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A nexus between human capital management and lean supply chain in an organization

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ABSTRACT

This study investigates the impact of key human resource management (HRM) practices—learning and development, recruitment and selection, and performance management—on the lean supply chain performance of organizations. A sample size of 100 participants was selected using a simple random sampling technique, targeting individuals with direct experience in both HR and supply chain management. Data were analyzed using SPSS software, applying regression analysis to examine the relationships between variables. The findings provide insights into how HCM contributes to optimizing supply chain performance, offering practical implications for organizations striving for lean supply chain success. The findings confirm the positive influence of these HRM practices on supply chain efficiency and effectiveness. Learning and development (L&D) emerged as critical for fostering continuous improvement and waste reduction in lean supply chains, equipping employees with the necessary skills to support operational excellence. Recruitment and selection were shown to play a fundamental role in hiring individuals aligned with lean principles such as waste minimization and process efficiency. Performance management further contributed by aligning employee performance with lean objectives, ensuring continuous progress in supply chain performance. The study emphasizes the need for strategic integration of HRM practices into lean supply chain initiatives for sustained organizational competitiveness. Limitations include a small sample size, highlighting the need for future research to expand the respondent pool and explore additional organizational development tools to better define the connection between human capital management and lean supply chains.

Keywords: *Human capital, Lean supply chain, Supply chain management, SPSS, Regression analysis*

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1. Introduction

In this section we only discuss about the background of study for both Human Capital management and Supply Chain Management, it contains views of several academic and perspectives of different organizations. This section has enlightened the purpose, problem statement and significant of this research paper.

1.2 Background of the Study

The management of humans in any organization plays a vital role in the attainment of its goals; in fact, it is the key function that drives and manages the human workforce of any organization in order to make sure the right person is in the right place. This paper relates to the performance of supply chain management, which is affected by practices of human capital management. As the purpose of this study is to investigate the impact of human capital management on lean supply chains, this paper contains the essence of two different fields for discussion (i.e., human resource management and supply chain management) because it is necessary to understand both of them. Whereas sustainable supply chain performances can have a major impact on environmental performance compared to other activities and are exceedingly related to, organizations still have disregarded the human and behavioral components of supply chain management (Albhirat et al., 2024; Dubey et al., 2017). An excellence supply chain must possess sustainability in all its operations, as recently, companies have grasped viability in their corporate methods (Rashid eta l., 2024h; Zimmermann et al., 2017); the lack of economical supply chain talent is an issue that has put organizations in an awkward circumstance (Dubey et al., 2017). A study also narrates that the arrangement of human assets practices is critical and pivotal to the greening of firms, as they diminish boundaries for green supply chain management adoption. In other words, GSCM requires more consideration from green preparation programs, which ought to be outlined and given by the HR division for them (Sarkis, 2012), because training has a positive and significant impact on the succession of a lean supply chain. Human capital management has a moderating role in upgrading and empowering supply chain professionals in any organization, which will directly affect overall performance to achieve those predetermined goals.

1.3 Problem Statement

The purpose of this study is to find out the correlation present between human capital management and the lean performance of the supply chain, which means what the contribution of human capital management is to the excellence of the supply chain in any organization. As previous studies show little connection between these two things, according to some studies The human resource management bundle is a set of practices that have a general impact on overall manufacturing as well as other organization's performances by (1) selecting perfect workers who are adequately mindful of the environmental management perspectives of the organization; this is called "green hiring" (Renwick et al., 2013; Tang et al., 2018). (2) Providing environmental training to the organizational individuals for inclusion in greening exercises in order to extend environmental awareness, called "green training and involvement" (Teixeira et al. 2016). The fields of human resources (HR) and supply chain (SC) have always been treated as separate disciplines, despite the fact that they are "intimately linked" in almost all business environments (Barnes & Liao, 2012).

Hence, organizations in such an energetic and complex environment are compelled to oversee and operate supply chains where markets are profoundly unstable (Kiessling & Harvey, 2005; Bhatnagar & Teo, 2009; Harvey et al., 2013). Hence, the integration of supply chain management into organizational processes was really seen within the decade of 1990 and was considered a key advantage for firms around the world (Rashid et al., 2024i; Shub & Stonebraker, 2009). Essentially, it is broadly recognized that human resource management work may be a prevailing organizational

work that encompasses a significant positive affect on organizational capacities and execution. Hence, another key measurement of human asset management is to ensure that proficient experts with the right KSA (information, expertise, and capacities) are accepted within the organization, independent of any geographic area (Roberts & Eisenhardt, 2003; Glenn Richey & Autry, 2009). Since humans play a predominant role in the logistic process of the supply chain, HRM has picked up more thought (Myers & McPhee, 2006). The education of workers as well as their information, aptitudes, and capacities are exceptionally fundamental (Gammelgaard & Larson, 2001; Murphy & Poist, 2007; Wu et al., 2017). Hence, it is apparent from past investigations that the relationship between human capital administration and the adequacy of supply chain offices is underdeveloped, and there ought to elaborate advanced relations among them and fill that gap.

