Vol. 5 No. 1 (2026)
e-ISSN: 2963-7589
Economic and Business Journal | ECBIS
https://ecbis.net/index.php/go/index

TRAINING, TECHNOLOGY CAPABILITY, AND COMPENSATION: THE MEDIATING ROLE OF AGENT PERFORMANCE IN BANKING CONTACT CENTER

Eka Tofa Kumalasari[1], Sandra Arfan[2], Cicih Ratnasih[3]

[1-3] Faculty of Economics, Borobudur University, Jakarta, Indonesia
E-mail: [1)] ekatofakumalasari@gmail.com

Submitted:	Revised:	Accepted:
12 September 2026	08 October 2026	02 November 2026

Abstract

The banking contact center has become a frontline service channel that depends heavily on both agent competence and digital systems. This study examines whether training and technology capability affect compensation, and whether agent performance mediates these relationships. A quantitative explanatory design was used with agents from a private bank contact center in Jakarta. Data were collected using a structured questionnaire and analyzed with multiple regression, path analysis, and mediation testing. The results show that training and technology capability positively affect agent performance. Both variables also positively affect compensation, while agent performance demonstrates the strongest direct effect. Furthermore, agent performance partially mediates the effect of training on compensation and the effect of technology capability on compensation. These findings suggest that competency investments improve compensation both directly and through enhanced operational outcomes. Contact center managers should therefore treat skill development, technological proficiency, and performance management as interconnected components of the reward system.

Keywords: *training, technology capability, agent performance, compensation, contact center*

1. INTRODUCTION

Over the past decade, banking services have shifted rapidly toward digital channels. Mobile banking, internet banking, customer relationship management systems, and omnichannel platforms now shape how customers interact with financial institutions. Contact centers, once viewed merely as support units, have become the frontline of customer experience. Agents handle complaints, provide information, and resolve problems while operating several digital systems simultaneously.

This shift creates new demands for human resource management. Banks cannot rely on technology investment alone; they also need employees who can leverage these tools effectively. Human Capital Theory posits that knowledge, skills, and abilities are forms of capital that raise productivity and organizational value. From this perspective, training and technology capability are strategic investments that should produce measurable returns for both the organization and the employees.

In practice, the link between competency investment and employee rewards is not always direct. Some studies report that motivation and compensation affect employee performance

directly in traditional organizational settings (Rozali 2018). Conversely, other research indicates that training and compensation affect performance indirectly through mechanisms like job satisfaction (Luthfiyah 2025). Similar debates appear in the technology capability literature. Earlier work has examined how high organizational commitment shapes and increases employee performance (Shinta Oktafien and Anton Budi Santoso 2025), but the specific roles of training and technology capability in banking contact centers remain underexplored. This raises a critical question: does training affect compensation directly, or does it work primarily through enhanced performance? The same question applies to technology capability.

Most prior studies on this topic were conducted in manufacturing, education, or public organizations, leaving a distinct gap in the literature. Evidence from banking contact centers is limited, even though this setting possesses unique features: high digital intensity, strict performance metrics, and performance-based reward systems. This gap motivates the present study.

This study examines the effects of training and technology capability on compensation, with agent performance as a mediating variable. It contributes to the literature in three ways. First, it extends Human Capital Theory to the banking contact center context. Second, it provides evidence on the partial mediating role of agent performance. Third, it links Human Capital Theory and Performance-Based Compensation Theory in a single empirical model. The novelty of this study lies in its focus on the banking contact center as a unique digital-intensive service environment, where the mediating mechanism of agent performance between competency investments and compensation has not been previously examined. The research objective is to analyze whether training and technology capability affect compensation directly or indirectly through agent performance.

2. RESEARCH METHOD

This study employed a quantitative explanatory research design. The population consisted of agents at a private bank contact center in Jakarta. Using a proportional sampling technique, data were collected from respondents through a closed-ended questionnaire distributed digitally. The instrument utilized a five-point Likert scale ranging from strongly disagree to strongly agree, encompassing items across four main variables.

Training was measured by assessing material relevance, delivery methods, and evaluation mechanisms. Technology capability was evaluated based on system operation proficiency, digital routing, and adaptation to new tools. Agent performance was defined as the measurable output of an individual's efforts in fulfilling organizational responsibilities (Chairunnisah, Km, and Mataram 2021), measured through service speed, accuracy, and customer satisfaction. Compensation was assessed based on base salary fairness, bonuses, and alignment with performance metrics.

