Journal of Informatics Education and Research
ISSN: 1526-4726
Vol 6 Issue 1 (2026)

Impact of Human Resource Training and Development Programs on Supply Chain Integration and Coordination

Dr. D. C. Agrawal

Director, Accurate Institute of Advance Management

Saumy Gupta

Assistant professor, Accurate Business School

Ankit Bhati

Research Scholar, Amity University

Abstract

This paper discusses how human resource training and development programs influence supply chain integration and coordination, highlighting the need to explore how human capital initiatives lead to effective supply chain operations. A quantitative and cross-sectional research design was adopted, with a focus on primary data collected through a structured questionnaire administered to employees in human resource, operations, and supply chain positions across manufacturing and service organizations. Descriptive statistics, reliability analysis, correlation analysis, multiple regression analysis, and Structural Equation Modeling were used to conduct the data analysis. The outcomes show that HR training and development programs are significantly and positively related to supply chain integration ($r = 0.62$) and coordination ($r = 0.58$). The regression analysis indicates that training initiatives can explain about 29 percent of the variance in supply chain integration. Structural modeling also indicates that supply chain integration plays an important role in improving coordination (beta = 0.61), which demonstrates its mediating nature. The results indicate that effective training and development interventions reinforce inter-organizational teamwork and coordination among supply chain activities, which ultimately enhances coordination. The research concludes that investing in employee development is a strategic process for enhancing the performance of an integrated and coordinated supply chain.

Keywords: *HR training, employee development, supply chain integration, supply chain coordination, organizational performance*

Introduction

The increasing complexity of contemporary supply chains has shifted organizational focus toward human-based integration and coordination enablers. In addition to technological infrastructure and process alignment, the skills and competencies as well as the developmental capacity of employees are important in ensuring successful supply chain relationships. Human resource training and development activities are now being recognized as strategic processes that enable organizations to deepen knowledge sharing, cross-functional teamwork, and coordinated decision-making within supply chains. According to previous researchers, employees who are well trained can better handle interdependencies, respond to disruptions, and align operational goals with partners in a supply chain (Ellinger and Ellinger, 2013; Gowen and Tallon, 2003).

The current literature has examined how human capital and HR practices can enhance supply chain performance and integration (Huo et al., 2016; Shub and Stonebraker, 2009). Training programs have been associated with an increase in the degree of internal integration, information sharing, and risk management capabilities (Riley et al., 2016), and coordinated HR–supply chain strategies have demonstrated beneficial effects on responsiveness and resilience (Saeed et al., 2022). Nevertheless, empirical evidence demonstrating the specific role played by HR training and development programs in supply chain integration and coordination within the same framework remains scarce.

Research Gap:

The majority of previous research considers either HR practices or supply chain integration separately and focuses less on their combined and sequential impacts on coordination processes. Empirical models that interlink HR training, integration, and coordination as constructs are lacking.

Conceptual Framework:

The proposed framework postulates that HR training and development programs serve as antecedents of supply chain integration, which in turn enhances supply chain coordination. The model highlights the mediating effect of integration in translating human capital development into coordinated supply chain outcomes.

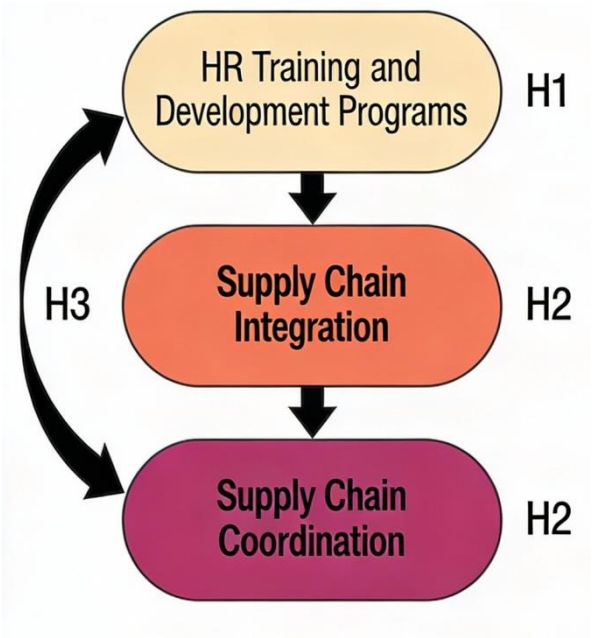

Figure 1: Conceptual Framework of the Study

Hypotheses

H1: Supply chain integration is positively associated with HR training and development programs.
H2: Supply chain integration is positively associated with supply chain coordination.
H3: Supply chain coordination (indirectly through integration) is influenced by HR training and development programs.

