"Optimizing Human Resource Management Practices in Logistics and Supply Chain Management: A Comprehensive Review and Analysis"

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ABSTRACT

The logistics and supply chain management (SCM) industry are the backbone of the global economy, facilitating the smooth flow of goods. Dynamic sector: The need for good HRM sector Human Resources Management is a crucial aspect that needs to be taken care of to optimize a dynamic sector's performance. This study examines and contrasts the role and impact of HRM in logistics and SCM, capturing the essential elements underpinning HRM efficacy and effectiveness. The future trajectories of human resource management in response to 21st-century challenges, including high employee turnover rates, labour shortage, and skill development, are defined through strategic HRM practices such as recruitment, training, performance management, and employee engagement. The study also examines how trends affecting HRM strategies link technological advances, globalization/harmonization and sustainability. This study contributes valuable insights and a practical framework to improve organizational efficiency, labour productivity, and the overall competitiveness of the logistics and SCM industry.

Keywords: Logistics, Supply Chain Management (SCM), Human Resource Management (HRM), Employee Engagement, Performance Management, Recruitment and Selection, Workforce Development, Technological Advancements, Globalization, Organizational Efficiency.

INTRODUCTION

Supply chain performance is the backbone of nearly every business today--from retail to healthcare--yet we still know very little about how human resource practices impact operations. Drawing on the contingency view of HRM, and by systematically relating recruitment, training, performance management and engagement practices to order accuracy, cycle time and cost per order, the paper shows how HRM levers generate quantifiable supply chain benefits. Following a discussion on the theoretical underpinnings (theories of Self-Determination, Temporal Motivation and Cognitive Evaluation), we delineate four central research questions and analytically derived hypotheses, describe our mixed methods data collection in three global organisations, and provide recommendations for practitioners.

Proper recruitment and selection go a long way towards building supply chain competencies by assuring the availability of the right people (Ding et al., 2015; Pandey, Bhattacharyya & Kaur, 2012). Performance management is important in general but less so when analyzing this sphere of corporate life: SCM. Traditional performance management forms typically fail to cultivate team-based competencies in specific contexts (Ding et al., 2015). Flexibility in job descriptions and teamwork training is associated with increased satisfaction with the performance of the supply chain, as this can spread companies to teams that take care of cooperation and collaboration (Menon, 2012).

The human resource practices should be consistent with the SCM goals to promote integration and enhance business performance. The alignment mediates the relationship between HRM and SCM outcomes, stimulating

customer satisfaction and organizational performance (Gómez-Cedeño et al., 2015; Albahussain, Elgaraihy & Mobarak, 2016). SCM strategy has been successful when HRM policies fit the organization's culture. Supply chains become significantly more resilient and adaptable with a strategic mechanism of HRM (Mcafee, Glassman & Honeycutt, 2002; Esan, Ajayi & Olawale, 2024). For global supply chain resilience, engendering strategies that develop workforce agility, leadership, and integration of technology at the workplace become imperative (Esan, Ajayi & Olawale, 2024; Lei, 2023).

In recent years, the role of human resource management (HRM) in logistics and supply chain management has received considerable attention. The logistics and SCM domains have experienced significant growth and transformation attributed to technology, globalization, and changing consumer requirements. Thus, the efficient management of human resources has emerged as a crucial component for achieving organizational effectiveness and sustainability (Khan et al., 2013).

HRM practices can considerably serve the efficiency and effectiveness of logistics and SCM. These industries rely on a skilled workforce to oversee complex operations like transportation, warehousing, inventory management, and customer service. Technologies such as automation, data analytics, and artificial intelligence have highlighted the necessity of a flexible, well-trained, and well-managed workforce (Damilola Emmanuel Ogedengbe et al., 2024).

Logistics and SCM employees perform various roles, from operational tasks to strategic planning. Organizations must establish strong human resource management (HRM) practices to hire, grow, and retain talent and stay relevant. Essential practices like training and development programs, performance management systems, and employee engagement initiatives are vital in shaping a motivated and productive workforce.

HRM in logistics and SCM also involves tackling recurring issues such as high employee turnover, labour shortages, and the continuing pursuit of upskilling. Organizations should implement strategies to help improve employee satisfaction and retention to ease these challenges. These could involve providing comprehensive benefits, competitive salaries, promoting work-life balance, and recognizing employee contributions. Additionally, fostering a culture of continuous improvement and innovation is crucial to respond to the fast-evolving landscape of the industry (Holloway, 2024).

This article investigates the drivers of HRM practice effectiveness in logistics and SCM. It reviews the interrelations of recruitment and selection, training and development, performance management, employee engagement and motivation, and the implications of all these for the efficiency and effectiveness of logistics and SCM processes.

Importance of HRM in Logistics and SCM

Human resources are key to firms' success and performance (Karami et al., 2004). This holds particularly true in the logistics and supply chain management (SCM) sectors, where efficient and effective human resource management (HRM) practices are critical to operational success. Contemporary firms in these industries are keen to attract top talent to achieve their business vision. However, possessing human resources alone does not necessarily lead to a firm's success. Poor HRM can negatively impact employees' job satisfaction and organizational commitment (Allen & Grisaffe, 2001), affecting a firm's ability to meet its performance goals (Delery, 1998).

For better performance, logistics and SCM organizations must establish and maintain effective on-the-job HRM practices, such as training and development, performance management, and employee engagement and motivation (Chand & Katou, 2007). These practices are vital to fostering a motivated, skilled, and productive workforce capable of navigating the complexities of logistics and SCM operations.

Scholars studying HRM practices and organizational performance commonly define HRM as a strategy and/or process for effectively utilizing human resources to achieve organizational goals (Hashim et al., 2015). The importance of HRM to organizational performance has become a research focus since the 1990s (Lee et al., 2010). A significant body of research by Fong et al. (2011) finds that HRM practices are positively related to

firm performance.

In the context of logistics and SCM, effective HRM practices are essential for managing the industry's unique challenges, such as high employee turnover, labour shortages, and the need for continuous skill development. Implementing good HRM practices can lead to better HRM outcomes and contribute positively to the performance of logistics and SCM firms, including small and medium-sized enterprises in developing countries (Zheng et al., 2006).

Over the past two decades, empirical studies have identified a wide range of HRM practices that are vital to firms' performance. (Delaney & Huselid, 1996), staff selection, employee skills, employee motivation, job structure, and training are positively related to organizational performance. (Harel & Tzafrir, 1999) Recruitment, selection, compensation, employee participation, internal labour market, and training positively relate to firm and market performance. (Fong et al., 2011) argued that recruitment and selection, teamwork, training and development, and performance appraisal show a positive relationship with knowledge sharing, indirectly impacting the performance of manufacturing and service organizations in developing countries.

Given the diverse and complex nature of HRM practices across different studies, defining the boundary of HRM practices in each study is crucial (Lee et al., 2010). This research aims to optimize HRM practices in logistics and SCM by identifying and analyzing key HRM factors that influence organizational performance. This study contributes to developing a strategic framework for HRM in logistics and SCM, ultimately enhancing the industry's overall efficiency and effectiveness.

Problem Statement

Human Resource Management (HRM) is crucial in enhancing the efficiency and effectiveness of logistics and supply chain management (SCM). Effective HRM practices can significantly impact SCM success, organizational performance, and competitive advantage. HRM factors, such as managerial and employee support, are critical in enhancing SCM practices. These factors help overcome implementation barriers and create a sustainable competitive advantage, even when competitors adopt similar SCM best practices (Gowen & Tallon, 2003; Hussain, Khan & Khan, 2020). HRM has direct and indirect impacts on SCM outcomes, affecting customer satisfaction and organizational performance. Aligning HR practices with SCM fosters better integration and business outcomes (Gómez-Cedeño et al., 2015; Asnordin, Sundram & Noranee, 2020). In the Chinese logistics market, HRM practices like training and development and recruitment and selection are significant in nurturing logistics and supply chain competencies. However, performance and reward management practices may be less effective in this context (Ding et al., 2015).

The success of SCM strategies is influenced by a firm's corporate culture and HRM policies. A good cultural fit between HR and logistics strategies can enhance SCM success (Mcafee, Glassman & Honeycutt, 2002). HRM strategies, including workforce agility, leadership development, and technological integration, are essential for building resilient supply chains that can withstand disruptions (Esan, Ajayi & Olawale, 2024). HR practices such as flexible job descriptions, teamwork training, and performance-based rewards contribute to satisfaction with supply chain performance and employee wellbeing (Menon, 2012).

However, with the fast-paced nature of logistics and supply chain management (SCM), especially in this era of technology, globalization, and changing markets and consumer behaviour, specifically in the context of human resource management (HRM), there is a need for better HRM practices. However, the existing literature accentuates the significance of HRM for SCM performance but fails to provide a comprehensive framework related to the sectors. There is a considerable need to develop supply chain talent because the lack of expertise is a significant problem. Therefore, effective HRM practices, including targeted recruitment, training and development, are critical to creating a skilled workforce able to fulfil the demands of SCM (Van Hoek, Gibson & Johnson, 2020; Ogedengbe et al., 2024; Ding et al., 2015). H2: Joint HRM-SCM practices enhance supply chain performance. SCM- Human Resource Management Integration This integration is meant to align the HRM strategies with SCM objectives (Jena & Ghadge, 2021; Kitchot, Siengthai & Sukhotu, 2020).

