchrony (healthcare professionals versus medical administrative staff, respectively). Thus, although some numerical differences were observed, the omnibus structural invariance test did not indicate significant group differences in the focal paths. The group-specific estimates are summarized in Table 6. Figure 2 shows the final structural model estimated for the entire sample.

Table 6. Group-specific standardized structural path estimates.

Structural Path	Healthcare Professionals β	Medical Administrative Staff β
Group formality $\rightarrow$ Knowledge-creation processes	0.431	0.408
Knowledge-creation processes $\rightarrow$ Contextual performance	0.669	0.597
Knowledge-creation processes $\rightarrow$ Perceived emotional synchrony	0.576	0.404
Group formality $\rightarrow$ Perceived emotional synchrony	0.110	0.209

Note. The coefficients are standardized estimates. The omnibus equality constraint test indicated no statistically significant differences in the four focal structural paths across occupational groups, $\Delta\chi^2(4) = 3.62$, $p = 0.460$. Therefore, numerical differences should be interpreted descriptively rather than as statistically established between-group differences.

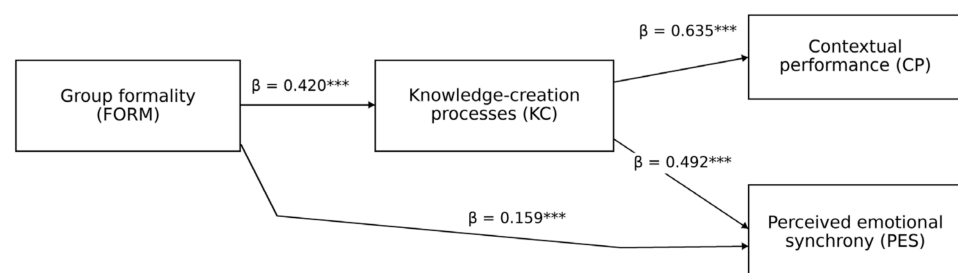


Figure 2. Final structural equation model of organizational design, knowledge creation, and team outcomes. Standardized path coefficients are shown. Model fit: $\chi^2(1425) = 4332.64$, CFI = 0.890, TLI = 0.886, RMSEA = 0.064, SRMR = 0.055. *** $p < 0.001$.

5. Discussion

5.1. Principal Findings

This study provides a new perspective on how organizational design is associated with behavioral and affective team outcomes in knowledge-intensive organizations. Rather than viewing formal organizational structures solely as mechanisms for standardization and control, the findings suggest that appropriately designed group formality may create organizational conditions that facilitate knowledge-creation processes. Knowledge creation, in turn, was positively associated with contextual performance and perceived emotional synchrony. The association with contextual performance was consistent with complete mediation, whereas the association with perceived emotional synchrony was consistent with partial mediation because a direct path from group formality remained significant.

These findings extend previous research on organizational behavior by emphasizing the interdependence of structural management practices and learning processes within organizations. Organizational structure and knowledge creation appear to function as complementary organizational resources that support behavioral contributions and shared affective experiences. The multigroup analysis further indicated that the focal structural relationships did not differ significantly between healthcare professionals and medical administrative staff despite their different occupational roles and knowledge domains. From this perspective, group formality is not merely a bureaucratic mechanism designed to reduce uncertainty but may also represent an organizational infrastructure that enables professionals to exchange, integrate, and collectively develop knowledge across occupational boundaries.

5.2. Theoretical Implications

One of the most important theoretical implications of this study is the positioning of group formality as a potentially enabling organizational resource rather than as a mechanism of formal control. This interpretation is consistent with Adler and Borys's (1996) distinction between enabling and coercive formalization. Formal structures may support knowledge creation when they clarify responsibilities, provide usable coordination routines, and reduce unnecessary ambiguity. However, the same structures may become restrictive when they prioritize compliance over professional judgment. Therefore, the present findings should not be interpreted as evidence that greater formalization is beneficial. Rather, the relevant theoretical issue is how organizational members design and experience these formal structures.