Validity was tested using Pearson correlation, and reliability was assessed via Cronbach's Alpha. Classical assumption tests included normality, multicollinearity, and heteroscedasticity checks. Common method bias was evaluated using Harman's single factor test. Hypothesis testing utilized multiple regression, path analysis, and mediation testing procedures (Ghozali 2021). The structural equations are formulated as follows:

$$Z = \rho ZX1 + \rho ZX2 + e1 \quad (1)$$

$$Y = \rho YX1 + \rho YX2 + \rho YZ + e2 \quad (2)$$

where Z represents agent performance, Y denotes compensation, X1 indicates training, X2 signifies technology capability, ρ represents path coefficients, and e denotes the error term.

3. RESULTS AND DISCUSSION

The demographic profile of the respondents indicates a balanced gender distribution, with a majority falling within the 26–30 age group. Educational attainment is relatively high, with most holding bachelor's degrees or diplomas. In terms of tenure, the largest group has worked for 1–3 years. This profile reflects the typical characteristics of contact center operations: a young, educated workforce with moderate experience, which aligns with the industry's tendency to employ individuals who can adapt quickly to technology-intensive environments.

Table 1. Respondent Profile

Category	Frequency	Percentase (%)
Male	47	48,0
Female	51	52,0
Age 20–25 years	29	29,6
Age 26–30 years	38	38,8
Age 31–35 years	23	23,5
Age >35 years	8	8,2
SMA/SMK	12	12,2
Diploma (D3)	31	31,6
Undergraduate (S1)	50	51,0
Masters (S2)	5	5,1
Work period <1 years	15	15,3
Work period 1–3 years	44	44,9
Work period 4–6 years	26	26,5
Work period >6 years	13	13,3

Source: *Proceed Data, 2026*

The instrument quality assessment confirms that all measurement items meet validity and reliability standards. Corrected item-total correlations exceeded the minimum threshold, and

Cronbach's Alpha values for all variables surpassed 0.70, indicating that the measurement instrument is internally consistent and suitable for hypothesis testing.

Table 2. Validity and Reliability Test Results

Variable	Total Item	Correlation Item-Total	Cronbach's Alpha	Information
Training (X1)	10	0,38–0,84	0,88	Valid and reliabel
Technology Capability (X2)	10	0,32–0,86	0,91	Valid and reliabel
Agent Performance (Z)	10	0,36–0,89	0,89	Valid and reliabel
Compensation (Y)	10	0,42–0,93	0,92	Valid and reliabel

Source: *Proceed Data, 2026*

Classical assumption tests confirm that the regression models meet all required statistical prerequisites. Normality testing showed significance values above 0.05, indicating normally distributed residuals. Multicollinearity assessment revealed Variance Inflation Factor (VIF) values well below 10 and tolerance values above 0.10, confirming the absence of multicollinearity. Heteroscedasticity tests showed no significant patterns, validating the appropriateness of using multiple regression and path analysis.

Table 3. Classical Assumption Test Results

Test	Model 1 (X1, X2 → Z)	Model 2 (X1, X2, Z → Y)	Criteria	Conclusion
Normality (Kolmogorov-Smirnov)	Sig. = 0,200	Sig. = 0,200	Sig. > 0,05	Normal
Multicollinearity (VIF)	X1 = 5,797; X2 = 5,797	X1 = 2,183; X2 = 3,079; Z = 3,569	VIF < 10	No multicollinearity
Multicollinearity (Tolerance)	X1 = 0,173; X2 = 0,173	X1 = 0,182; X2 = 0,143; Z = 0,174	Tolerance > 0,10	No multicollinearity
Heteroscedasticity (Glejser)	Sig. > 0,05	Sig. > 0,05	Sig. > 0,05	No heteroscedasticity

Source: *Proceed Data, 2026*

Common method bias was assessed using Harman's single factor test, which examines whether a single factor accounts for the majority of variance in the dataset. The results show that the first factor explains only 25,246% of the total variance, which is substantially below the critical threshold of 50%. The second factor accounts for 5,411% (cumulative 30,657%), the third for 4,892% (cumulative 35,549%), the fourth for 4,597% (cumulative 40,147%), and the fifth for 4,400% (cumulative 44,546%). Since no single factor dominates the variance structure, common method bias does not pose a serious threat to the validity of the

findings. This suggests that the data collection method and questionnaire design effectively minimized systematic measurement error.