The agility of the workforce, robust leadership development, and adoption of new technologies are key human

resource management (HRM) strategies to help supply chain organizations build resilience. This ensures that organizations remain operational despite disruption (Esan, Ajayi & Olawale, 2024). Applying HR analytics and data-driven decision-making to human resources management (HRM) enables the optimization of workforce performance to align human capital with supply chain goals, resulting in improved efficiency of supply chain management (SCM) (Olawale et al., 2024). There is an immense demand for qualified professionals in the logistics and shipping sector, and it is a talent-scarce sector, thus proving difficult to attract and retain talent in logistics and shipping. Ogedengbe et al., 2024) emphasize the need for strategic HRM approaches such as competitive compensation and continuous learning opportunities. Traditional HRM practices might not efficiently cultivate logistics and supply chain capabilities in certain areas. Effective teams require tailored approaches for cultural and contextual variables (Ding et al., 2015).

This study investigates how certain core HRM practices affect the efficiency and effectiveness of logistics and SCM processes, considering the effect of developing trends such as technology adoption, sustainability, and globalization. Logistics and shipping require specialized skills, so recruiting and training quality people is imperative. This relates to strategic HRM practices that include the availability of strong recruitment strategies and continuous learning opportunities to help manage human capital and enhance organizational performance (Ogedengbe et al., 2024). HrM practices emphasize employee support and training to improve ScM effectiveness through relieving implementation barriers and developing sustainable competitive advantage (Gowen & Tallon, 2003). Additionally, employee well-being and engagement have been associated with increased productivity and the organization's viability (Madero-Gómez et al., 2023).

As one of the remarkable consequences of Industry 4.0, the extensive effect of new skills and capabilities in various industries, especially HRM, on SCM is responsible for this necessity. Training programs to improve technology skills play a significant role in adapting to these changes (Liboni et al., 2019). First, green HRM practices are encouraged and enhanced by green transformational leadership, boosting green supply chain performance. Rana, 2024; Basu et al., 2024) and include aspects such as employee performance measurement, training, and green-based rewards focusing on advancing sustainability-related targets (Dahinine et al. Among these are an increasingly competitive landscape and the questions of how to work(attract and retain the best talent) in an era of globalization. To stay competitive, strategic HRM must adjust to these modifications (Ogedengbe et al., 2024). Train employees on how to adopt Technologies and Sustainability practices to improve SCM performance (Liboni et al., 2019; Dahinine et al., 2024). Adopt strategic HRM practices at the intersection of deliveries that include recruitment-oriented practices and promote continuous learning and career development (Ogedengbe et al., 2024). Madero-Gómez et al. (2023) foster employee engagement and well-being to help them be more productive and the organization more sustainable.

Research Question and Objectives

Research Question:

1. What is the impact of recruitment and selection strategies on the operational effectiveness of logistics and supply chain management systems?
2. How do training and development programs impact the operational efficiency of logistics and supply chain management systems?
3. To what extent do performance management practices affect the operational effectiveness of logistics and supply chain management systems?
4. How do employee engagement and motivation strategies impact the operational effectiveness of logistics and supply chain management systems?

Research Objective:

1. To examine the impact of recruitment and selection methods on the technical efficiency of logistics and SCM systems.

Rationale: By correlating recruitment metrics (time-to-fill; quality-of-hire) with process KPIs (order

accuracy; cycle time), we show how precise candidate selection reduces errors and increases throughput.

2. To explore the impact of training and development programs on the operational effectiveness of logistics and SCM system.

   Rationale: Evaluating training completion rates, post-training skill assessments, and subsequent pick-pack rates and error-reduction metrics reveals which modality delivers the greatest operational gains.

3. To explore the impact of performance management practices on the operational efficiency of logistics and SCM systems.

   Rationale: Assessing appraisal data, feedback frequency, and their impact on lead-time reduction and resource utilization demonstrates how systematic reviews drive sustained efficiency.

4. To examine research to explore the effect of strategies for employee engagement and motivation on the operational performance of logistics and SCM systems.

   Rationale: Correlating employee engagement survey scores and turnover intentions with delivery reliability and cost-per-order shows how motivation initiatives translate into measurable SCM performance improvements.

LITERATURE REVIEW

Introduction

Effective recruitment and selection processes are crucial for building a competent workforce to drive supply chain success. In the Chinese logistics service market, recruitment and selection have been identified as significant contributors to nurturing logistics and supply chain competencies (Ding et al., 2015). Similarly, in the context of Pakistani SMEs, HR practices, including recruitment, are positively related to improvements in supply chain management (Hussain, Khan & Khan, 2020). These findings underscore the importance of strategic hiring practices in ensuring that the right talent is in place to support supply chain operations.

Training and development are pivotal HRM practices that enhance supply chain performance. Studies have shown that training programs can significantly improve employee capabilities, boosting supply chain effectiveness (Gowen & Tallon, 2003; Jena & Ghadge, 2021). In China, training and development were critical in building logistics competencies, highlighting the need for continuous skill enhancement to meet the demands of the supply chain sector (Ding et al., 2015). Additionally, flexible job descriptions and teamwork training have been linked to higher satisfaction with supply chain performance, emphasizing the role of tailored training initiatives (Menon, 2012).

Performance management systems are essential for aligning employee objectives with organizational goals in supply chain management. However, the effectiveness of these systems can vary. In the Chinese logistics market, traditional performance management practices were not as effective in nurturing team-based competencies, suggesting a need for more collaborative approaches (Ding et al., 2015). Conversely, in other contexts, performance metrics used to determine rewards have been associated with improved supply chain satisfaction, indicating that performance management can be a powerful tool when aligned with supply chain objectives (Menon. 2012).

Employee engagement and motivation are critical for sustaining high performance in supply chain operations. HR strategies focusing on employee motivation, such as reward management and career development opportunities, can enhance supply chain resilience and performance (Esan, Ajayi & Olawale, 2024; Pandey, Bhattacharyya & Kaur, 2012). In global supply chains, adaptability and flexible work arrangements are key factors in maintaining employee engagement, which is crucial for operational resilience (Esan, Ajayi & Olawale, 2024). These strategies help create a motivated workforce committed to achieving supply chain excellence.

HRM Practices in Logistics and SCM

Human Resource Management (HRM) practices are crucial for enhancing the effectiveness and resilience of

logistics and supply chain management (SCM). These practices ensure that the right personnel are in place, adequately trained, motivated, and managed to meet the challenges of the supply chain environment.

Practical training and development are significant in nurturing logistics and supply chain competencies. This is particularly evident in the Chinese logistics market, where training and recruitment are crucial for building competencies, while performance and reward management are less effective (Ding et al., 2015). Flexible job descriptions and teamwork training also contribute to satisfaction with supply chain performance (Menon, 2012).

Selecting the right personnel is essential for SCM success. HR practices focusing on finding, hiring, and retaining suitable employees are vital for maintaining a competitive edge (Pandey, Bhattacharyya & Kaur, 2012). Managerial and employee support enhance the effectiveness of training and mitigate barriers to SCM success (Gowen & Tallon, 2003). HR strategies that include adaptability, flexible work arrangements, and digital HR technologies are essential for operational resilience and employee engagement (Esan, Ajayi & Olawale, 2024). Organizational culture and HRM policies significantly impact SCM strategy. Aligning HR practices with cultural and ethical considerations is crucial for effective SCM (Mcafee, Glassman & Honeycutt, 2002; Esan, Ajayi & Olawale, 2024).

HRM practices contribute to a sustainable competitive advantage in SCM, even when competitors adopt similar best practices (Gowen & Tallon, 2003; Hussain, Khan & Khan, 2020). HRM impacts SCM outcomes, which in turn affect customer satisfaction and organizational performance. SCM implementation plays a mediating role in these relationships (Gómez-Cedeño et al., 2015). Workforce agility, leadership development, and a resilient organizational culture are key HRM strategies that enhance supply chain resilience, enabling organizations to maintain continuity during disruptions (Esan, Ajayi & Olawale, 2024).

Human Resource Management (HRM) practices are crucial in streamlining logistics and supply chain management (SCM) functions. Recruitment and selection, employee training and development, performance management, and employee engagement and motivation are some of the most important people practices that are crucial to ensuring an effective and resilient workforce.

Innovative robotics may be used throughout the logistics and supply chain chain. These practices make it possible to recognize and recruit people who possess the abilities required to fulfil the evolving needs of the industry (Ding et al., 2015; Jena & Ghadge, 2021). Recruitment is a critical segment of the strategic HRM approach that enables all potential candidates to work compatible with organizational goals and is also needed to stay ahead of the game of supply chain operations to seek competitive advantage (Pandey, Bhattacharyya & Kaur, 2012).