1.4 Purpose of the Study

The purpose of this study is based on its problem statement, as there is an enormous area to be worked on to elaborate on the further connections between the success of the supply chain and practical applications of human capital management. Here are some objectives of this paper

a) To analyze the impact of learning and development on the success of supply chain management
b) To explore the effects of HR practices on an efficient supply chain
c) To assess the aftermath of performance management on a successful supply chain

1.5 Research Questions

In any organization, what is the impact of learning and development on a successful supply chain strategy?

a) How do HR practices contribute to the excellence of supply chain management?
b) How does performance management contribute to the lean supply chain?

1.6 Significance of Study

This study seeks to extend and understand the connection between human capital management and a lean supply chain by addressing the gaps not filled in previous studies about it. This study will investigate the impact of learning and development. 2) Performance management 3) HR practices include planning, staffing, and organizing needed human resources for the best flow of supply chain operations in any organization. As in previously in many papers authors state that there is a logical connection between both of these fields & performance of supply chain department in any field can be maximize by managing their workforce i.e. personnel who operate that operations of supply chain have crucial impact on its deliverables, therefore it should be a updated candidate having strong decision making skills for it, for that purpose one should have to understand the potential causes & driving factors for it by which management can obtain more than enough from it and he/she should also utilize itself at perform at its best, Hence there is need to explore further this sophisticated area either Human capital management can actually improve the performance of supply chain or not? So, the findings of this paper will clear the concepts and fill the gaps between their relations, which will be beneficial for both of them.

2. Literature Review

2.1 Human Capital Management (HCM)

Employees are definitely the lifeline of any organization. An organization is run with the help of these personnel, who contribute in their own way to its success and prosperity; therefore, it is essential to control and manage that workforce effectively. Human capital management possesses a set of practices related to people resource management that incorporate recruiting, developing, and

optimizing representatives to improve their esteem for the organization. A perfect HCM (human capital management) involves hiring the correct talent, managing teams effectively, and ensuring the presence of the right set of skills for each workforce. The positive relationship between human capital investment and firm performance is widely acknowledged (Lengnick-Hall et al., 2013). The significance of organizational learning for organizational execution has been characterized as a process by which managers strive to enhance human capital capabilities to effectively acquire, manage, and utilize them, as well as to oversee the organization and its environment (Skerlavaj et al., 2007). Similarly, a firm's victory is inseparably connected to the goals it makes in improving human capital through representatives' training and education, which makes it one of a kind, unmistakable, and difficult-to-imitate competencies (Barnes & Liao, 2012). HCM is also abbreviated as a stock of accumulated skills, knowledge, creativity, experience, and other relevant workforce attributes. There must be some policies and regulations to drive organizations seamlessly, as "each organization has its own set of HRM practices according to its own culture and circumstances. These policies are designed and circulated in a way that will decrease the chances of misunderstanding between employers and employees about their rights and responsibilities (Vermeeren , 2014). If these policies are not written or implemented, then organizations may have to face serious trouble. In the last three decades, Strategic Human Resource Management (SHRM) has begun addressing different investigative issues in the supply chain space. Human capital management's practices are focused on organizational needs to provide authentic proficiencies and are implemented in categories like workforce acquisition, workforce management, and workforce optimization. These practices are used for recurring, developing, and optimizing employees to increase their values, which will ultimately result in

a) The right person in the right place
b) Ensure all necessary sets of skills
c) Management of staff
d) Increase overall productivity.