Literature Review

Training and development of human resources has been highly recognized as a key determinant of supply chain performance, as it improves employee skills that are necessary for coordination and integration across business borders. Ellinger and Ellinger (2013) highlight that specific development projects enhance the ability of supply chain managers to analyze and relate effectively in order to improve the alignment of supply chain activities. Similarly, Gowen and Tallon (2003) posit that collaborative behaviors, which are imperative in integrated supply chain operations, are enhanced by HR practices.

A number of studies point to the importance of human capital in nurturing supply chain integration. Huo et al. (2016) and Shub and Stonebraker (2009) have shown that employee skills and knowledge play an important role in internal and external integration, which enhances competitive performance. Information sharing and cross-functional collaboration as part of integration processes are also supported by high-involvement HR practices (Huo et al., 2015; Lengnick-Hall et al., 2013). Enhanced supply chain learning and innovation capabilities are also associated with training initiatives (Haqu et al., 2021).

Supply chain coordination has been discussed as a supplementary outcome of integration. According to Simatupang et al. (2002), success in the coordination process is based on shared knowledge, understanding, and synchronized decision-making. There is empirical evidence that training and career development programs enhance these coordination mechanisms by improving communication and teamwork skills (Fernando and Wulansari, 2021; Kongtana et al., 2020). Recent research also shows that more resilient and responsive supply chains are characterized by coordinated supply chain structures supported by robust HR practices (Saeed et al., 2022; Patrucco et al., 2022).

Altogether, the literature highlights the intertwined relationship between HR training, supply chain integration, and coordination, but emphasizes that integrated empirical models are required to reflect these relationships simultaneously.

Methods

This research utilized a quantitative research design to examine the impact of human resource training and development programs on supply chain integration and coordination. The cross-sectional survey method was chosen because it allows the exploration of relationships between organizational variables at a single point in time and is commonly used in organizational and supply chain research.

A structured questionnaire developed for this study was used to collect primary data. The instrument included four subsections: demographics, supply chain basics, HR training and development programs, and supply chain integration and coordination. The construct-based items were measured using a five-point Likert scale ranging from strongly disagree to strongly agree. The questionnaire was administered electronically to employees working in human resource management, operations, and supply chain roles in service and manufacturing organizations. This data collection method was selected to ensure efficiency, accuracy, and broader geographical coverage.

A stratified random sampling method was employed to ensure proportional representation of respondents across various functional areas and organizational levels. Stratification was used to minimize sampling bias and to obtain diverse perspectives on training initiatives and supply chain practices.

The HR training and development measurement items were based on existing instruments used in prior human resource development research, while the measurement items for supply chain integration and coordination were derived from validated supply chain management scales. These instruments had been previously validated to enhance content validity and facilitate comparison with existing literature. The questionnaire was also pretested and revised by academic scholars and industry practitioners to ensure clarity, relevance, and adequacy of content prior to data collection.

IBM SPSS Statistics version 26 was used for data coding and preliminary screening. The same software was employed to perform descriptive statistics, reliability analysis using Cronbach's alpha, correlation analysis, and multiple regression analysis, as it is effective for handling quantitative survey data. Structural Equation Modeling was conducted using AMOS version 24 due to its ability to test complex relationships among latent variables and assess overall model fit. These tools were applied solely for statistical computation and model estimation, without interpretation of findings in this section.

Results

In this section, the empirical results pertaining to the influence of HR training and development programs on supply chain integration and coordination are presented. Tables and figures are incorporated to ensure clarity and coherence.

Table 1 presents a summary of the descriptive statistics for the key variables of the study. The findings indicate that the mean score for HR training and development programs was relatively high, implying that the sampled companies emphasize employee skill development. Supply chain integration and supply chain coordination also exhibited moderate to high mean values, indicating the presence of collaborative and coherent supply chain practices within the sampled organizations.

Table 1: Descriptive Statistics of Study Variables

Variable	Mean	Standard Deviation
HR Training and Development Programs	4.12	0.58
Supply Chain Integration	3.98	0.63
Supply Chain Coordination	4.05	0.60

Reliability analysis was done in order to ensure that the measurement scales were internally consistent. Table 2 indicates the values of Cronbach alpha of all constructs. All scales were above the generally accepted threshold, which means that the reliability was satisfactory.