SCM success is often credited to training and development. These programs develop employee skills, equipping them to adjust and better operate supply chain performance (Gowen & Tallon, 2003; Ding et al., 2015; Khan et al., 2013). This constant upskilling creates a workforce able to handle the challenges of contemporary supply chains, improving overall operational efficacy (Jena & Ghadge, 2021).

Performance management is arguably one of the most common HRM practices. However, its effectiveness in logistics and SCM can vary. For example, in some situations, such as supply , traditional approaches to performance management can sometimes be CONTRASTIC to team-based competencies (Ding et al., 2015). However, when linking rewards, performance metrics can provide satisfaction in achieving supply chain performance indicators, indicating the potential of this practice when aligned with SCM objectives (Menon, 2012).

Employee engagement and motivation are also significant for sustaining a committed workforce capable of producing SCM success. Employees with high motivation would become a part of innovative solutions and effective operations (Pandey, Bhattacharyya & Kaur, 2012). Employee motivation and well-being enhancing HRM practices positively impact supply chain performance and employee satisfaction (Menon, 2012)

Recruitment and Selection

Recruitment and selection processes are critical components of HRM practices that directly influence the

effectiveness of logistics and supply chain management. According to Kamran et al. (2015), recruitment is defined as identifying and attracting potential employees, involving a meticulous process of assessing the organization's strategic needs and aligning them with the skills and capabilities of prospective candidates. Lievens and Chapman (2019) note that an organization can choose from various sources for recruiting personnel, depending on the type of job vacancy. There are different recruitment types and techniques to meet management requirements. Once the job description is obtained from the technical personnel, it is essential not to rely on just one type or source; instead, search for and implement the best type. Abbas et al. (2021) stated that different techniques and types of recruitment include Advertisement, Contracting Agencies, Employee Referrals, Labour and Union Offices, E-Recruitment, Electronic Application Systems, and E-Advertisement.

Moreover, the selection process is a comprehensive procedure that assesses candidates' qualifications and competencies and ensures a good fit with the organizational culture and job requirements (Chungyalpa & Karishma, 2016). The selection activities depicted in Figure 1 typically follow a standard pattern, beginning with an initial screening interview and concluding with the final employment decision. The selection process may consist of the following steps:

1. Initial screening interview;
2. Completing the application form;
3. Comprehensive interview;
4. Background investigation;
5. Medical/Physical examination;
6. Final job offers.

Each of these steps represents a decision point requiring affirmative feedback for the process to continue. Each step in the process seeks to expand the organization’s knowledge about the applicant’s background, abilities, and motivation, increasing the information from which decision makers can make their predictions and final choice. However, some steps may be omitted if they do not yield data that aids in predicting success, or if the cost of the step is not justified (Kamran et al., 2015).

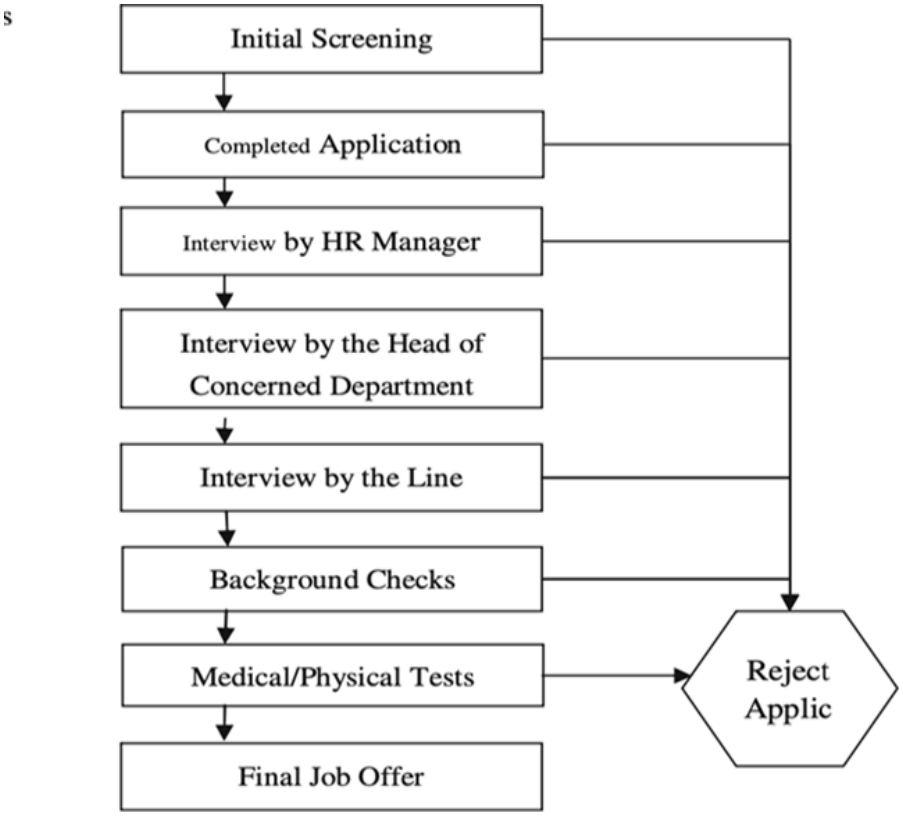

Figure 1: Selection process chart

Sources: (Kamran et al., 2015)

Training and Development

Training and development refer to implementing relevant programs designed to maintain and develop both individual and organizational capabilities, which contribute to organizational change (Beydoun & Saleh, 2023). According to Okechukwu (2017), training and development are deliberate endeavors used by organizations to equip their workforce with the necessary skills, knowledge, and attitudes to perform their duties effectively and efficiently. Ding (2015) states that training activities influence organizational performance in two key ways. First, training improves the skills and abilities relevant to employees' tasks and development. Second, training increases employees' job satisfaction and workplace engagement. The studies further highlight that training in problem-solving, leadership, team building, and job-specific skills is statistically linked to the success of SCM practices. HRM practices, such as soft skill training, employee exchanges with partners, and performance-based evaluations, are crucial mechanisms for developing specialized human resources that enhance performance and profitability

In addition, HRM can have a long-term impact on companies that want to improve organizational performance through training so that there are adequate training systems. Figure 2 depicts Saini's (2009) strategic training and development process model. Identify the business strategy and conduct a needs assessment to identify the training needs — Strategic training and development process. The needs provide a basis for setting up strategic training initiatives and various methods to be implemented as training activities. It is a procedure that guarantees employees effectively transfer their learned skills and knowledge to their roles. You will evaluate the impact of the training based on relevant metrics to show how it led to achieving organizational objectives. This method enables the training to stay in line with the business strategy, adds value to a company's intellectual capital and raises organizational performance.

Figure 2: Selection process chart

Sources: (Saini, 2009**)**

Furthermore, Table 1 lists the varieties of training needed for a workforce to build the workforce (Raza, 2015): skill training, retraining, cross-functional training, team training, literacy training, diversity training, and customer service training. Skill training refers to training new entrants to acquire job-specific knowledge and skills. Training = Preparing employees who remain with the organization for later technology development + Skill improvement. Cross-functional training also gives employees skills to do multiple jobs, improving flexibility and coordination—team training results in the formation of self-directed teams and fosters management and functional skills. Literacy training is helpful to enhance most basic academic skills, including mathematics, reading, writing, and communication. It encourages employees to respect and tolerate people of different races, genders, religions and backgrounds. Finally, and perhaps most significantly, ST enhances communication skills to meet customers' needs better and satisfy them—such types of training help to build a well-qualified, experienced and agile workforce.

Table 1: Type of Training

Types of Training						
Skill training	**Retraining**	**Cross Functional training**	**Team Training**	**Literacy Training**	**Diversity Training**	**Customer Service**
focused on job knowledge and skills for instructing new hires	maintain the knowledge and skills of workers as job requirements change with technological innovation and organizational restructuring	prepare employees for a wide variety of tasks like flexibility in work scheduling and improving coordination among them	self-directed teams and address management skills, cross-functional skills and cross functional skills	improve the academic skills of workforce like, mathematics, reading, writing, communication skills,	Core ideology of respect and tolerance for persons of different race, gender, religion, and backgrounds.	focuses on better communication, meeting customer needs and satisfaction

Sources: (Saini, 2009)

Performance Management

It allows organizations to assess and manage how employees perform their responsibilities per their overall goals. It has transformed from a purely administrative function in human resources to a necessary strategic part of both success and sustainability for any organization. PM has also been identified as a strategic human resource management (HRM) technique enabling an organization to set and achieve its goals according to its wider objectives. It allows organizations to tap, retain, and motivate competent human resources to attain primary financial objectives and remain competitive (Walhekar & Khatke, 2020; Hervie, 2016; Luo, 2021). The introduction of PM into the strategic HRM landscape helps to enhance organizational performance through more standardized HR practices, improved managerial competencies, and employee engagement (Hervie, 2016; Lu, 2023).