2.2 Difference between HRM (Human Resource Management) and HCM (Human Capital Management)

The term human resources (HR) is something of limited quantity, whereas human capital is implicitly an ongoing relationship of value. Both of these are used interchangeably, but they possess different meanings. HRM has essential center on core administrative functions like maintaining records of employees, compensation, and perks, while HCM has broader aspects that include HRM functions and strategic functions too, such as performance, management, and strategic analytics. HCM helps to manage the employee life cycle constructively. Let's compare both of them to understand them clearly.

a) Human resources management HRM manages core payroll, time, and labor management; on the other hand, HCM manages human capital, from talent to applicant tracking to salary planning and analytics.

b) HRM creates and organizes the systems and processes to hire, retain, and enable employees to do their jobs. Optimize and enhance the value and return on investment of human capital.

c) HRM works according to law and company policies, while HCM is related to all employees' issues and other elements like compensation, learning and development, and employee's utilization.

d) HRM uses simple bench marking techniques, and HCM has complicated evaluation techniques.

e) HRM can be driven regularly by HR professionals, but it can only be executed through the interaction of human capital management.

f) HRM is slow and not integrated at all levels, while HCM is fast, flexible, and systematic.

g) Human resource's important investments are products, technology, and finance, but people and their skills, knowledge, and abilities are important for HCM.

In conclusion, it can be said that HCM is a well-employed HR that impressively took part in meaningful, worthwhile work and delivered some level of desired calculated productivity for that organization.

2.3 Lean Supply Chain (LSC)

The supply chain is a network of all individuals, resources, activities, organizations, and technology engaged in the creation and sale of that product or service. The supply chain incorporates each thing in it, from receiving raw materials to manufacturing processes to dispatching that finished goods or product to the end customer. Lean manufacturing is broadly considered one of the most proclaimed production systems, which enhances customer value through waste elimination and continuous enhancement in that system. Evidence in the literature suggests a positive connection between implementing lean manufacturing (LM) practices and improving the operational execution of the supply chain. With the forecasted shortage of required talent inside the supply chain (SC) workforce, there is flourishing interest in HRM (Human Resource Management) and the improvement of the capacities, knowledge, and skills needed to adequately manage the global supply chain network. Human Resource Management policies, corporate culture, and a firm's orientation towards its employees assist prominently in the formulation of a methodology for supply chain management of a firm (Rasheed & Rashid, 2023). More than ever, the authors recognized almost 129 interesting LSCM elements and practices, from which eight (08) practices were characterized as columns of lean SCM usage, such as data innovation management, provider management, end-of-waste, just-in-time (JIT) production, customer relationship management (CRM), logistics management, best administration commitment, and continuous persistent advancement (Marodin et al., 2017). Lean supply chain consists of all processes from strategic procurement of raw materials to manufacturing processes in which quality and precision can be obtained, and from warehouses where inventory can be optimized and keeping the stock level as low as required at that time to consolidate multiple products into a single consignment or shipment and other possibilities to optimize transportation processes. Despite the fact that a lean supply chain is not only for manufacturing firms but can also help in service sectors by eliminating non-value-added activities from the process, there is always room for reducing non-value-added activities in areas like cost, time, and inventory.

Adopting LSCM has various advantages, including increased manufacturing efficiency, lower costs, improved quality, enhanced competitiveness, increased flexibility, and success. Furthermore, a lean supply chain ensures a smooth flow of goods and services, data, and information with the use of innovations among SC partners without waste. Furthermore, according to Abu Nimeh et al. (2018), if LSCM is incorporated into operations both upstream and downstream, it may be possible to lessen demand variation through capabilities optimization, streamlining, and the creation of capabilities. Moreover, manufacturers discovered that combining SCM with lean management could result in better performance.

The JIT system, flow of information, supplier relationship, customer relationship, and waste reduction were identified as the most frequently and commonly employed LSCM methods. These five methods are elaborated below

JIT System: In many companies, the JIT system has been an important component in the development of lean production. Furthermore, lean manufacturing techniques necessitate small-scale deliveries from approved suppliers, which helps to reduce inventory levels and associated inventory storage costs. Improved quality, enhanced responsiveness, reduced cost, lowered inventory levels, improved productivity, shorter lead times, and reduced downtime are all advantages of implementing a JIT system. Lack of senior management support, lack of supplier training, lack of staff participation,

and local culture hurdles have all been identified as barriers to JIT adoption (Rashid et al., 2024a).

Flow of information: The goal of Flow of Information is to gather and assess knowledge among SC partners in order to improve decision-making, operations, response, and quality of service. One of the major pillars of SC and lean management, according to some studies, is information exchange. The value of information sharing is determined by the quality of the information given. The term "quality of shared information" refers to the correctness, adequacy, timeliness, and veracity of information communicated, all of which contribute to improved SC performance. Transfer of inaccurate information, on the other hand, will mislead SC members in their decisions, resulting in waste and disrupting the coordination between the various stages of a SC rate (Rashid et al., 2023).

