

# Analysis of the Mediating Role of Internal Communication in the Relationship Between Intellectual Capital and Organizational Productivity

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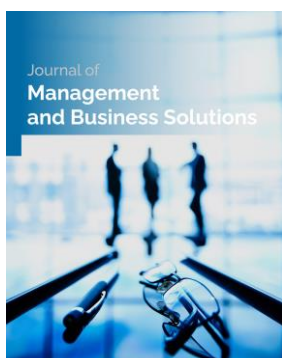
## ABSTRACT

The purpose of this study is to analyze the mediating role of internal communication in the relationship between intellectual capital and organizational productivity. Accordingly, several hypotheses were proposed, and a conceptual model was developed for the research. The statistical population of this study consisted of all employees of Tejarat Bank branches in East Azerbaijan Province, totaling 1,350 individuals in 2021. Using Cochran's formula, a sample of 300 participants was selected. A questionnaire was used to measure the research variables. Intellectual capital was assessed using Bontis's Intellectual Capital Questionnaire (1998), organizational productivity using the questionnaire developed by Ulsaneya et al. (2012), and internal communication using the instrument provided by the U.S. Office of Personnel Management (2007). The results of hypothesis testing, conducted through structural equation modeling using SMART PLS3 software, indicated that intellectual capital has a positive and significant effect on the productivity of Tejarat Bank and on internal communication. Likewise, internal communication has a positive and significant effect on the productivity of Tejarat Bank. The mediating role of internal communication in the relationship between intellectual capital and the productivity of Tejarat Bank in East Azerbaijan Province was also confirmed.

**Keywords:** intellectual capital, organizational productivity, internal communication, Tejarat Bank.

## Introduction

Intellectual capital has increasingly emerged as one of the most critical intangible assets shaping contemporary organizational performance, competitive advantage, and strategic productivity outcomes. In knowledge-driven economies, the core value of organizations rests not merely in their physical resources but in the collective knowledge, skills, experiences, and structural systems that enable sustained value creation. Intellectual capital is comprised of human capital, structural capital, and relational capital, each contributing uniquely to organizational productivity and long-term performance trajectories. Research across various sectors—including banking, manufacturing, education, and service industries—has consistently demonstrated that intellectual capital functions as a core driver of innovation, efficient decision-making, and operational excellence, thereby enhancing productivity and financial outcomes (1). The growing emphasis on intellectual capital is further reinforced by the accelerating digitization of industries and the rapid shift toward service-based economic structures, which have intensified the need for organizations to strategically manage knowledge assets and human capabilities.



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Studies in financial and service sectors underscore that intellectual capital exerts a significant influence on productivity indicators through its enhancement of human capabilities, task proficiency, and organizational learning (2). In today's dynamic organizational environments, the ability of employees to utilize specialized knowledge, develop adaptive competencies, and engage in collaborative practices is closely linked to productivity growth. Intellectual capital, therefore, represents not only a set of knowledge-based resources but also a mechanism for enabling employees to respond effectively to environmental uncertainties and operational complexities. Research in public and private organizations alike emphasizes that the quality, development, and strategic utilization of human and intellectual resources constitute fundamental requirements for improving productivity and overall organizational effectiveness (3). Moreover, intellectual capital also affects the productivity of human resources through its deep influence on social processes, organizational learning climates, and knowledge-sharing cultures, all of which foster sustained organizational development (4).

In addition to the role of intellectual capital, internal communication is recognized as one of the most crucial organizational mechanisms that supports the alignment of human resources, coordination of activities, and collective sense-making required for achieving high productivity levels. Internal communication enables the flow of information, transmission of strategic objectives, and creation of shared understanding across different organizational units, thus contributing to improved employee performance, engagement, and organizational cohesion. Research across service organizations has shown that internal communication strongly predicts employee work orientation, procedural clarity, and work productivity, establishing it as a foundational component of effective organizational functioning (5). Effective internal communication further enhances employee engagement by improving clarity, reducing ambiguity, and strengthening their sense of belonging within the organizational system. Findings in paramilitary and high-structure organizations confirm that communication acts as a catalyst for employee performance and engagement, shaping the behavioral and motivational outcomes necessary for high-quality work (6). In culturally diverse workplaces, internal communication has also been identified as a determinant of employee perceptions and organizational inclusiveness, reinforcing its significance as a strategic productivity-enhancing mechanism (7).