This perspective extends existing knowledge-creation theory by emphasizing that organizational learning is influenced not only by interpersonal interactions but also by structural organizational arrangements. Nonaka's theory of organizational knowledge creation highlights the dynamic conversion of tacit and explicit knowledge through social interaction (Nonaka & Takeuchi, 1995). The present findings suggest that such interactions may be supported when organizational structures provide clear roles, standardized communication processes, and shared expectations that facilitate repeated collaboration among professionals. In this sense, enabling group formality may function as an organizational platform upon which knowledge-creation processes become sustainable, rather than occurring only through individual initiatives.

Viewed through the SECI framework, this structural role can be specified more precisely. Recurrent cross-professional routines may provide opportunities for socialization; structured briefings and case discussions can facilitate externalization; shared documentation and coordination systems can aid combination; and repeated enactment of collectively developed routines may support internalization. Therefore, the theoretical contribution is not that formalization itself produces knowledge but that the enabling structure can shape

the interaction architecture through which knowledge conversion becomes repeatable and organizationally embedded.

This interpretation also clarifies the boundary conditions of the model. Under high interdependence or clinical risk, some formal structures may reduce ambiguity and protect coordination reliability. However, when uncertainty takes the form of highly novel, non-routine problems requiring rapid professional adaptation, overly prescriptive rules may suppress the discretionary judgment on which knowledge creation depends. Thus, enabling and coercive formalization should be understood as qualitatively different ways of designing and experiencing structures, rather than simply as low versus high levels of formality. Future research should examine whether task uncertainty, clinical risk, and professional discretion moderate the association between group formality and knowledge creation.

These findings also contribute to organizational learning research by integrating the structural and behavioral perspectives, which are often examined separately. Previous studies have primarily focused on organizational structures or interpersonal processes, such as leadership, trust, and psychological safety. The revised model suggests that structural arrangements may establish conditions under which knowledge exchange becomes more systematic and is subsequently associated with both contextual performance and shared emotional experience. This integrated perspective provides a broader understanding of how organizational design relates to the collective capabilities of knowledge-intensive organizations.

Although the omnibus structural invariance test did not identify statistically significant occupational group differences, the descriptive variation in the standardized coefficients may be theoretically informative. The direct association between group formality and perceived emotional synchrony was numerically larger among medical administrative staff (0.209) than among healthcare professionals (0.110), while the association between knowledge creation and perceived emotional synchrony was numerically larger among healthcare professionals (0.576) than among administrative staff (0.404). One possible interpretation is that administrative work may derive affective stability more directly from predictable procedures and clearly delineated responsibilities, whereas clinical work, which is characterized by greater case-specific uncertainty and distributed expertise, may generate shared emotional experiences more strongly through collaborative sensemaking and knowledge exchange. These patterns should be treated as exploratory because the formal test of path equality was nonsignificant.

5.3. Practical Implications

The present findings also provide several practical implications for healthcare organization managers. Contemporary healthcare management has increasingly emphasized interpersonal interventions, including leadership development, communication training, team-building programs, and the promotion of psychological safety. Although these approaches remain essential, the present findings suggest that organizational design itself may represent an equally important target for management interventions. Organizational structures that clarify professional roles, standardize essential coordination processes, and facilitate repeated opportunities for knowledge sharing may create favorable conditions for contextual performance and shared emotional coordination.

From this perspective, effective team management should extend beyond improving interpersonal relationships to designing organizational systems that continuously support knowledge creation. Practical examples include structured interdisciplinary case conferences, standardized handover procedures, clearly defined role allocations, routine team briefings, and organizational mechanisms that encourage professionals to externalize tacit knowledge accumulated through clinical experience. Such organizational arrangements

may reduce unnecessary ambiguity while simultaneously promoting collaborative learning across professional boundaries (Haynes et al., 2009; Wu et al., 2022).