Table 4. Harman's Single Factor Test Results

Factor	Initial Eigenvalues (% of Variance)	Cumulative (%)
1	25,246	25,246
2	5,411	30,657
3	4,892	35,549
4	4,597	40,147
5	4,4	44,546

Source: *Proceed Data, 2026*

Linearity testing using ANOVA confirms that all hypothesized relationships exhibit linear patterns, which is a prerequisite for regression analysis. Linearity testing using ANOVA confirms that all hypothesized relationships exhibit linear patterns, which is a prerequisite for regression analysis.

All relationships meet the linearity assumption, validating the use of linear regression techniques for hypothesis testing.

Table 5. Linearity Test Results

Relationship		Linearity (Sig.)	Deviation from Linearity (Sig.)	Conclusion
Compensation Training	*	0,000	0,133	Linear
Compensation Technology	*	0,000	0,747	Linear
Performance Training	*	0,000	0,004	Linear
Performance Technology	*	0,000	0,134	Linear
Performance Compensation	*	0,000	0,334	Linear

Source: *Proceed Data, 2026*

The first path model examined the effects of training and technology capability on agent performance. The model explained a high percentage of the variance in agent performance. Training had a positive and significant effect, supporting the first hypothesis. Technology capability showed an even stronger positive and significant effect, supporting the second hypothesis.

The second path model examined the effects of training, technology capability, and agent performance on compensation. Training had a positive and significant direct effect on compensation, supporting the third hypothesis. Technology capability also had a positive and significant direct effect, supporting the fourth hypothesis. Agent performance demonstrated the strongest direct effect on compensation, supporting the fifth hypothesis.

Table 6. Path Analysis and Hypothesis Testing Results

Hipotesys	Track	Koefisien β	t-count	Sig.	Conclusion
H1	Training → Agent Performance	0,336	4,041	0,000	Accepted
H2	Technology Capability → Agent Performance	0,403	4,485	0,000	Accepted
H3	Training → Compensation	0,156	2,254	0,026	Accepted
H4	Technology Capability → Compensation	0,146	2,205	0,043	Accepted
H5	Agent Performance → Compensation	0,612	6,335	0,000	Accepted
H6	Training → Agent Performance → Compensation	Z = 3,639	—	0,000	Accepted
H7	Technology Capability → Agent Performance → Compensation	Z = 4,184	—	0,000	Accepted

Source: *Proceed Data, 2026*

The Sobel test provides formal statistical evidence for the mediation effects. Mediation testing confirmed the indirect effects. Agent performance significantly mediated the effect of training on compensation, supporting the sixth hypothesis. Similarly, agent performance significantly mediated the effect of technology capability on compensation, supporting the

seventh hypothesis. Since the direct effects remained significant, the mediation is partial rather than full.

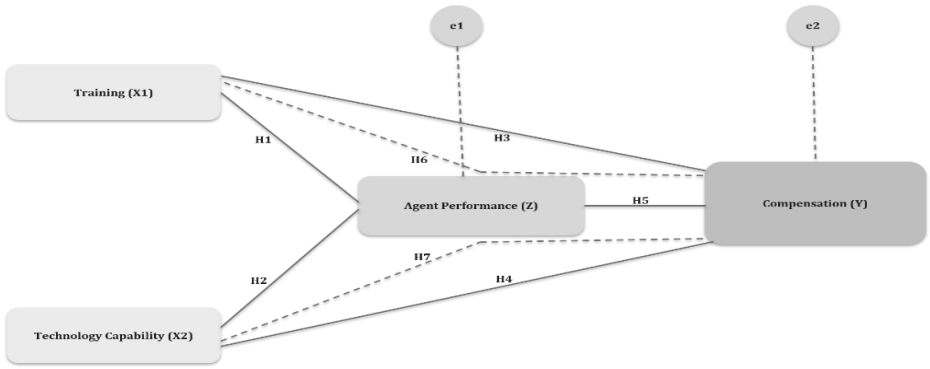
This means that training and technology capability influence compensation through two pathways: directly (because organizations value the competencies themselves) and indirectly through improved agent performance.