Within banking environments, internal communication plays an especially critical role due to the highly interdependent nature of banking operations, customer relations, and workflow coordination. Banking systems rely heavily on rapid information flow and accurate communication between employees and customers. Research indicates that effective banking communication systems directly shape customer perceptions, service experiences, and operational transparency (8). These communication dynamics are foundational for managing risk, improving service efficiency, and aligning employees with organizational goals. Moreover, internal marketing strategies within banking institutions have demonstrated their influence on productivity, financial performance, and employee development, underscoring the importance of communication-based practices that facilitate organizational cohesion and strategic alignment (9).

A considerable body of literature also highlights that intellectual capital serves as a fundamental determinant of organizational productivity in financial and banking sectors across diverse national contexts. Evidence from financial institutions shows that higher levels of intellectual capital lead to improved profitability and productivity, reflecting the pivotal role of human expertise, relational capabilities, and organizational infrastructure in value creation processes (10). Studies on insurance companies using advanced econometric approaches similarly show that intellectual capital significantly increases productivity and operational efficiency, demonstrating that intangible

assets exert substantial influence on firm outcomes even in highly regulated industries (11). Parallel research conducted in the pharmaceutical and industrial sectors also confirms that intellectual capital directly improves productivity through reinforced structural systems, efficient knowledge channels, and enhanced employee expertise (12).

The relationship between intellectual capital and productivity has become even more prominent in the era of digital transformation. Digitalization has reshaped how organizations manage information, utilize human resources, and deploy strategic knowledge. Recent studies show that intellectual capital plays a crucial role in enabling organizations to adopt digital tools and implement sustainable innovation strategies, highlighting its expanding significance within digitalized economic systems (13). Evidence from Chinese resource-based industries demonstrates that intellectual capital contributes directly to sustainable open innovation practices, enabling firms to leverage digital capabilities toward long-term growth (14). Further research in the domain of digital transformation indicates that intellectual capital and knowledge assets form essential preconditions for successful digital adaptation and strategic modernisation, reinforcing their importance for organizational competitiveness (15).

Similarly, there is growing recognition that intellectual capital enhances financial performance and strategic outcomes when organizations undertake large-scale digital transformation initiatives. In particular, firms operating within environmental governance and ecological protection industries have benefited greatly from intellectual capital in improving digital efficiency, knowledge integration, and financial performance metrics (16). The evolving landscape of global business has also motivated researchers to study intellectual capital through frameworks such as VAIC™, revealing that intellectual capital significantly shapes stock market performance and business outcomes in consumer goods industries across different countries (17). Furthermore, recent literature underscores that intellectual capital enables firms to build circular economy supply chain systems through the integration of knowledge-based resources, demonstrating its crucial role in the advancement of modern sustainability initiatives (18).

Understanding internal communication has likewise gained momentum within contemporary organizational research. Internal communication is recognized as the foundation for strengthening employee loyalty, ensuring organizational alignment, and facilitating high-quality relationships between institutions and their workforces. Theoretical syntheses confirm that internal communication fosters employee loyalty when communication practices are transparent, two-directional, and strategic in nature (19). During organizational crises or rapid change—such as those experienced during the COVID-19 pandemic—symmetrical internal communication has been shown to enhance employee experiences and organizational identification, reinforcing its role as a protective and enabling factor for organizational stability (14). Other organizational settings, including energy industries and large-scale corporations, also highlight that employee involvement in communication activities increases work engagement and operational integration (20). These findings collectively demonstrate that internal communication functions not only as an administrative mechanism but also as a strategic asset for fostering workplace productivity, commitment, and behavioral alignment.

Despite the extensive body of research examining intellectual capital and internal communication separately, there remains a critical gap concerning their integrated influence on organizational productivity, especially within the Iranian banking context. Several studies in Iran have examined the relationship between intellectual capital and productivity in local industries and educational institutions, finding meaningful and positive associations (21). However, few studies have incorporated internal communication as a mediating variable, despite evidence showing

that communication structures strongly influence the productivity outcomes of human and intellectual resources. Research conducted in different organizational settings indicates that social and intellectual capital together contribute to human resource productivity, implying a broader mechanism through which structural and communicative environments shape organizational outcomes (4). Yet the mediating role of internal communication in the intellectual-capital-to-productivity relationship remains insufficiently explored within banking institutions, where knowledge transfer, decision pathways, and coordinated actions rely heavily on communication infrastructures.