From a managerial perspective, the descriptive occupational patterns noted in Section 5.2 suggest that the common principles of enabling organizational design may be implemented through somewhat different emphases across occupational groups. Administrative teams may benefit from clear process architecture, explicit responsibility boundaries, and predictable coordination routines that provide a stable baseline for collaboration. Clinical teams may require the same structural clarity to be paired with protected opportunities for interdisciplinary knowledge exchange, case-based discussions, and adaptive problem-solving. Because the group differences were not statistically significant, these implications should be viewed as hypotheses for practice and future research rather than as evidence for occupation-specific prescriptions.

Importantly, our findings do not suggest that greater formalization is necessarily beneficial. Rather, they indicate that appropriately designed group formality may create sufficient organizational stability to enable professionals to collaborate effectively while maintaining the flexibility required for adaptive problem-solving. In line with the distinction between enabling and coercive formalization, managers should consider formal structures not as ends in themselves but as organizational resources that facilitate collective learning and continuous improvement.

5.4. Implications Beyond Healthcare

Although the present study was conducted within healthcare organizations, the proposed conceptual framework may have broader relevance for other knowledge-intensive professional organizations. Increasing specialization, distributed expertise, and the need for interdisciplinary collaboration are not unique to healthcare but have become defining characteristics of many contemporary organizations, including universities, research institutes, information technology companies, consulting firms, public organizations, and engineering projects. Across these settings, organizational effectiveness increasingly depends on the ability of professionals to integrate specialized knowledge while adapting to rapidly changing environments.

Therefore, the present findings suggest that organizational design should be viewed as an important strategic resource for supporting collective knowledge creation beyond healthcare settings. Rather than relying exclusively on individual expertise or interpersonal relationships, organizations may benefit from designing formal structures that encourage repeated collaboration, knowledge sharing, and organizational learning. Such organizational arrangements may enable teams to develop collective capabilities that exceed the contributions of individual experts, thereby strengthening innovation, adaptability, and long-term organizational performance.

More broadly, the proposed framework contributes to an emerging perspective in organizational behavior that views organizational structures not as static administrative systems but as dynamic organizational resources that shape knowledge generation, sharing, and transformation into collective capabilities. This perspective may encourage future research to examine how organizational design can facilitate collaborative learning across a wide range of professional environments facing increasing complexity and uncertainty.

5.5. Limitations and Future Research

This study has several limitations that warrant consideration. First, the cross-sectional design prevents definitive conclusions regarding temporal ordering or causal relationships between group formality, knowledge-creation processes, contextual performance, and perceived emotional synchrony. Reverse relationships are also plausible. For example,

teams that collaborate effectively or experience stronger shared affect may develop clearer routines and more active knowledge-sharing practices over time. More broadly, the design leaves open the possibility of structural endogeneity arising from reciprocal causation and omitted variables. Unobserved factors, such as leadership quality, staffing adequacy, team climate, and team tenure, can simultaneously influence formal routines, knowledge creation, and team outcomes. Accordingly, the estimated paths should be interpreted as conditional associations consistent with the proposed theoretical mechanism rather than as definitive causal effects. Future research should use lagged multisource panel designs, organizational interventions, or other quasi-experimental designs and instrumental-variable approaches to strengthen causal inference where theoretically defensible exogenous instruments can be identified.

Second, all variables were measured using self-report questionnaires, which may have introduced common method bias. Harman's single-factor test indicated that the first unrotated factor accounted for 40.78% of the total variance in the focal measures; therefore, it did not suggest that a single common factor dominated the data. However, Harman's test is a limited diagnostic tool and cannot rule out common method variance, omitted variable bias, reverse causality, or structural endogeneity in a single-source, cross-sectional design (Podsakoff et al., 2003). Future research should combine supervisor ratings, peer evaluations, objective organizational indicators, and behavioral observations with temporally separate measurements to provide a more rigorous assessment of the proposed relationships.

Third, this study focuses on healthcare organizations in Japan. Healthcare provides an appropriate empirical context for examining knowledge-intensive professional organizations. Organizational cultures, institutional environments, professional authority relationships, and management practices may differ across industries and countries. In addition, although the multigroup analyses supported metric invariance and did not indicate significant differences in the focal structural paths between healthcare professionals and medical administrative staff, the significant chi-square test for scalar invariance should be interpreted alongside the small change in CFI. Future comparative studies involving diverse occupational and national settings would help evaluate the broader applicability and boundary conditions of the proposed conceptual framework.