Table 2: Reliability Analysis (Cronbach's Alpha)

Construct	Number of Items	Cronbach's Alpha
HR Training and Development Programs	6	0.89
Supply Chain Integration	5	0.86
Supply Chain Coordination	5	0.88

Correlation analysis was done to test the relationships between the variables of the study. Figure 1 is the correlation matrix, which demonstrates that there are positive and statistically significant relations between the HR training and development programs and the supply chain integration as well as the supply chain coordination. The correlations are also strong, and this indicates that organizations that have stronger training efforts have a higher degree of supply chain alignment.

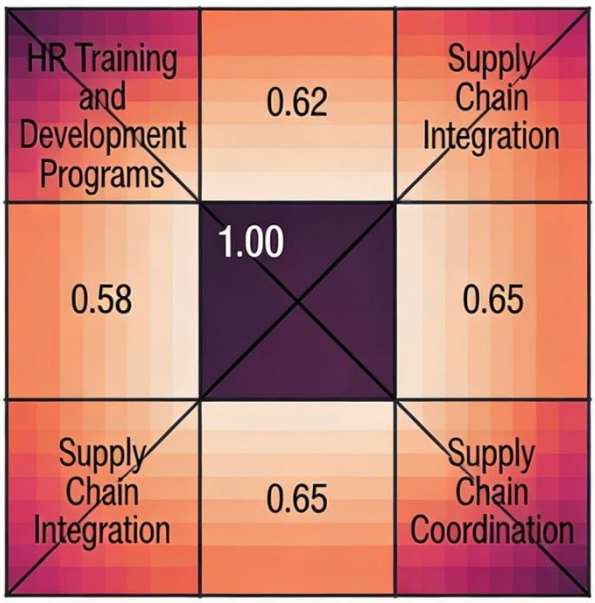

Figure 2: Correlation Matrix between HR Training and Development, Supply Chain Integration and Supply Chain Coordination.

The multiple regression analysis was carried out to determine the predictive value of the HR training and development programs on the supply chain integration. Figure 2 shows the regression coefficient path, which shows a positive and significant effect of the HR training and development on the integration of the supply chain, and a significant percentage of variation in the integration results is explained.

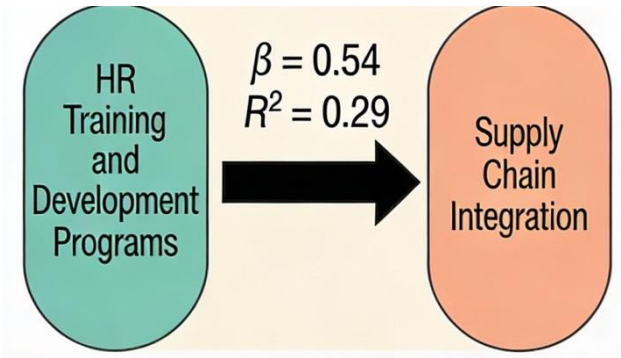

Figure 3: Coefficients of the Regression Path of the HR Training and Development on Supply Chain Integration.

Structural Equation Modeling was used to test the relationships between all the variables simultaneously. The estimated structural model (figure 3) shows that the supply chain integration is directly affected by the HR training and development programs that increase the supply chain integration, which in turn improves the supply chain coordination. The model shows a logical sequence of relations that agree with the framework of proposed research.