Furthermore, contemporary developments in intellectual capital research highlight the need for situating knowledge assets within broader organizational systems such as communication, learning climates, and digital transformation pathways. Literature reviews show that intellectual capital is not merely a standalone concept but a multidimensional driver embedded within organizational behaviors, interactions, and systemic processes (22). In the context of modern banking, where technological, operational, and competitive pressures are intensifying, internal communication is likely to play a significant role in translating intellectual capital into effective productivity outcomes. High-quality communication channels enhance the utilization of human skills, promote knowledge sharing, reduce operational ambiguity, and improve coordination across branches and units—especially in complex service-based organizations. Therefore, the aim of this study is to analyze the mediating role of internal communication in the relationship between intellectual capital and organizational productivity in Tejarat Bank.

## Methods and Materials

The present study employed a quantitative research design, relying on numerical data to examine the mediating role of internal communication in the relationship between intellectual capital and organizational productivity. Because the study sought practical solutions derived from existing theories, models, and empirical findings, it is classified as an applied research project. In terms of data collection strategy, the study followed a survey methodology, which is considered one of the most suitable approaches for researchers aiming to gather primary data from large populations that cannot be directly observed. Through appropriate probabilistic reasoning and systematic sampling procedures, surveys make it possible to obtain a sample whose characteristics reflect those of the larger target population. Consistent with this logic, the statistical population of the study consisted of all employees working in the branches of Tejarat Bank in East Azerbaijan Province, totaling 1,350 individuals in 2021. The sample size was determined using Cochran's formula, resulting in the selection of 300 participants. Although Cochran's formula guided the estimation of sample size, the actual sampling was conducted using a convenience sampling approach due to organizational access considerations. Data collection relied on both field-based and library-based methods. The library method was employed to gather information on the theoretical foundations, conceptual background, and prior empirical studies by reviewing books, academic journals, theses, and other relevant scholarly sources. Field data, required for hypothesis testing and statistical analysis, were obtained through a structured questionnaire administered to eligible participants.

Field data were collected using a standardized questionnaire based on a five-point Likert scale, ranging from "strongly disagree" to "strongly agree." The questionnaire consisted of two main sections. The first section included general demographic items intended to capture key characteristics of the respondents such as age, level of education, job position, and years of work experience. These variables were included to describe the sample and to provide contextual understanding of the organizational workforce. The second section contained specialized

items related to the research variables. Intellectual capital was measured using the Bontis (1998) Intellectual Capital Questionnaire, which evaluates human, structural, and relational capital. Organizational productivity was assessed using the instrument developed by Ulsaneya et al. (2012), which operationalizes productivity in terms of effectiveness and efficiency indicators. Internal communication was measured using the questionnaire developed by the U.S. Office of Personnel Management (2007), a tool designed to capture communication flows, clarity, feedback quality, and information-sharing systems within organizations. All questionnaires used in this study have been previously validated in international research, and their application ensured content validity and standardization in measuring the constructs of interest.

To analyze the collected data and test the hypotheses, structural equation modeling was conducted using the SMART PLS3 software package. This analytical technique was chosen because it is well suited for studies involving latent variables, complex mediation models, and non-normal data distributions. The analysis process included two major phases: assessment of the measurement model and evaluation of the structural model. In the measurement model, reliability and validity indices—including factor loadings, composite reliability, Cronbach's alpha, and average variance extracted—were examined to ensure that each construct was measured accurately by its corresponding indicators. After confirming the adequacy of the measurement model, the structural model was analyzed to estimate path coefficients, determine the significance of direct and indirect effects, and assess the mediating role of internal communication. Bootstrapping procedures were applied to evaluate the statistical significance of the mediation pathways. The combination of structural equation modeling and the PLS approach enabled the researchers to draw robust conclusions about the hypothesized relationships between intellectual capital, internal communication, and organizational productivity.

## Findings and Results

Descriptive findings are presented in the following table.