Fourth, the group formality measure was originally developed in a context different from that of highly regulated multidisciplinary healthcare organizations. Although the construct captures role clarity, explicit procedures, responsibility allocation, and coordination mechanisms with functional analogs across clinical and administrative workflows, additional validation is required to establish its measurement properties across healthcare occupations and organizational settings. In particular, the present scale assesses perceived structural formality but does not directly distinguish between enabling and coercive formalization; future studies should incorporate measures that explicitly capture this qualitative distinction. Furthermore, although RMSEA and SRMR indicated a substantially improved fit for the revised structural model, CFI and TLI remained slightly below the conventional 0.90 criterion. The divergence between the absolute and incremental fit indices may indicate localized item-level strain, residual covariation, or cross-loadings that are not fully represented in the current specification. Therefore, we retained the theoretically specified model rather than introducing additional post hoc modifications solely to optimize the fit, and the findings should be interpreted with caution.

Finally, the present study establishes a theoretical foundation rather than providing definitive evidence regarding organizational interventions. Future intervention studies should examine whether intentionally redesigning organizational structures, such as clarifying professional roles, improving coordination mechanisms, redesigning interdisci-

plinary meetings, or implementing structured knowledge-sharing systems, can strengthen knowledge-creation processes and subsequently improve both behavioral and affective team outcomes (Reeves et al., 2017). Such intervention research represents an important step toward translating organizational behavior theory into practical organizational design.

6. Conclusions

This study contributes to organizational behavior research by proposing that appropriately designed formal structures may support behavioral and affective team outcomes by facilitating knowledge-creation processes. Group formality was positively associated with knowledge creation, which, in turn, was positively associated with contextual performance and perceived emotional synchrony. These findings encourage a broader perspective in which formal organizational arrangements are viewed not only as mechanisms of standardization and control but also as potentially enabling resources for collective learning across professional boundaries.

Importantly, the present findings should not be interpreted as definitive evidence of causal effects or specific organizational interventions. The data were obtained from Japanese healthcare organizations using a cross-sectional self-report design, and the revised model retained some limitations in terms of global fit. Nevertheless, the findings provide a basis for future longitudinal, cross-national, and interventional research examining how organizational structures can be intentionally designed to strengthen collaborative knowledge creation and improve team outcomes in healthcare and other knowledge-intensive professional organizations.

Author Contributions: Conceptualization, H.K.; methodology, H.K.; software, H.K.; validation, H.K.; formal analysis, H.K.; investigation, H.K.; resources, H.K.; data curation, H.K.; writing—original draft preparation, H.K.; writing—review and editing, H.K. and T.H.; visualization, H.K.; supervision, T.H. and H.K.; project administration, H.K. All authors have read and agreed to the published version of the manuscript.

Funding: This study received no external funding.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Research Ethics Committee of the University of Tsukuba (protocol code 25-46; approved on 28 July 2025).

Informed Consent Statement: Informed consent was obtained from all the participants involved in the study.

Data Availability Statement: The data are not publicly available because the consent obtained from the participants and the approved ethics protocol did not include public data sharing. Reasonable requests may be considered by the corresponding author, subject to ethical and institutional approval.

Acknowledgments: The authors sincerely thank all healthcare professionals and medical administrative staff who participated in the survey.

Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

AVE	Average variance extracted
CFA	Confirmatory factor analysis
CFI	Comparative Fit Index
CMIN/DF	Chi-square divided by degrees of freedom

CP	Contextual performance
CR	Composite reliability
FORM	Group formality
HTMT	Heterotrait–monotrait ratio
KC	Knowledge-creation processes
OCB	Organizational citizenship behavior
NFI	Normed Fit Index
PES	Perceived emotional synchrony
RMSEA	Root Mean Square Error of Approximation
SECI	Socialization, externalization, combination, internalization
SEM	Structural equation modeling
SRMR	Standardized Root Mean Square Residual
TLI	Tucker–Lewis Index

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