Good PM practices are tied to employee satisfaction, which leads to more significant achievements and improved performance. The relationship between business performance and employee engagement extends to ongoing feedback and appraisal processes. PM systems aim to enhance productivity and increase staff morale and job satisfaction, all of which remain critical for the sustainability and efficient functioning of organizations. Models such as the Balanced Scorecard and AMO framework are major in directing the PM process (Simpson & Simpson, 2022; Hervie, 2016).

However, there are many specific challenges concerning PM, most notably the misalignment with business objectives, poor manager effectiveness and overdependence on systemization. These are vital issues that need to be addressed to improve the efficacy of PM systems (Battista, 2020). We call for more on-translational research worldwide, especially in Africa, to help contextualize successful PM approaches and inform the effective implementation of internationally recognized PM best practices. This involves, among other things, filling gaps in the theoretical and methodological approaches to PM (Tenakwah, Otchere-Ankrah & Watson, 2023.

Performance management systems have become a necessity for many organizations to remain competitive. These systems help employees know precisely what is expected of them in a manner that is harmonized with organizational objectives. One prerequisite of an Effective Performance management system is that every employee clearly understands their role. This allows employees to work effectively towards the company's

vision, mission, and strategic objectives. Consistently improving performance is one of the vital challenges for any organization, particularly during the global economic crisis (Gautam & Jain, 2016).

Well-designed performance management in HRM underpins a culture of continuous improvement and accountability. This helps organizations make informed decisions about developing and retaining talent, rewarding and recognizing high performance, and creating a clear career path. By tracking performance continuously and providing feedback regularly, HRM identifies where development is needed, allowing targeted interventions to enhance skills and competencies (Brauns, 2013). This optimizes their workforce's potential and enhances the organization's agility and competitive advantage in an ever-changing business environment.

Figure 3: Strategic Performance Management.

Source: (Hutchinson, 2013).

Figure 3 depicts a structured Strategic Performance Management (SPM) approach within an organization, starting with the core elements of Vision and Mission, which set the overarching goals and purpose. These elements steer the creation of the Organizational Strategy, essential for market positioning and competition. The Human Resources (HR) and Performance Management (PM) strategies and objectives then stem from the broader organizational strategy, ensuring that HR initiatives align with organizational goals. This alignment facilitates the formulation of Departmental and Individual Objectives derived from higher-level strategies. Ultimately, these objectives shape the Performance Management Policies and Practices implemented to effectively manage and enhance workforce performance (Hutchinson, 2013).

Employee Engagement and Motivation

Employee engagement and motivation are fundamental aspects of Human Resource Management (HRM), playing a pivotal role in enhancing the operational and strategic efficiency of logistics and supply chain management (SCM). Engaged and motivated employees are more likely to contribute positively to

organizational objectives, displaying higher levels of productivity and creativity (Kamran et al., 2015).

Employee engagement explains how employees feel emotionally connected to their organization and dedicated to its goals. An engaged employee does not just come in to work to earn his salary; he is involved, cares for his work and makes sure that he brings value to the firm. It highlights the importance of HRM practices in contributing to a culture of engagement, including job satisfaction, commitment to the organization, loyalty, and a sense of belonging. Furthermore, motivation is the process that leads an individual to take action and guides and maintains goal-directed behaviours, i.e., the biological, emotional, social, and cognitive forces that activate behaviour. Several motivation practices in HRM include recognition and rewards, job design, leadership style, career development opportunities, etc. These factors influence the degree of effort employees put in on top of the call of duty and whether they internalize their goals with those of the organization (Albrecht et al., 2015).

However, promoting employee engagement and motivation is directly related to organizational well-being and performance. When employees are engaged and motivated, they are more likely to stay productive and use an innovative mind that will give the organization a competitive edge. When employees are engaged, they are likely to have high levels of commitment, motivation, and productivity, which leads to higher profitability, customer satisfaction, and competitiveness within the market (Ghimire, 2023; Kurniawati & Raharja, 2022). For an organization to succeed, it needs a set of motivated employees at all levels (Lakshmi, Varalakshmi & Ahmed, 2024; Dwibedi, 2018), which in turn increases the productivity of its employees.

Engagement positively influences individual well-being, reducing stress levels and increasing job satisfaction and mental health (Sathish, Krishna & Vamshi, 2024; Rasool et al., 2021). A supportive work environment further enhances employee engagement and well-being (Rasool et al., 2021). Engaged employees are more likely to stay with their organization, reducing turnover costs and the need for retraining (Sathish, Krishna & Vamshi, 2024; Kurniawati & Raharja, 2022; Kurniawati & Raharja, 2022). A motivated workforce fosters creativity and adaptability, leading to superior problem-solving capabilities and a vibrant work environment (Lakshmi, Varalakshmi & Ahmed, 2024; Dwibedi, 2018).

Involving employees in decision-making processes and keeping the communication lines robust increases engagement and performance considerably (Chatterjee, 2022). Empowering employees and respecting their efforts increases motivation and efficiency in an organization (Manzoor, 2011; Dwibedi, 2018). Mitigating toxic workplace environments and ensuring organizational support is critical for maintaining high levels of engagement (Rasool et al., 2021).

The strategic alignment of Human Resource Management (HRM) practices with supply chain management (SCM) is crucial for enhancing the efficiency, adaptability, and overall performance of supply chain operations. Effective HRM strategies can significantly impact the functionality and success of logistics and SCM by improving organizational performance and customer satisfaction. HRM practices, such as HR planning, have a significant impact on the efficiency and effectiveness of supply chain management. These practices help in better accountability to customers, increasing product quality, and reducing costs (Adibpour, Goli & Adibpour, 2020). HRM directly and indirectly influences SCM outcomes, which in turn affects customer satisfaction and organizational performance. This relationship highlights the mediating role of SCM in linking HRM practices to business outcomes (Gómez-Cedeño et al., 2015).

When HRM policies align with culture, SCM strategies are much more successful. A firm with a transaction/relationship orientation toward its employees will inform its choice of supply chain partners, suggesting that HRM/logistics strategies must be culturally compatible (Mcafee, Glassman & Honeycutt, 2002). At the same time, industries such as logistics and shipping are very dynamic (to name a few); thus, applying HRM strategy is crucial to acquiring and ensuring the availability of talented professionals. One effective way to handle human capital is through intense recruitment, reasonable compensation and learning opportunities (Ogedengbe et al., 2024). Overall, its influence on supply chain performance is marked when HRM practices are integrated with SCM, especially in demand environments of extreme volatility. These cross-functional integration aspects have all been addressed together by (Jena and Ghadge, 2021) regarding angel investors (other components include angel investor training, recruitment, and performance

management). HRM practices, e.g. training and development, are imperative for developing logistics and supply chain competency. Conventional reward management can, nevertheless, not have as significant an effect in promoting team-based competencies (Ding et al., 2015).

Effectiveness

Effective logistics and supply chain management (SCM) is fundamentally measured by how efficiently and accurately these systems manage the flow of goods, services, and related information from a point of origin to a point of consumption. Effective SCM ensures that transportation, warehousing, and inventory management operations optimise product delivery to the appropriate location within the required time frame while reducing unnecessary delays and costs (Fugate et al., 2010).

Flexibility and resilience in the supply chain are other factors that contribute to the effectiveness of SCM. A flexible system must proactively respond to market dynamics (e.g. demand volatilities, changes in consumer preferences, supply-chain interruptions). Such flexibility guarantees that any changes to the supply chain can be effectively translated to new operating conditions with minimal drops in performance. Also, having transparency across the supply chain is necessary since it helps the businesses keep track of and monitor the condition of products and services as they go through the different stages, which leads to better decisions and makes them respond quickly to any potential issue (Arshinina & Kiseleva, 2020).

Integrated supply chain and sustainable practices are among the most important attributes of a functional supply chain. Smooth coordination between all stakeholders — suppliers, manufacturers, distributors, and retailers — allows the seamless flow of information and goods, which is critical for efficient operations. Sustainable SCM is also an emerging trend, where organizations are incorporating sustainable practices into their supply chain to reduce their environmental impact. Compliance with this requirement implements the environmental policy at the level of the organization, giving it an "additional cost" characteristic, but at the same time, leads to long-term viability and goodwill for the business (according to global environmental goals). (Arshinina & Kiseleva, 2020).

Moreover, the effectiveness of logistics and SCM is influenced by Human Resource Management (HRM) practices. An effective Human Resource Management (HRM) strategy implemented within the supply chain, including strategic staffing, training, up-skilling, and performance management, will adequately prepare the workforce to manage these complexities (Kumar et al., 2020). Moreover, a skilled workforce that can adapt to various roles enriches operations, fostering efficient problem-solving and increasing productivity.

Hypothesis Development

Recruitment and Selection

Recruitment and selection are pivotal HRM practices that significantly influence the effectiveness of logistics and supply chain management. As the logistics sector continues to evolve with increasing globalization and technological advancements, effectively recruiting and selecting the right talent becomes crucial for maintaining competitive advantage and operational efficiency (Aqeel & Siddiqui, 2019).