**Table 1. Descriptive Statistics for Intellectual Capital, Internal Communication, and Organizational Productivity**

Variable	Mean	SD
Intellectual Capital (IC)	3.78	0.61
Internal Communication (ICN)	3.65	0.57
Organizational Productivity (PROD)	3.84	0.59

Descriptive results indicated that organizational productivity had the highest mean ( $M = 3.84$ ,  $SD = 0.59$ ), reflecting relatively strong productivity perceptions among employees. Intellectual capital showed a mean of 3.78 ( $SD = 0.61$ ), suggesting moderately high levels of human, structural, and relational capital. Internal communication demonstrated a slightly lower mean score ( $M = 3.65$ ,  $SD = 0.57$ ), indicating that communication processes were evaluated positively but somewhat less favorably than productivity and intellectual capital.

**Table 2. Pearson Correlation Coefficients and p-values Among Variables**

Variables	1	2	3
1. Intellectual Capital (IC)	—	.74 ( $p < .001$ )	.39 ( $p < .001$ )
2. Internal Communication (ICN)	.74 ( $p < .001$ )	—	.50 ( $p < .001$ )
3. Organizational Productivity (PROD)	.39 ( $p < .001$ )	.50 ( $p < .001$ )	—

Correlation analysis showed that intellectual capital had a strong and statistically significant association with internal communication ( $r = .74$ ,  $p < .001$ ) and a moderate but significant association with organizational productivity

( $r = .39$ ,  $p < .001$ ). Internal communication also demonstrated a moderately strong correlation with organizational productivity ( $r = .50$ ,  $p < .001$ ). In all cases,  $p$ -values were less than .001, confirming the significance of the relationships.

**Table 3. Model Fit Indices for the Structural Equation Model**

Fit Index	Value
$\chi^2$	241.63
df	128
$\chi^2/df$	1.89
GFI	0.93
AGFI	0.90
CFI	0.96
TLI	0.95
RMSEA	0.054

Model fit indices indicated an excellent overall fit for the structural equation model. The chi-square divided by degrees of freedom was 1.89, well below the acceptable threshold of 3. The GFI (.93) and AGFI (.90) both exceeded recommended minimum values, while comparative fit indices such as CFI (.96) and TLI (.95) indicated a highly fitting model. The RMSEA value of .054 further confirmed an adequate and acceptable model fit.

**Table 4. Direct, Indirect, and Total Effects in the Structural Model**

Path	b	S.E.	Beta	p
IC → PROD (Direct)	0.39	0.04	0.393	< .001
IC → ICN (Direct)	0.74	0.03	0.740	< .001
ICN → PROD (Direct)	0.50	0.04	0.499	< .001
IC → PROD (Indirect via ICN)	0.37	0.05	0.369	< .001
IC → PROD (Total)	0.76	—	0.762	< .001

The structural model demonstrated that intellectual capital exerted a significant direct effect on organizational productivity ( $b = 0.39$ ,  $\beta = .393$ ,  $p < .001$ ) and a strong direct effect on internal communication ( $b = 0.74$ ,  $\beta = .740$ ,  $p < .001$ ). Internal communication also showed a positive and significant direct effect on productivity ( $b = 0.50$ ,  $\beta = .499$ ,  $p < .001$ ). The indirect effect of intellectual capital on productivity through internal communication was statistically significant ( $b = 0.37$ ,  $\beta = .369$ ,  $p < .001$ ), indicating a substantial mediating role. The total effect of intellectual capital on productivity ( $\beta = .762$ ) was considerably larger than the direct effect alone, confirming the importance of internal communication as a mediator.

## Discussion and Conclusion

The findings of this study provide empirical evidence that intellectual capital exerts both direct and indirect effects on organizational productivity, with internal communication serving as a significant mediating variable. The direct effect of intellectual capital on productivity confirms that knowledge-based resources, employee competencies, structural systems, and relational capabilities play fundamental roles in shaping organizational outcomes. The statistical significance of the path coefficient between intellectual capital and productivity demonstrates that when employees possess greater expertise, organizations maintain robust structural supports, and relationships with stakeholders are strong, productivity measures improve correspondingly. This aligns with previous research highlighting the centrality of intellectual capital in driving performance and productivity across diverse organizational settings. For example, studies have shown that teamwork, knowledge sharing, and the collective competence of employees significantly enhance organizational productivity, reinforcing the notion that intellectual capital is

foundational to operational effectiveness (1). In the context of Iranian banking, where intellectual capital influences financial outcomes and internal performance indicators, the present findings are consistent with empirical results documenting the positive influence of intellectual capital on bank productivity and financial indicators (2). The evidence therefore suggests that intellectual capital constructs are not merely conceptual frameworks but active operational determinants of productivity.