Table 7. Sobel Test Results

Indirect Path	A	B	SE_A	SE_B	Z	Sig.	Conclusion
Training → Agent Performance → Compensation	0,461	0,626	0,114	0,075	3,639	0	Significant mediation
Technology Capability – Agent Performance – Compensation	0,324	0,626	0,067	0,075	4,184	0	Significant mediation

Source: Author's data processing (2026)

Figure 1. Conceptual Mode



Note: Solid lines indicate direct effects; dashed lines indicate indirect effects through mediation
Source: Proceed Data, 2026

These findings strongly support Human Capital Theory. Training and technology capability represent investments in employee knowledge and skills, which raise productivity and, in turn, affect economic rewards. The results also validate Performance-Based Compensation Theory, which holds that organizations reward employees based on measurable contributions (Gerhart, Newman, and Milkovich 2023).

In the banking contact center context, where agents must navigate CRM systems, digital call routing, and omnichannel dashboards simultaneously, technology capability emerged as a slightly stronger predictor of performance than training. This aligns with recent empirical evidence showing that digital competence and technology adoption directly enhance employee efficiency and service accuracy in the banking sector (Annisa, Siahaan, and Lumbanraja 2024). It suggests that while foundational training is necessary, the ability to actively leverage digital tools is the primary driver of an agent's operational success. Furthermore, large-scale empirical evidence demonstrates that targeted technology training and AI assistance significantly enhance agent productivity and performance in service.

The partial mediation finding has profound practical implications. It suggests that organizations value both the process of competency development and its outcomes. Training not only improves environments (Brynjolfsson, Li, and Raymond 2025).

The partial mediation finding has profound practical implications. It suggests that organizations value both the process of competency development and its outcomes. Training not only improves skills but also increases an employee's bargaining power for better financial and non-financial rewards (Alien Dewi Alifah and Ahmad Mardalis 2025). Organizational investments like training must first translate into individual competence to yield reward outcomes (Gustshella et al. 2024). At the same time, the indirect path through performance remains strong. Without performance improvement, the effect of training and technology capability on compensation would weaken. This confirms models proposing that in hybrid, metric-driven work environments like call centers, behavioral performance outcomes must precede and justify reward outcomes (Story and Castanheira 2021).

These results align with and expand upon previous studies. Evaluating technological competencies is crucial, as it directly dictates how effectively new systems are utilized to improve operational outcomes (Candolfi-Arballo et al. 2022). Strategic innovation requires harnessing technology not just for operational growth but also for aligning human resource policies with digital transformation (Damayanti and Ratnasih 2025). Effective management information systems are foundational for tracking agent performance metrics and aligning them with compensation structures (Erwin et al. 2024). Furthermore, compensation systems that are perceived as fair significantly boost employee motivation, which in turn drives higher performance (Ervina, Ferdinand, and Meitiana 2023).

Talent-based training programs improve cognitive engagement, which subsequently translates into superior individual performance (Fachrunnisa et al. 2022). Transparent, technology-supported human resource information systems (HRIS) strengthen the perceived fairness of compensation and its link to performance (Fatimah & Hidayat, 2026). Training that enhances self-awareness and soft skills directly improves the quality of interactions and job performance among banking professionals (Gathuya, J. Chewen (PhD), and Chepsiror (PhD) 2026). In the banking sector, determinants of labor productivity directly dictate the structure and magnitude of employee compensation (Irwan, Fadliyanti, and Purwadinata

2026). Contact center agents' positive perception of technology adoption is critical for promoting quality customer service and operational efficiency (Modjela and Mkhomazi 2025).

Enhancing employee performance in banking requires a synergistic approach combining digital literacy, targeted training, and aligned (Prasetya, Maryadi, and Hutahayan 2026). Workplace technology adoption necessitates concurrent organizational change management to ensure that new tools effectively enhance employee performance (Obadiah et al. 2025). Electronic human resource management practices significantly enhance perceived organizational performance, especially when moderated by information technology (ALRawashdeh et al. 2024). The formulation of organizational strategy heavily relies on information technology capabilities to drive overall performance (Sonjaya, Yudianto, and Nurpratama 2025). Digital transformation improves productivity only when employees are adequately trained to use new technologies effectively (Verhoef et al. 2021). In the high-pressure contact center context, job resources and support are vital for maintaining job satisfaction and mitigating turnover intentions (Zito et al. 2018), Furthermore, service quality and trust significantly influence loyalty through satisfaction, a mechanism that parallels how agent performance mediates the link between organizational inputs and rewards (Erwin et al. 2024).