Effective recruitment and selection processes are vital for identifying and attracting individuals who possess the specific skills and competencies required to meet the dynamic challenges of the logistics and supply chain sector. According to Prabhakaran and Jayaraj (2023), these practices ensure the acquisition of qualified personnel and play a critical role in shaping logistics companies' strategic direction and performance. They argue that a well-designed recruitment strategy aligned with organizational goals significantly enhances workforce productivity and reduces turnover, which is essential for sustaining operational effectiveness in logistics (Darlington Nnabugo et al., 2023).

The study (Anthony, 2015) corroborates the notion that recruitment and selection positively impact organizational performance. The research emphasizes that effective recruitment strategies contribute to building a resilient workforce capable of adapting to the complexities of supply chain management. The

authors point out that recruitment practices that are systematically aligned with the organization's strategic needs lead to improved job satisfaction and employee retention rates, which are crucial for maintaining a stable and committed workforce in the logistics sector (Ding et al., 2014).

According to Aqeel and Siddiqui (2019), strategic recruiting is also crucial for the logistics industry as it helps firms embed a culture of continuous innovations and improvements. The results indicate candidates are generally aligned with corporate goals when organizations invest time and effort in their sophisticated recruitment and selection processes, which in itself leads to enhanced organizational performance and customer satisfaction.

Past literature suggests that the efficiency of logistics and supply chain management is directly affected by quality recruitment and selection. In one logistics sector study, why companies with strong recruitment processes had increased operational effectiveness and adaptability for the global economy. This study revealed a strong relationship between strategic recruitment activities, time, inventory, and customer service (Darlington Nnabugo et al., 2023).

Based on the evidence presented in these studies, it is hypothesized that effective recruitment and selection practices have an important impact on the overall effectiveness of logistics and supply chain management. The hypothesis suggests a rapid connection between HRM practices and logistics operations performance metrics. This relationship, however, will be explored using quantitative analysis, drawing on data regarding recruitment strategies and performance outcomes from multiple logistics firms. Therefore, the following hypothesis can be constructed:

H1: Effective recruitment and selection practices positively impact the effectiveness of logistics and supply chain management.

Comprehensive Training and Development Programs

Comprehensive training and development programs are essential in enhancing employees' capabilities, which, in turn, significantly contribute to the effectiveness of logistics and supply chain management (Younis et al., 2016). The perceived usefulness of these training programs is reflected in how employees believe participating in them will enhance their work performance and, consequently, the organization's operational success (Barakat et al., 2023).

Training and development programs in the logistics sector are not merely about improving individual skills but also about aligning the workforce’s capabilities with the strategic goals of supply chain management (Gandhi et al., 2017). These programs cover various aspects, from operational training to leadership development and strategic decision-making processes, which are crucial for managing complex supply chains effectively. According to the research findings from Sittisom and Mekhum (2020), training programs that incorporate green practices not only enhance environmental awareness among employees but also improve the social performance of organizations in the manufacturing industry.

Comprehensive training enhances employees' adaptability, enabling them to handle dynamic changes within the supply chain, such as technological advancements and varying customer demands (Gandhi et al., 2017). Thus, effective training programs are seen as a strategic investment in human capital and a critical logistics and supply chain management resource. The importance of such training is highlighted by its ability to foster a proactive workforce capable of contributing to continuous improvement and innovation within the supply chain (Younis et al., 2016).

The linkage between training and development and supply chain effectiveness is further supported by empirical evidence suggesting that well-trained employees are more efficient and can significantly reduce errors and inefficiencies in the supply chain. For instance, research by Sittisom and Mekhum (2020) indicates a positive relationship between specialized training in green supply chain practices and the overall sustainability performance of firms. These findings are aligned with the broader literature, which consistently shows that the skills and competencies acquired through training directly contribute to enhanced operational

performance, customer satisfaction, and competitive advantage (Khan et al., 2013).

The strategic value of training programs is also reflected in their capacity to enhance collaboration and communication across different segments of the supply chain. Effective training equips employees with not only technical skills but also with interpersonal and communication skills that are essential for collaborative problem-solving (Barakat et al., 2023). The ability to effectively communicate and collaborate with various stakeholders, from suppliers to customers, is crucial for the seamless functioning of supply chains. Given the substantial evidence and the critical role of training and development in boosting the effectiveness of logistics and supply chain management, the following hypothesis is proposed:

H2: Comprehensive training and development programs positively impact the effectiveness of logistics and supply chain management.

Robust Performance Management Systems

Robust performance management systems in logistics and supply chain management play a crucial role in enhancing organizations' effectiveness and operational success. As strategic tools, performance management systems ensure that employee activities and outputs align with the organization's goals, thereby significantly improving organizational performance (Dissanayake & Cross, 2018). The perceived barriers to adopting new performance management systems can influence their effectiveness and acceptance, similar to technological barriers affecting technology adoption (Almatarneh et al., 2022).

The effectiveness of performance management systems in logistics involves several factors, including setting clear performance metrics, regular performance evaluations, and aligning performance outcomes with strategic business goals (Rai et al., 2006). Studies have shown that comprehensive performance management systems help identify areas of inefficiency and enable timely corrective actions, which are crucial for maintaining the fluidity and responsiveness of supply chains (Gandhi et al., 2017).

Performance management systems are instrumental in monitoring logistics activities, optimizing route planning, and managing supply chain risks. A well-implemented system ensures that performance reviews are not merely administrative routines but are critical to continuous improvement and strategic planning (Dubey et al., 2015). Research by Almatarneh et al. (2022) suggests that management accounting tools, part of broader performance management frameworks, significantly enhance supply chain performance by providing necessary data for decision-making and strategy formulation.

Performance management systems incorporate feedback mechanisms that facilitate better communication between managers and staff, fostering an environment of continuous improvement (Rai et al., 2006). These systems are designed to assess performance and motivate and engage employees through recognition and reward systems that align their personal goals with organizational objectives (Kottala & Herbert, 2019).

The integration of advanced analytics and real-time data into performance management allows for more precise tracking of performance indicators such as delivery times, customer satisfaction rates, and cost reductions (Dubey et al., 2015). This integration supports the dynamic capabilities of supply chains to adapt to market changes and customer demands efficiently. Given the crucial role of performance management systems in driving the effectiveness of logistics and supply chain operations, the following hypothesis can be proposed:

H3: Robust performance management systems positively impact the effectiveness of logistics and supply chain management.

High Levels of Employee Engagement and Motivation

In optimizing human resource management practices within logistics and supply chain management, high levels of employee engagement and motivation are essential (Maloni et al., 2017). These factors are perceived benefits that significantly influence the operational effectiveness of supply chains. Engaged and motivated

employees are crucial as they typically exhibit higher productivity, better job satisfaction, and a profound alignment with organizational goals—all of which are critical in the dynamic and challenging environment of supply chain management (Fu et al., 2013).

Engagement in logistics and supply chain management refers to an employee's emotional and functional commitment to their organization (Jabbour et al., 2017). This commitment is pivotal in logistics, where rapid pace and complex problem-solving require employees who are both present, proactive, and deeply involved in their work (Defee et al., 2010). Studies have shown that organizations with high employee engagement benefit from lower turnover rates and higher efficiency, which are critical for maintaining seamless supply chain operations.

Motivation complements engagement by driving employees to excel in their roles. In supply chain management, motivation is linked to the continuous improvement and innovation necessary for adapting to global market changes and demands (Hwang & Min, 2015). Motivational strategies such as performance incentives, clear career progression paths, and recognition programs are vital for maintaining high employee morale and motivation levels (Maloni et al., 2017).

The direct link between employee engagement, motivation, and supply chain effectiveness can be empirically supported (Fu et al., 2013). For instance, research highlights that highly engaged and motivated logistics personnel manage workflows more efficiently, adapt more readily to changes in supply chain demands, and achieve better compliance with operational protocols, all of which significantly contribute to the overall effectiveness and competitiveness of the supply chain (Jabbour et al., 2017). Given the critical role these human resource practices play in achieving strategic outcomes in logistics and supply chain management, the following hypothesis is proposed:

H4: High levels of employee engagement and motivation positively impact the effectiveness of logistics and supply chain management.