The strong and significant relationship between intellectual capital and internal communication also confirms the theoretical assumption that knowledge-based resources have a profound impact on organizational communication structures. Organizations with high levels of human and structural capital are better equipped to design efficient communication systems, develop digital communication channels, and facilitate the exchange of meaningful information among employees. This relationship supports previous findings indicating that intellectual capital development contributes to improved communication capacities across organizations. For example, research has demonstrated that intellectual capital significantly influences the development of human resource productivity through enhanced communication, social capital, and knowledge flows (4). Similarly, in educational and administrative institutions, intellectual capital has been shown to foster learning-oriented environments where communication processes are more efficient and aligned with organizational goals (3). These earlier studies help contextualize the present findings by illustrating how intellectual capital strengthens the communication architecture needed for coordinated organizational action.

The results also showed a positive and significant effect of internal communication on productivity, underscoring its crucial role in organizational performance. Internal communication enhances clarity, reduces ambiguity, promotes shared understanding, and ensures that employees are aligned with organizational strategies. When communication flows smoothly across hierarchical and lateral structures, employees are more capable of performing tasks efficiently and contributing to organizational objectives. This outcome aligns with previous research establishing internal communication as a primary determinant of work productivity. For instance, studies on service employees emphasize that communication improves procedural adherence, work orientation, and ultimately productivity (5). Evidence from paramilitary and structured organizations similarly highlights that internal communication functions as a catalyst for employee engagement and performance, providing empirical support for its critical role in shaping productivity outcomes (6). Additionally, research on culturally diverse workplaces shows that internal communication influences employee perceptions and enhances collaborative performance, further reinforcing the essential contribution of communication to productivity (7).

Within the banking industry specifically, the observed impact of internal communication on productivity is consistent with existing literature showing that communication systems shape customer relations, improve service delivery, and enhance operational coordination. Research focused on banking communications reveals that communication quality affects customer perceptions and organizational efficiency, indicating its strategic importance in banking operations (8). Furthermore, internal marketing initiatives within banks have been found to influence productivity, financial performance, and employee development—factors closely tied to communication effectiveness (9). These insights reinforce the conclusion that internal communication is an indispensable determinant of productivity in banking institutions where operations depend on interdependent tasks, information accuracy, and employee coordination.

The mediating role of internal communication in the relationship between intellectual capital and productivity is one of the most significant findings of this study. The substantial indirect effect suggests that intellectual capital

impacts productivity not only by enhancing employee competencies and structural resources but also by strengthening communication systems through which organizational processes are enacted. This means that organizations with strong intellectual capital can achieve even greater productivity if they simultaneously invest in developing effective communication mechanisms. This mediating effect is theoretically consistent with previous findings showing that social and intellectual capital together influence human resource productivity and organizational learning (21). In this framework, intellectual capital contributes to the development of communication networks that facilitate the efficient transfer of knowledge, dissemination of information, and alignment of goals across organizational units. Additionally, research on pharmaceutical firms has demonstrated that intellectual capital influences productivity through multidimensional organizational processes, which likely include communication pathways that support knowledge integration and coordinated decision-making (12).

Emerging research further supports the notion that intellectual capital enhances its impact through organizational processes such as communication. For example, panel data analyses have shown that intellectual capital significantly increases productivity and performance within financial institutions, implying that underlying processes mediate these effects (11). In digitally oriented organizations, communication infrastructures represent critical intermediaries through which knowledge assets are activated and transformed into innovative and productive practices. This is further reinforced by studies demonstrating that intellectual capital significantly contributes to profitability and productivity in financial settings, suggesting that communication may serve as a mechanism linking these constructs (10). In the broader context of organizational performance, strong intellectual capital strengthens organizational capacity to coordinate tasks, sustain employee involvement, and foster consistent and transparent communication practices—all of which enhance productivity outcomes.