Supplier relationship: Supplier relationships are supposed to lower costs and promote confidence, strengthen SC partners' technology and design capabilities, align capabilities and establish learning routines, and minimize or eliminate wasted activities and time. Integrated procedures, long-term contracts, cooperative quality improvement initiatives, and risk and reward sharing are all possibilities.

***Customer relationship*:** Demand management practices through long-term client relationships, satisfaction enhancement, and complaint management," Integrated problem-solving initiatives, developing long-term relationships with customers, enhancing customer connections, effectively responding to customer complaints, and boosting customer happiness are all examples of customer relationships. These benefits automatically take part in the lean supply chain and improve the efficiency of an organization (Al-Ghwayeen & Abdallah, 2018).

Waste reduction: Any tasks carried out by businesses that use resources without providing value to the end product of the customer. The reduction of waste leads to the optimization and simplification of procedures throughout the SC (Rasheed et al., 2024a).

2.4 Human Capital Management (HCM) and Lean Supply Chain

There's an expanding affirmation of the need for workforce organization in supply chain management regarding forecasts suitable system-wide. HR has to enroll and convey staff competent in supply chain and logistics assignments and increment the professionalization of these cadres. There's a trend to think that a lean supply chain brings together great practices, but in reality, the development of lean in different divisions is a troublesome and challenging thing. Research work related to the execution of lean supply chain management (LSCM) practices ordinarily disregards the supply chain contexts or barely approaches them centered on a specific industry section (Taylor, 2006; Theagarajan & Manohar, 2015). Many HR practices, such as recruitment, performance and execution management, and awards and rewards, should be environmentally situated. And their thinking proves that GHRM has no positive impact on increasing supply chain execution (Al Romeedy, 2019; Arulrajah et al., 2017). When human capital management is agile and able enough to understand the potential needs of that supply chain cycle, they can ultimately contribute to the to the supply chain department's planning, staffing, and management of the required manpower and training, upgrading the available staff so that they can assist each other’s in attaining organizational goals. However, this is not enough for long-term strategies as one should also have to monitor and manage individual performances; therefore, it must be a valid performance management system to control and motivate the team consistently.

2.5 Learning and Development

The concept of learning organization has developed over a long period of time. It encouraged both academics and practitioners to write many textbooks and studies, and it has been broadly shown as a prescription for productive organizational activities and sustainable competitiveness. An author suggests that there should be a genuine learning organization where people at all levels can learn and upgrade themselves (Rashid & Rasheed, 2023; Zegordi et al., 2009) individually and collectively to

increase capacity to generate outcomes continuously. Therefore, organizations should have a learning culture where employees consistently learn and develop their capacity to achieve more than ordinary practices, where new patterns of thinking should be nurtured, all possess collective aspirations, and each one loves to learn from each other's, respectively. Studies show that all the dimensions of learning organization are positively correlated with better organizational performance. And the regression analysis depicts that the job satisfaction of employees can partly be explained by the presence of a learning organization.

Research has been conducted on the relationship between learning organization and organizational commitment among nursing administrators. There was a vital relationship between learning organization and organizational commitment, as well as between learning organization and work involvement, as per the result of this research. Only organizations with active adaptation can survive and remain capable of growth (Yaghoubi et al., 2010). Gould-Williams and Davies (2005) integrate HR practices with learning organizational practices that affect organizational performance, success, and competitiveness.

To meet the increasing competition in the modern era, it is essential to recognize that the culture of learning organizations significantly impacts organizational performance through innovation. There are seven dimensions of learning organizations that contribute to this influence. We should understand all these dimensions as variables to measure the impact of learning organizations on the success of the supply chain, such as

Continuous learning: This learning is planned into work so that individuals can learn there in the workplace; opportunities are given for continuous instruction and development.

Collaboration and team learning: Work is designed to utilize teams to access diverse modes of thinking. Teams are expected to learn together and collaborate; the culture values and rewards collaboration.

Inquiry and dialogue: People gain productive thinking abilities to specific their sees and the capacity to tune in and ask into the views of others; the culture is changed to support feedback, addressing, and experimentation.

Embedded system: Both high- and low-innovation frameworks to share learning are made and coordinated with work; access is given; frameworks are maintained.

System connection: Individuals make a difference by seeing the impact of their work on the whole venture; individuals check the environment and utilize data to alter work practices; and the organization is connected to its communities.

Empowerment: Individuals are included in setting, owning, and actualizing a joint vision; duty is distributed near to decision-making so that individuals are persuaded to remember what they are held responsible for doing.