Conceptual Framework

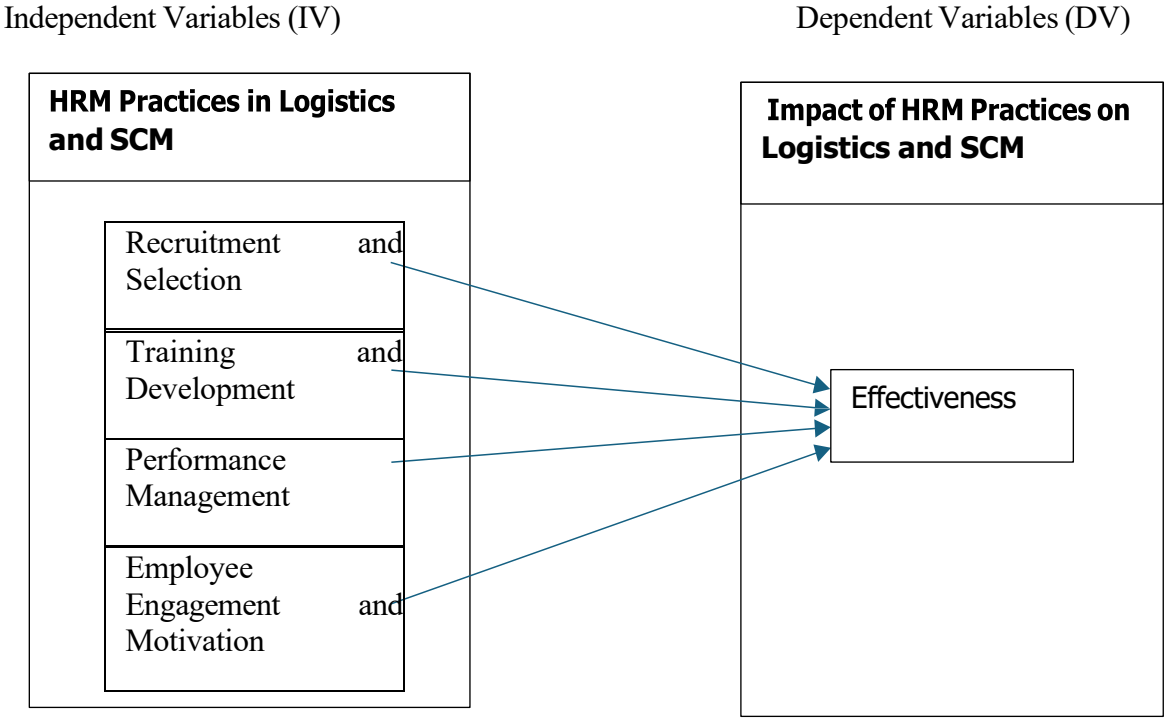

Figure 4: Conceptual framework

The conceptual framework depicted in the image illustrates the impact of various Human Resource Management (HRM) practices on the effectiveness of logistics and supply chain management (SCM).

Specifically, it identifies four key HRM areas—Recruitment and Selection, Training and Development, Performance Management, and Employee Engagement and Motivation—as integral components that influence the overall effectiveness of logistics and SCM.

Theoretical Frame – Resources-Based View (RBV) Theory

The firm's Resource-Based View (RBV) is a cornerstone of strategic management theory that accentuates the critical role of a firm's resources in gaining a sustainable competitive advantage. Specifically, RBV posits that in a competitive and dynamic industry such as logistics and supply chain management, a firm's internal resources—both tangible and intangible—are pivotal in crafting its competitive strategy and operational effectiveness (Xiao et al., 2018). This framework is particularly relevant for the study "Optimizing Human Resource Management Practices in Logistics and Supply Chain Management: A Comprehensive Review and Analysis," as it underscores the strategic significance of human resources as key drivers of firm success.

According to RBV, not all resources possess the same strength, and only the unique combination of VRIO emphasis ensures firms' remission (Madhani, 2010). In addition, not all resources are physical; within logistics and supply chain management, human resources such as employee skills, organizational culture, and leadership capabilities are often critical components that enable a firm to manage its operations and respond to market shifts effectively.

Numerous empirical studies examining RBV in the logistics and supply chain domain signify that strategic human resource management practices can drive operational efficiencies and promote innovation with favourable implications for firm performance. Highly skilled logistics personnel and strong training programs have, for example, been found to give firms the necessary capabilities for process optimization across their supply chain, reducing costs and creating superior service delivery (Oh, 2015).

The dynamic capabilities extension of RBV is vital for understanding how firms in rapidly evolving sectors like logistics manage and reconfigure their human resources in response to external changes. This aspect of RBV is particularly salient for analyzing how continuous development and strategic alignment of HR practices can help firms maintain their competitive edge by adapting to technological advancements and changing customer demands (Madhani, 2010).

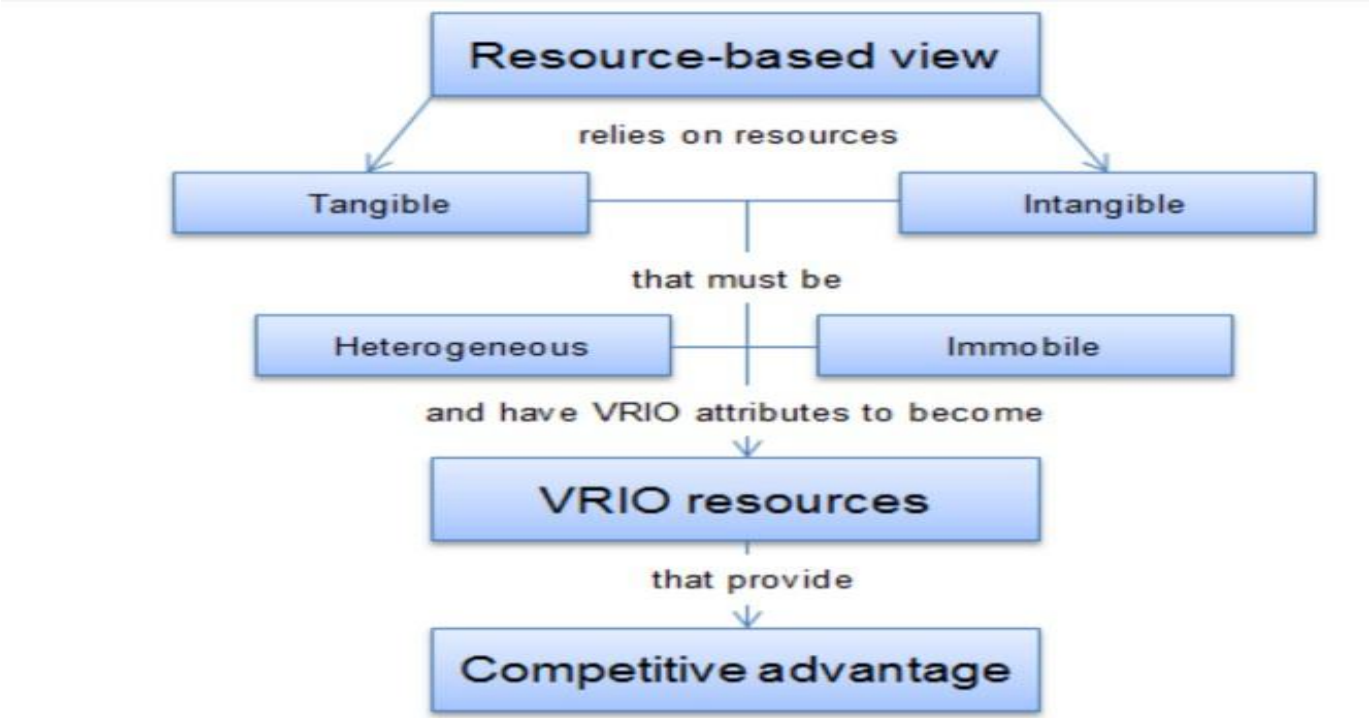

Figure 5: Resources-Based View Frameworks

Source: (Tan et al., 2016).

The figure 5 encapsulates the essence of the RBV framework by delineating how a firm's resources—both tangible like machinery and financial capital, and intangible such as brand reputation and organizational culture—must be heterogeneous and immobile to give rise to a competitive advantage. These resources, when imbued with VRIO (Value, Rarity, Inimitability, Organization) attributes, become pivotal strategic assets that enable a firm to outperform its competitors. VRIO resources are thus the keystones of the RBV theory, as they are fundamental in crafting a sustained competitive advantage for the firm within its market (Tan, Ng, Fong, Chong, & Sukumaran, 2016).

In this thesis, RBV serves as a theoretical backbone by providing a structured approach to evaluate how specific HRM practices contribute to the effectiveness of logistics and supply chain operations. By integrating RBV, the thesis aims to delineate the particular human resources and capabilities that are most influential in optimizing logistics performance, thus offering strategic insights into HRM practices that could be enhanced or reconfigured for better alignment with operational goals (Galbreath & Galvin, 2004).

Overall, RBV offers a robust framework for understanding the strategic importance of human resources in logistics and supply chain management. It enables a comprehensive analysis of how effectively managed HR practices can become core competencies that drive a firm's success in the competitive logistics landscape. The ongoing evolution of RBV, particularly its emphasis on dynamic capabilities, reinforces its relevance in analyzing and optimizing HRM practices within the ever-changing context of global supply chains.

RESEARCH METHODOLOGY

The study will examine the factors strengthening the optimal management of human resource management (HRM) practices in logistics and supply chain management. Utilizing a Quantitative approach, the research will essentially use questionnaires sent to targeted respondents in Malaysia. This method aligns with the same niche of studies that use a survey to investigate HRM-based determinants of supply chain management success (e.g., Gowen & Tallon, 2003; Mendoza-Fong et al., 2020; Hussain, Khan & Khan, 2020).