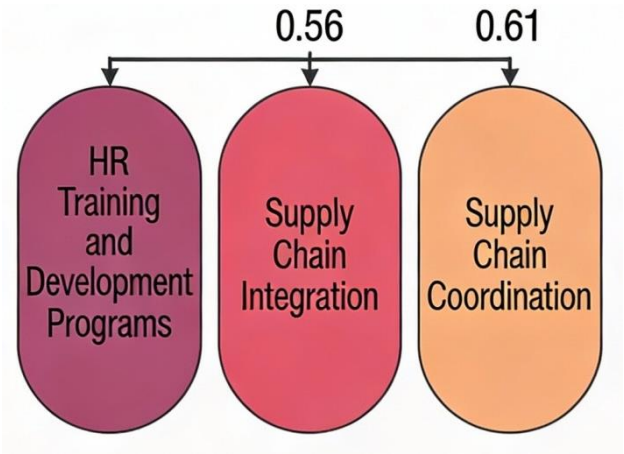

Figure 4: Structural Equation Model

The figure shows the relationships between HR training and development, supply chain integration, and supply chain coordination. Table 1 presents descriptive results showing relatively high mean scores for HR training and development programs, supply chain integration, and supply chain coordination, indicating that these practices are well established across the sampled organizations. Table 2 shows strong internal consistency for all measurement scales, as demonstrated by Cronbach's alpha values that exceed acceptable levels. Figure 2 illustrates positive relationships among all variables, particularly between supply chain integration and coordination. Figure 3 demonstrates that a significant level of variance in supply chain integration is explained by HR training and development programs. Figure 4 further shows that supply chain integration serves as an important mechanism linking HR training programs to improved coordination outcomes.

Conclusion

The findings indicate that HR training and development programs are highly beneficial for supply chain integration, which in turn enhances overall supply chain coordination, thus supporting the proposed hypotheses. Despite these contributions, the study has certain limitations. It is constrained by its cross-sectional design, which limits the analysis of causal relationships, and by the use of self-reported data, which may be subject to response bias. The findings have important managerial implications, as they suggest that organizations should invest in continuous training programs on a strategic basis to enhance cross-functional cooperation and alignment throughout supply chain operations. For future research, longitudinal studies are recommended to examine causal effects over time, along with the inclusion of contextual factors such as organizational culture and technological capability as supplementary variables to further improve understanding of the supply chain integration process.

References

1. E. Ellinger, A., & D. Ellinger, A. (2013). Leveraging human resource development expertise to improve supply chain managers' skills and competencies. *European Journal of Training and Development*, *38*(1/2), 118-135.
2. Menon, S. T. (2012). Human resource practices, supply chain performance, and wellbeing. *International Journal of Manpower*, *33*(7), 769-785.
3. Huo, B., Ye, Y., Zhao, X., & Shou, Y. (2016). The impact of human capital on supply chain integration and competitive performance. *International Journal of Production Economics*, *178*, 132-143.
4. Jena, S. K., & Ghadge, A. (2021). An integrated supply chain–human resource management approach for improved supply chain performance. *The international journal of logistics management*, *32*(3), 918-941.

5. Simatupang, T. M., Wright, A. C., & Sridharan, R. (2002). The knowledge of coordination for supply chain integration. *Business process management journal*, *8*(3), 289-308.
6. Riley, J. M., Klein, R., Miller, J., & Sridharan, V. (2016). How internal integration, information sharing, and training affect supply chain risk management capabilities. *International Journal of Physical Distribution & Logistics Management*, *46*(10), 953-980.
7. Gowen Iii, C. R., & Tallon, W. J. (2003). Enhancing supply chain practices through human resource management. *Journal of Management Development*, *22*(1), 32-44.
8. Huo, B., Han, Z., Chen, H., & Zhao, X. (2015). The effect of high-involvement human resource management practices on supply chain integration. *International Journal of Physical Distribution & Logistics Management*, *45*(8), 716-746.
9. Shub, A. N., & Stonebraker, P. W. (2009). The human impact on supply chains: evaluating the importance of "soft" areas on integration and performance. *Supply chain management: An international journal*, *14*(1), 31-40.
10. Patrucco, A. S., Rivera, L., Mejía-Argueta, C., & Sheffi, Y. (2022). Can you grow your supply chain without skills? The role of human resource management for better supply chain management in Latin America. *The International Journal of Logistics Management*, *33*(1), 53-78.
11. Holloway, S. (2024). Investigating the role of human resource management in supply chain effectiveness.
12. Holloway, S. (2025). Examining the Impact of Human Resource Management on Supply Chain Efficiency. *Available at SSRN 5122764*.
13. Huo, B. (2012). The impact of supply chain integration on company performance: an organizational capability perspective. *Supply Chain Management: An International Journal*, *17*(6), 596-610.
14. Latha, V. M., Shanthi, B., Menon, B., Goel, A. V., Panda, S., & Kumar, S. P. (2024). Analysis On The Role Of Strategic Human Resource Management In Enhancing Supply Chain Integration. *Frontiers in Health Informatics*, *13*(8).
15. Lengnick-Hall, M. L., Lengnick-Hall, C. A., & Rigsbee, C. M. (2013). Strategic human resource management and supply chain orientation. *Human resource management review*, *23*(4), 366-377.
16. Ali, N. (2024). A nexus between human capital management and lean supply chain in an organization. *South Asian Journal of Operations and Logistics*, *3*(2), 414-437.
17. Haq, M. Z. U., Gu, M., & Huo, B. (2021). Enhancing supply chain learning and innovation performance through human resource management. *Journal of Business & Industrial Marketing*, *36*(3), 552-568.
18. Chen, F. H., Tsai, Y. T., & Oen, W. A. (2022). Configurations of green human resource management practices on supply chain integration. *International Journal of Engineering Business Management*, *14*, 18479790221146443.
19. Cousins, P. D., & Menguc, B. (2006). The implications of socialization and integration in supply chain management. *Journal of operations management*, *24*(5), 604-620.
20. Hasan, M. Z., Hussain, M. Z., Umair, S., & Waqas, U. (2024). Role of Human Capital in the Supply Chain Management. In *Human Perspectives of Industry 4.0 Organizations* (pp. 131-154). CRC Press.
21. Barnes, J., & Liao, Y. (2012). The effect of individual, network, and collaborative competencies on the supply chain management system. *International journal of production economics*, *140*(2), 888-899.
22. Kongtana, J., Khasasin, R., Khasasin, K., & Nualkaw, S. (2020). The impact of training and career development, information sharing and diversity on developing a sustainable supply chain strategy. *Int. J. Supply Chain Manag*, *9*, 553-561.
23. Fernando, Y., & Wulansari, P. (2021). Perceived understanding of supply chain integration, communication and teamwork competency in the global manufacturing companies. *European Journal of Management and Business Economics*, *30*(2), 191-210.