4. CONCLUSION

This study demonstrates that training and technology capability are critical investments that enhance both agent performance and compensation in banking contact centers. Agent performance serves as a vital bridge, transforming competency development into tangible economic rewards through both direct and indirect pathways. These findings extend Human Capital Theory by establishing technology capability as a distinct form of human capital in digital-intensive service environments, while also enriching Performance-Based Compensation Theory by revealing how competency investments influence rewards through multiple mechanisms. For contact center managers, the practical implication is clear: training programs must be integrated with performance evaluation systems, and digital competency should be explicitly recognized as a criterion in compensation decisions to maximize both employee development and organizational outcomes.

The study has several limitations that warrant consideration. First, data were collected from a single contact center, which may constrain the generalizability of findings to other banking institutions or service industries with different operational characteristics.

Second, the cross-sectional design captures only a snapshot in time, limiting the ability to observe how these relationships evolve as digital technologies and compensation systems continue to transform. Future research could address these limitations by employing longitudinal designs across multiple organizations, expanding sample sizes to include diverse banking contexts, and exploring additional variables such as work motivation, organizational support, leadership styles, or the moderating role of generational differences

in technology adoption.

.

REFERENCES

Alien Dewi Alifah, and Ahmad Mardalis. 2025. "Pengaruh Penggunaan Media Sosial Dan Pelatihan Kerja Terhadap Kinerja Pegawai Dengan Kompensasi Sebagai Mediasi Pada Badan Keuangan Daerah Kabupaten Pacitan." *El-Mal: Jurnal Kajian Ekonomi & Bisnis Islam* 6(3). doi:10.47467/elmal.v6i3.7418.

ALRawashdeh, Naji Mohammad Awwad, Nur Amalina Mohamad Zaki, Nik Hazimah Binti Nik Mat, Juhaizi Bin Mohd Yusof, and Siti Nur 'Atikah Zulkiffli. 2024. "Impact of Electronic Human Resource Management Practices on Perceived Organization Performance: Moderating Role of Information Technology Capability on Jordanian Universities." *Pakistan Journal of Life and Social Sciences (PJLSS)* 22(1). doi:10.57239/PJLSS-2024-22.1.00477.

Annisa, Sri, Elisabet Siahaan, and Prihatin Lumbanraja. 2024. "Impact of Digital Transformation on Banking Employee Performance with Self-Efficacy as a Mediator." *Problems and Perspectives in Management* 22(4):523–31. doi:10.21511/ppm.22(4).2024.39.

Brynjolfsson, Erik, Danielle Li, and Lindsey Raymond. 2025. "Generative AI at Work." *The Quarterly Journal of Economics* 140(2):889–942.

Candolfi-Arballo, Norma, Alfredo Hualde-Alfaro, Yessica Espinosa-Díaz, Patricia Avitia-Carlos, and Bernabé Rodríguez-Tapia. 2022. "The Evaluation of Technological Competencies among Leaders of the Renewable Energy Industry: The Case of SMEs in Baja California, Mexico." *Energies* 15(16):5946. doi:10.3390/en15165946.

Chairunnisah, Reni, S. Km, and PMFH Mataram. 2021. "Teori Kinerja Karyawan." *Kinerja Karyawan* 29. https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Chairunnisah%2C+R.%2C+Km%2C+S.%2C+%26+Mataram%2C+P.+M.+F.+H.+%282021%29.+Teori+Kinerja+Karyawan.+Kinerja+Karyawan%2C+29.&btnG=.

Damayanti, Dian, and Cicih Ratnasih. 2025. "Strategic Innovation in Economic Development and Defense Industries." Pp. 195–220 in.

Ervina, Ervina, Ferdinand Ferdinand, and Meitiana Meitiana. 2023. "Pengaruh Kompensasi Terhadap Kinerja Pegawai Dengan Motivasi Sebagai Variabel Mediasi Pada PT. Pos Indonesia Kantor Pos Palangka Raya." *Edunomics Journal* 4(2):144–66. doi:10.37304/ej.v4i2.10027.

Erwin, Erwin, Loso Judijanto, Annisa Fitri Anggraeni, Nurfaidah Nurfaidah, Febriyani Damayanti, Herva Emilda Sari, and Novi Indrayani. 2024. *Sistem Informasi Manajemen: Teori, Prinsip*

Dan Penerapan. PT. Sonpedia Publishing Indonesia.

Fachrunnisa, Olivia, Aldizard Gani, Nurhidayati Nurhidayati, and Ardian Adhiatma. 2022. "Cognitive Engagement: A Result of Talent-Based Training to Improve Individual Performance." *International Journal of Training Research* 20(2):141–59. doi:10.1080/14480220.2021.1990105.