Quantitative research in Malaysia will target the logistics and supply chain sectors. This is selected to examine the HRM practices in a particular geographical and scalar state, as has been recently done in other world domains like Pakistan and China, where the influence of HRM on supply chain efficiency has been investigated (Hussain, Khan & Khan, 2020; Ding et al., 2015). Participants will be chosen through a purposive sampling technique. However, this kind of research usually targets an organization's specific group or role (Mendoza-Fong et al., 2020; Wahyuni & Sugiarto, 2023) explicitly, thus ensuring the research sample is in line with the population research.

The structured questionnaires will be developed as the primary data collection instrument to measure the HRM practices and their perceptions regarding their impact on supply chain performance. This approach is consistent with prior research that collected information about HRM practices and measures using surveys (Gowen & Tallon, 2003; Ali, 2024; Chen, Tsai & Oen, 2022). The data generated from the questionnaires will be analysed using Statistical software like SPSS or PLS-SEM to discover the association between HRM practices and supply chain performance. Some techniques, such as regression analysis and structural equation modelling, will be applied to test hypotheses as well as validate the findings (for example, Mendoza-Fong et al., 2020; Ding et al., 2015; Wahyuni & Sugiarto, 2023).

Sampling procedure

Sampling describes the strategy and method for choosing samples from a population group as well as the technical formula for estimating sample statistics. It is an ideal for the study's time and financial limitation as well as the great complexity of surveying so many people. By conducting a general population survey, researchers are able to gather specific kinds of information. In addition, extrapolating population parameter estimations will be done using samples taken from a specific population. As a result, we will only include one sample group in this research. Krejcie and Morgan (1970) developed a method to calculate sample size based on the size of the population, providing a useful tool for researchers. Table 2 displays the guidelines for determining the appropriate sample size corresponding to different population size.

Table 2: Determining Sample Size

Table for Determining Sample Size from a Given Population

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size.
S is sample size.

Source: (Krejcie & Morgan, 1970)

In general, there are two categories of sampling techniques: probability sampling and non- probability sampling. The non-probability approach lacks a framework for estimating the likelihood of elements from the population being included in the sample for study. Instead, samples are chosen based on predetermined criteria or reasons. Within non-probability sampling, there exist five distinct methods: quota sampling, purposive sampling, snowball sampling, convenience sampling, and voluntary

response sampling. However, the probability sampling known as random sampling, is a sampling method ensuring each item in the population has an equal opportunity of being selected for the sample. It is therefore guaranteed that the sample fairly represents the total population. Probability sampling can be carried out by randomly selecting a sample from each of the population units. We would like to use a non-probability sampling method to show the bigger population in order to ensure that the sample size in this study is enough (Martínez-Mesa et al., 2016). The convenience sampling method from non- probability sampling will be utilized because it provides researchers with easy access to respondent groups and their willingness to participate in the survey. Additionally, this approach enables us to locate respondents quickly, saving both time and costs in completing our study. Furthermore, this sampling technique offers advantages in terms of response availability, ease of observation and monitoring of respondents, and the rapid collection of data for analysis (Taherdoost, 2020).

Unit of analysis

The focus group for this study will consist of customers from Malaysia. Kuala Lumpur state will be the primary focus of the sample location. Due to convenience, an online survey questionnaire will serve as the primary tool for data collection in this study. In a nutshell, we will primarily employ online questionnaires to collect data and information from Kuala Lumpur residents. There is a standard procedure for figuring out sample size for research purposes. With an anticipated 34.67 million people living there in 2024, Malaysia has a population that is too big for us to gather data from. In order to simplify and reduce the expense of our research process, we should make an attempt to take the sample size into account when gathering data from respondents. According to Bullen (2014), a maximum sample set that is representative of the population is often around 10 percent. Furthermore, he stated that in order to have the greatest outcome, it is necessary to keep the sample size around 100. It is unlikely having a sample size greater than 100 as it may affect the accuracy of the data gathered and would be a time and effort waster. In this instance, we will maintain the optimal sample size to allow us to finish our study with the least amount of money and work.

Pilot study

According to (Simkus, 2023), A pilot test is a preliminary study conducted to assess research procedures, data collection tools, sample recruitment strategies, and other research methodologies before undertaking a larger-scale study. A pilot test should be conducted at the initiation of the data collection process for the study. The main objective of this study method is to assist us in determining whether the list of variables is correct and dependable in relation to the research question and objective. Through the pilot test, a few minor issues that were not noticed were discovered. Therefore, the study will greatly benefit from the pilot test in terms of the quality of the research report.

Reliability test

The degree of dependability or consistency of a measurement, calculation, or study's outcome is referred as the reliability (Carlson, 2018). The main objective of this evaluation is to determine the quality of every piece of data we gathered for the study in order to produce a final product that is more dependable, consistent, and trustworthy. The information gathered from the participants is used to examine the independent variables. The Cronbach's Alpha system in SPSS is among the top reliability statistics systems utilised by researchers today. With a value range of 0 to 1, this system will demonstrate the internal consistency of a scale. Internal consistency refers to all of the test items, which should be checked before being used in research. Then, by incorporating the queries into the computer system's code, it will be ascertained utilising SPSS. Next, an entry value of 0.6 and an overall value of 0.8 were produced by the data computation. Consequently, any numbers above 0.8 were ranked as good reliability, whereas any value below 0.6 was considered low reliability. Any values less than 0.6 have to be eliminated in order to guarantee precision.

Normality Test

A normality test is a technique that uses observational data to determine if the sample population has a normal distribution (Ghasemi & Zahediasl, 2012). The normality test is crucial because it allows researchers to confirm if that specific rule is applicable to all of the data collected from the survey. More precisely, the procedure of measuring a sample using a standard graphic evaluation can also be explained by the normality test. Furthermore, skewness and kurtosis statistics are employed to assess the normality of distribution. The deviation in a bell-shaped curve that resembles a symmetrical pattern is referred to as skewness in statistical terminology. The kurtosis examines the tails of a frequency distribution to determine the relative concentration, which takes into account the flatness or preakness of data values in the centre. Additionally, the main goal of determining the data's skewness and kurtosis is to see whether any other distribution data matches the obtained data.

Data Collection Method

Generating data (and data collection) is crucial in research since it tests and assesses theories. It consists of

collecting dependable and precise information to guide decisions and lower the chances of falling into errors. The data collection can be divided into two key forms– primary and secondary. This technique, employed in experimental and qualitative research, entails direct observation of participants. Surveys, which rely more on self-report questionnaires (Morgan & Harmon, 2001), are less commonly used. These can be casual or organized, but qualitative researchers prefer open-ended (Morgan & Harmon, 2001; Scârneci-Domnișoru, 2021). Because designed experiments vary things and monitor the effects, they can avoid issues like multicollinearity (Montgomery, 2016).

It uses data already collected over some time. Although cost-effective, it poses a heightened risk for data quality problems (such as bias) and multicollinearity (Montgomery, 2016). It uses big data to derive hypotheses but does not necessarily expose causal relationships (Montgomery, 2016). Mixed qualitative and quantitative approaches can also increase the breadth and analytic depth of studies. This involves employing instruments for qualitative descriptions and connecting datasets by way of interpretive means (Sandelowski, 2000).

The nature of instruments should be reliable and valid for the population and purpose (Morgan & Harmon, 2001). According to Mwita (2022), researchers should select the methods based on research objectives, sample size, and data type, as this would ensure valid findings. For instance, in areas like mental health, new digital methods for collecting intensive longitudinal data, such as sensors and apps, are becoming more commonly used (Schick et al., 2023).

Data Analysis Technique

Descriptive Analysis

The organisation and summary of the data features in a particular data collection is known as descriptive analysis. A collection of responses and observations from a sample or whole population can also be referred to as a data set. Frequency distribution is a sort of descriptive analysis. When the number of observations in a certain test sector is expressed in numbers and percentage and it is necessary to analyse the demographic information of respondents, such as their age and gender, frequency distribution is used (Trochim, 2020). Additionally, the data is then abstracted into a table format, which facilitates and eases the process of providing researchers with a comprehensive picture of the data sheet and allows them to convey difficult information.

Normality Test

The test known as the "normality test" is used to determine whether the sample population has a normal distribution by using observational data. The normality test is crucial because it allows researchers to confirm if a particular rule is relevant to all of the data collected from the survey. More precisely, the procedure of measuring a sample using a standard graphic evaluation can also be explained by the normality test. Furthermore, skewness and kurtosis statistics are utilized to assess the normality of distribution. The distortion in a bell curve shape that resembles a symmetrical pattern is referred to as skewness in statistical terminology. Kurtosis examines the tails of a frequency distribution to determine the relative concentration, which takes into account the flatness or preakness of data values in the centre. Additionally, the main goal of determining the data's skewness and kurtosis is to see whether any other distribution data matches the obtained data (Rani Das, 2016).