24. Song, G., & Song, S. (2021). Fostering supply chain integration in omni-channel retailing through human resource factors: empirical study in China's market. *International journal of logistics research and applications*, *24*(1), 1-22.

25. Tian, M., Huo, B., Park, Y., & Kang, M. (2021). Enablers of supply chain integration: a technology-organization-environment view. *Industrial Management & Data Systems*, *121*(8), 1871-1895.

26. Lin, H. F. (2017). Antecedents and consequences of electronic supply chain management diffusion: The moderating effect of knowledge sharing. *The International Journal of Logistics Management*, *28*(2), 699-718.

27. Song, D., Zhang, P., Shi, R., & Yin, Y. (2024). Impact of strategic human resource management on open innovation: a chain mediation analysis of intellectual capital and supply chain integration. *Chinese Management Studies*, *18*(4), 1085-1106.

28. Shou, Y., Kang, M., & Park, Y. W. (2022). Enablers of supply chain integration: a socio-technical system perspective. In *Supply Chain Integration for Sustainable Advantages* (pp. 67-89). Singapore: Springer Singapore.

29. Saeed, G., Ellahi, A., Bakhsh, K., Ishfaq, U., Ullah, M., & Shaheen, I. (2022). Effect of human resource capabilities, supply chain coordination, and responsiveness on supply chain resilience. *Indian journal of economics and business*, *21*(1), 343-359.

30. Quang, H. T., Sampaio, P., Carvalho, M. S., Fernandes, A. C., Binh An, D. T., & Vilhenac, E. (2016). An extensive structural model of supply chain quality management and firm performance. *International Journal of Quality & Reliability Management*, *33*(4), 444-464.

31. Ngai, E. W., Chau, D. C., & Chan, T. L. A. (2011). Information technology, operational, and management competencies for supply chain agility: Findings from case studies. *The Journal of Strategic Information Systems*, *20*(3), 232-249.

32. Liu, H., Ke, W., Kee Wei, K., & Hua, Z. (2013). Effects of supply chain integration and market orientation on firm performance: Evidence from China. *International Journal of Operations & Production Management*, *33*(3), 322-346.

33. Nejati, M., Rabiei, S., & Jabbour, C. J. C. (2017). Envisioning the invisible: Understanding the synergy between green human resource management and green supply chain management in manufacturing firms in Iran in light of the moderating effect of employees' resistance to change. *Journal of cleaner production*, *168*, 163-172.

34. Alzoubi, H. M., Shwedeh, F., Shamout, M. D., Alquqa, E. K., & Bawaneh, B. (2024, June). The impact of environmental management practices on sustainability performance: Investigating the mediating role of supply chain integration. In *International Scientific Conference Management and Engineering* (pp. 37-44). Cham: Springer Nature Switzerland.

35. Koulikoff-Souviron, M., & Harrison, A. (2010). Evolving HR practices in a strategic intra-firm supply chain. *Human resource management*, *49*(5), 913-938.