Gathuya, Ms. Jane, Dr. Betty J. Chewen (PhD), and Dr. Esther Chepsiror (PhD). 2026. "Influence of Self-Awareness on Job Performance Among Banking Professionals in Commercial Banks in Eldoret City, Kenya." *International Journal of Social Science and Human Research* 09(09). doi:10.47191/ijsshr/v9-i9-66.

Gerhart, Barry A., Jerry M. Newman, and George T. Milkovich. 2023. *Compensation*. McGraw Hill New York.

Ghozali, Imam. 2021. "Aplikasi analisis mulltivariatel delngan program IBM SPSS 26 (10th eld.)." *Badan Penerbit Universitas Diponegoro*.

Gustshella, Febiola Audhia, Putri Kosasih, Reisya Dwina Permata, Sari, and Abdul Rohman. 2024. "The Effect of Training, Organizational Culture on Employee Performance with Competence as Intervening." *Pakistan Journal of Life and Social Sciences (PJLSS)* 22(2). doi:10.57239/PJLSS-2024-22.2.00214.

Irwan, Irwan, Luluk Fadliyanti, and Subhan Purwadinata. 2026. "Determinants of Labor Productivity and Their Implications for Employee Compensation in the Banking Sector of Mataram City." *JURNAL ECONOMINA* 5(8):6085–96. doi:10.55681/economina.v5i8.4044.

Luthfiyah, Anisah. 2025. "PENGARUH PELATIHAN, MOTIVASI, DAN KOMPENSASI KERJA TERHADAP KINERJA KARYAWAN MELALUI KEPUASAN KERJA PADA PT AGRI INDOMAS PALEMBANG."

Modjela, Nathaniel, and Sharol Sibongile Mkhomazi. 2025. "Contact Centre Agents' Perception on Technology Adoption in Promoting Quality Customer Service." *African Journal of Inter/Multidisciplinary Studies* 7(si2):1–12. doi:10.51415/ajims.v7i1.1551.

Obadiah, Kurutst Rika, Kelechi Enyinna Ugwu, Pauline Ihuoma Asiabaka, Odinakachi Charles Njoku, and Patricia Onyinyechi Onyechere. 2025. "Workplace Technology Adoption and Organizational Change in Nigerian Customs Service." *Journal of Commerce, Management, and Tourism Studies* 4(2):287–99. doi:10.58881/jcmts.v4i2.368.

Prasetya, Arik, Maryadi Maryadi, and Benny Hutahayan. 2026. "Enhancing Employee Performance through Digital Literacy, Work–Life Balance, Employee Engagement, and Training &

Development: Evidence from a Systematic Literature Review." *Cogent Business & Management* 13(1). doi:10.1080/23311975.2026.2676342.

Rozali, Muhammad. 2018. "Pengaruh Motivasi Dan Kompensasi Terhadap Kinerja Karyawan Pada Pt Takeda Indonesia." *Jurnal Ekonomi* 20(3):359–72. doi:10.37721/je.v20i3.483.

Shinta Oktafien, and Anton Budi Santoso. 2025. "The Effect of High Organizational Commitment on Increasing Employee Performance." *Manajemen Dan Bisnis* 24(1). https://mail.journalmabis.org/mabis/article/view/723/438.

Sonjaya, N. S., A. Yudianto, and M. Nurpratama. 2025. "Hubungan Teknologi Informasi Dan Formulasi Strategi Pemasaran Serta Dampaknya Terhadap Kinerja Organisasi." *Jurnal EMT KITA* 9(1):13–18.

Story, Joana, and Filipa Castanheira. 2021. "How Hybrid HR Systems Affect Performance in Call Centers." *Personnel Review* 50(3):918–34.

Verhoef, Peter C., Thijs Broekhuizen, Yakov Bart, Abhi Bhattacharya, John Qi Dong, Nicolai Fabian, and Michael Haenlein. 2021. "Digital Transformation: A Multidisciplinary Reflection and Research Agenda." *Journal of Business Research* 122:889–901.

Zito, Margherita, Federica Emanuel, Monica Molino, Claudio Giovanni Cortese, Chiara Ghislieri, and Lara Colombo. 2018. "Turnover Intentions in a Call Center: The Role of Emotional Dissonance, Job Resources, and Job Satisfaction." *PLOS ONE* 13(2):e0192126. doi:10.1371/journal.pone.0192126.