Multiple Linear Regression

Multiple linear regression (MLR) can be used to accurately predicting the link between two or more independent variables and one dependent variable. Furthermore, multiple linear regression is employed to assess the absence of multicollinearity, ensuring that the independent variables exhibit low correlation and are not closely related to each other. Additionally, multiple regression offers flexibility by allowing researchers to explore various issues, making it beneficial for their investigations (Bevans, 2020). During interactions, the relationship between an independent variable and the dependent variable may follow a linear or curvilinear

pattern, or it may depend on the value of another independent variable. In multiple regression analysis, independent variables are referred to as predictors, while the dependent variable is considered the criterion. These terms are crucial because they highlight how predictor scores can be used to accurately predict criterion scores statistically.

Anova

ANOVA(Analysis of Variance) is a statistical method used to determine if the means of two or more groups differ significantly from one another (Singh, 2024). Furthermore, by comparing the means of various samples, ANOVA examines the influence of one or more factors. As a result, ANOVA is a technique utilised in many research to examine the information gathered for every combination level. F-tests are used in ANOVA to evaluate the results. We can make more informed decisions on whether to accept or reject the alternative hypothesis of our research by using ANOVA, which gives us a more effective perspective. There are two types of ANOVA: one-way and two-way. One-way ANOVA involves only one independent variable, while two-way ANOVA involves two independent variables, as their names suggest. In our study, SPSS would be used to express the ANOVA value and the multiple regression tables.

Correlation analysis

The statistical technique used to ascertain the degree of association between two distinct quantitative variables is known as correlation analysis. A high correlation shows an important connection between two or more variables, whereas a low correlation shows a lack of relationship between the variables. According to (Franzese & Iuliano, 2019), correlation analysis is the act of examining the strength of the association between variables using the statistical data that is already accessible. Furthermore, this method is exclusively associated with linear regression analysis, a statistical methodology that shapes the relationship between one or more explanatory or independent factors and a dependent variable known as response.

Table 3: The guideline of Correlation Coefficient

Size of correlation coefficient	General Interpretation
0.90 to 1.00 (-0.90 to –1.00)	Very high positive (negative) correlation
0.70 to 0.90 (-0.70 to -0.90)	High positive (negative) correlation
0.50 to 0.70 (-0.50 to -0.70)	Moderate positive (negative) correlation
0.30 to 0.50 (-0.30 to -0.50)	Low positive (negative) correlation
0.00 to 0.30 (0.00 to -0.30)	Little if any correlation

(Source: Saunders et al., 2016)

The strength and importance of the relationship between independent and dependent variables are divided into five segments, each of which represents a different intensity level, as shown in table 3 above. The coefficient (r) was employed to calculate the degree of correlation between two variables. The significance of the empirical study was determined using the p-value (p). The range of values between negative one (-1) and positive one (+1), including zero (0), is the number of correlation coefficients (r). (+1) is present when the coefficient correlation produces positive results, and vice versa for (-1) is present when the coefficient

correlation produces negative results. Nevertheless, the result will display (0) if there is no link between IV and DV. The probability is represented by the p-value (p), which is obtained when the correlation coefficient is zero.

Ethical Consideration

It is not necessary for participants in this study to provide private information like their name or Malaysian identity card. This is being done in order to protect both the respondents' identity and the information collected from their decisions. The data is exclusive to this study and is kept totally confidential. In addition, all works utilised in this research are acknowledged in the original author's rights as a mark of appreciation for earlier efforts.

DISCUSSION

Implications for practice

Overall, SCM integration may necessitate more innovative HRM practices, such as flexible job descriptions, an emphasis on competencies and higher-order cognitive abilities rather than specific job skills, and a focus on the whole system rather than traditional, hierarchically oriented HR practices characterized by narrow, functional job descriptions and individual evaluations and rewards. This may need a transition to egalitarian team arrangements. Training on "soft" skills such as teamwork, leadership, problem solving, negotiation, and relationship management may be necessary in addition to classic SCM mainstays like process analysis. In conclusion, organizational theory contends that successful firms in supply chains require external and internal integration in the form of trusting relationships, shared goals, and systemic rewards, particularly to reduce vulnerability, transaction costs, and opportunistic behavior. These trust-based connections generate specialized types of human capital, which can provide a competitive edge. HR practices, particularly nontraditional HR practices such as team structures, soft skills training, employee-partner exchanges, and systemic performance-based evaluations, will be the primary organizational mechanisms for fostering the development of specialized human capital, thereby improving performance and profitability (Menon, S.T., 2012).

While practices such as partner selection and partner evaluation training aid in integration by introducing desirable partners, it is teamwork skills training that assists employees in their day- to-day interactions within the organization and with partners, positively influencing SC performance satisfaction in terms of cost and suppliers.

Implications for research

The current study has several implications for HRM practice in organisations, both at the strategic and operational levels (Menon, 2012). At the strategic level, HR leaders should be involved in the decision to move toward more SC integration. The transition to integrated SCM will have an operational impact on several conventional HR roles. Specifically:

(1) Job descriptions would need to be adaptable, comprehensive, and process-oriented. Job requirements would include higher order cognitive abilities as well as the capacity to operate in ambiguous and unpredictable environments.

(2) Work organization will shift toward a source-to-customer process focus. Teams for internal coordination, cross-functional teams, and external collaboration with SC partners would have to be formed (Menon, 2012).

(3) The skills required of all managers, particularly logistics and buying professionals, will expand to encompass general business, financial, and IT abilities, teamwork, problem-solving, and negotiating skills, leadership and influence skills, adaptability and flexibility. The internal labor pool might be enlarged to include SC partner people for short to medium-term tasks.

(4) Technical aspects of training, such as SCM-related content, process analysis, ISO 9002, Six Sigma, and so

on, must be combined with non-technical or behavioral aspects, such as teamwork, leadership, negotiations, partner selection and evaluation, relationship management, cross-cultural management, antiterrorism laws, and the new inspection regime (Menon, 2012). Job rotation might involve assignments at partner organizations.

(5) HR rules must be designed to deal with persons on exchange from partner organizations (implants) and staff assigned to partner organizations. Partner engagement in performance reviews would need the establishment of mechanisms.

(6) Internal and system-wide performance measures used to manage SC performance would need to be defined and assigned to certain offices or roles. These measures would need to be converted into key performance indicators (KPIs) for executives, managers, and employees at the appropriate levels. The performance management plan should incorporate these KPIs, and reviews should include input from SC partners as needed. Reward systems should be linked to these KPIs, with certain corporate and SC-wide targets for each individual (Menon, 2012).

(7) The labour situation of partner organizations should be monitored on a continuous basis, both upstream and downstream.

CONCLUSION

The study has provided a comprehensive analysis of Human Resource Management (HRM) practices and their impact on the effectiveness of logistics and supply chain management (SCM). By examining key HRM areas such as recruitment and selection, training and development, performance management, and employee engagement and motivation, the research has highlighted the critical role these practices play in enhancing operational efficiency and overall performance in the logistics and SCM sectors. Effective HRM practices not only improve workforce capabilities but also contribute to better adaptability and responsiveness to the dynamic challenges of the industry. This alignment of HRM strategies with organizational goals is essential for maintaining competitiveness in an increasingly complex and globalized market.

Limitations of the Study

While this research provides valuable insights, it is not without limitations. Firstly, the study relies heavily on secondary data, which may introduce biases related to the original data collection methods and the specific contexts in which the data were gathered. Additionally, the primary data collected through online surveys may be subject to response biases, including self-selection bias and social desirability bias, where respondents might provide socially acceptable answers rather than their true opinions. The limited scope of the sample population, focusing primarily on Malaysian logistics and SCM professionals, may also restrict the broader applicability of the findings.

Another significant limitation is the cross-sectional nature of the study, capturing data at a single point in time. This approach may not fully account for the dynamic and evolving nature of HRM practices and their long-term impacts on logistics and SCM. Moreover, the study does not extensively explore the potential impact of external factors such as economic fluctuations, technological advancements, and regulatory changes, which could significantly influence HRM practices and outcomes. These limitations highlight the need for more comprehensive and longitudinal research to validate and extend the current findings.

Future Research Directions

Future research should address the limitations identified in this study to provide a more robust understanding of HRM practices in logistics and SCM. Longitudinal studies that track changes over time would be beneficial in understanding the long-term effects of HRM practices on organizational performance. Additionally, expanding the research to include multiple countries and regions would enhance the generalizability of the findings and provide insights into how different cultural and regulatory environments influence HRM practices and their outcomes. Investigating the role of technological advancements, such as automation and

AI, in shaping HRM strategies in logistics and SCM could also provide valuable insights.

Moreover, qualitative research methods, such as in-depth interviews and case studies, could provide richer, context-specific insights into the mechanisms through which HRM practices affect organizational performance. Integrating perspectives from employees at different organizational levels would help in understanding the diverse impacts of HRM strategies across the workforce. Future studies should also explore the implications of emerging trends, such as sustainability practices and global economic shifts, on HRM in logistics and SCM. These additions would strengthen the existing knowledge base and provide actionable insights for both practitioners and scholars in the field.

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