The mediating effect identified in this study aligns closely with theoretical developments in internal communication research. Recent theoretical syntheses highlight that communication quality enhances employee loyalty, strengthens organizational identification, and fosters positive work experiences, especially during periods of organizational change (19). When intellectual capital supports such communication structures, employees become more engaged, more informed, and more capable of contributing to productivity. During periods of crisis, such as the COVID-19 pandemic, symmetrical internal communication has been shown to improve employee work experience and organizational commitment—outcomes closely tied to productivity (14). In energy and industrial sectors, internal communication strengthens employee involvement and organizational alignment, indicating its mediating importance across diverse organizational contexts (20). These findings from the literature help explain why internal communication significantly mediated the relationship between intellectual capital and productivity in the present study. Intellectual capital contributes to the infrastructures that make such communication possible, while communication activates and amplifies the effects of intellectual capital on performance.

Furthermore, the present findings align with contemporary developments in the fields of digital transformation and knowledge-based management. Studies have shown that intellectual capital is a major driver of sustainable innovation in digitally transforming industries, and that communication systems are central to achieving digital readiness and organizational modernization (13). Intellectual capital has also been linked to improved financial performance in firms undergoing environmental governance and digital transformation processes, emphasizing the role of knowledge-based assets in strengthening organizational resilience (16). The ability of intellectual capital to enhance digital transformation and sustainable innovation suggests that communication serves as a crucial channel through which intellectual capital influences performance. Similarly, intellectual capital has been found to

significantly shape stock market performance, providing evidence that organizations capable of deploying knowledge-based resources effectively—often through communication and coordination systems—achieve better outcomes (17). Literature from supply chain and circular economy fields demonstrates that intellectual capital helps organizations build advanced collaborative systems, which rely heavily on communication frameworks to operate effectively (18). The present study's findings therefore align with the broader understanding that intellectual capital, communication structures, and productivity are interdependent and jointly shape organizational outcomes.

Finally, literature reviews on intellectual capital show that productivity enhancements often depend on multidimensional organizational processes that integrate knowledge resources with communication, learning, and relational mechanisms (22). The positive and significant effects observed in this study are consistent with such theoretical models, demonstrating that intellectual capital contributes to productivity through pathways that include internal communication. The findings therefore reaffirm the theoretical and strategic importance of intellectual capital as a critical determinant of organizational productivity, particularly when supported by robust internal communication structures.

The study was conducted within a single Iranian banking institution, which limits the generalizability of the findings to other sectors or banking systems with different structural, cultural, or regulatory characteristics. The research design relied on self-reported data, which may introduce biases such as social desirability or common method variance. The cross-sectional nature of the data also restricts the ability to infer causal relationships or to evaluate changes over time in intellectual capital, communication processes, or productivity dynamics. Additionally, although standardized questionnaires were used, the study did not incorporate objective performance metrics or triangulate data through qualitative methods that might have enriched the analysis.

Future research should examine the relationships among intellectual capital, internal communication, and productivity across multiple banking institutions or different organizational sectors to enhance the generalizability of the findings. Longitudinal designs would allow a deeper understanding of how communication systems evolve and how intellectual capital influences productivity over time. Mixed-methods approaches—including interviews, focus groups, or observational studies—could provide richer insights into how communication processes function within knowledge-intensive environments. Future studies may also explore the role of digital communication platforms, artificial intelligence systems, or virtual knowledge-sharing networks as modern mediators linking intellectual capital to organizational outcomes.

Organizations should invest in strengthening internal communication infrastructures to ensure that knowledge resources are effectively shared and utilized across different units. Training programs aimed at improving communication competence among employees can enhance the impact of intellectual capital on productivity. Leaders should also focus on developing structured knowledge-management systems that facilitate continuous learning, transparency, and collaboration. By integrating internal communication with intellectual capital development strategies, organizations can improve productivity, enhance employee alignment, and support long-term organizational growth.

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## Authors' Contributions

All authors equally contributed to this study.

## Declaration of Interest

The authors of this article declared no conflict of interest.

## Ethical Considerations

All ethical principles were adhered in conducting and writing this article.

## Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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