Strategic leadership: The leader model and Support learning leadership uses learning strategically for business results. This was credited to the parallel enhancement of organizational execution and change, along these lines driving progress in organizational execution. Moreover, organizations learn to enhance their involvement in execution since the exchange of supportive information happens. Usually, in a learning organization, there's a determined and harmonious learning environment (Awan et al., 2020; Rashid et al., 2024b). Even though there were mixed results among these seven measurements of organizational learning, Specifically, a study by Akhtar et al. (2013) noted that only two dimensions of organizational learning had a positive impact on organizational performance: inquiry & dialogue and systems connection. This is supported by Jyothibabu et al. (2010), who found that inquiry and dialogue promote collective thinking and communication, which significantly contribute to organizational performance. The implications of

these considerations are backed by a study by Salim and Sulaiman (2011), whereby organizational learning was found to be basic for advancement in small and medium enterprises (SMEs) working within the Malaysian ICT industry. Hence, practices of learning must be reinforced to improve the performance of any organization.

2.6 Recruitment & Selection

Recruitment refers to selecting the right employees for the right job. Selection refers to choosing the right individuals for a vacant position in an organization based on their qualifications. Recruitment is the core function of the Human Resources (HR) department, and the recruitment process is the initial step in achieving competitive quality and gaining a strategic advantage for the industry. The recruitment process includes a systematic and technical process, from sourcing the candidates to arranging and leading the interviews, and requires multiple resources and time. According to Hamza et al. (2021), the traditional and orthodox recruiting process starts with a job description and specification. The job description describes the work responsibilities of the successful job presented. The job specification tells the experience an expected candidate should have to carry out the work and task.

Saridakis et al. (2017) stated that an employee's recruitment and selection are a human resources professional's most significant and important jobs. They have suggested that efficient and effective recruitment is crucial to the daily functioning of every organization. Recruitment success is based on searching for individuals with the worthy qualifications, skills, and expertise to meet the corporation's targets and the ability to make an effective, profitable, and positive contribution to the organization's values, goals, and objectives. The recruitment process has a major impact on a firm's supply chain performance. The issues, like increased hiring costs and high turnover, have compelled organizations to be more concerned about the commitment of their employees. The commitment of employees is one of the key factors in the performance of any department of the organization or industry. According to Mahmood et al. (2018), supporting the argument, the recruitment process is the first step where the organization and employee interact and set the foundation of this relationship. If this relationship's foundation is strong, we can expect a tremendous relationship in the future. Therefore, it can be argued that the recruitment process has a noticeable impact on the relationship between employee commitment types and firm supply chain performance. So, the current study has proposed the following points

a) The recruitment process conciliates the relationship between affective commitment and firm supply chain performance.

b) The recruitment process conciliates the relationship between normative commitment and firm supply chain performance.

c) The recruitment process conciliates the relationship between continuity commitment and firm supply chain performance.

Selection is a term used to describe ways of selecting candidates from a pool of candidates who have the best understanding, skill sets, and capacity to complete the job (Campion et al., 2019). It is a method for sorting candidates into groups based on their qualifications and then selecting those who are most likely to fulfil the task. Selection, according to Basaka (2017), is the process of selecting the best candidate for a job from a pool of candidates. In addition, Bell et al. (2017) defined selection as the process by which businesses decide whether or not to hire someone. A study stated that selection is the procedure for collecting and evaluating information about an individual in order to expand an employment offer. They also stated that the process is carried out under legal constraints and that it clearly demonstrates the association's and individual's interests. The purpose of employee selection is not only to replace departing employees or to grow the number of employees in a company, but also to upgrade to people with superior knowledge and skills and a higher degree of dedication to the organization.

According to Acikgoz (2019), the selection procedure is concerned with selecting qualified individuals to fill open jobs in the organization. Selection is a method of choosing applicants with relevant credentials to work in the company; it is actually the method of deciding on the individual(s) from a group or list of possible applicants who meet the needs of the opportunities determined in the organization. The goal of the selection process, according to Van Esch and Black (2019), is to choose the best individuals who can effectively meet the task and organizational criteria. They also emphasized the significance of incorporating more technology into the hiring and selection process.

The likelihood that a candidate will accept a job offer, as well as the impact on their dependent commitment to continue in the business, may be influenced by recruitment and selection experience (Mahmood et al., 2018). HR managers' appointment decisions are the most important decisions they must make since they determine their ability and strength to fulfill their objectives, as well as the quality of products or services given to customers. Previous studies have shown that the level of competence of an HR manager has the greatest impact on recruitment and selection and that having experienced HR scholars inside the HR department will not only shorten the vacancy but also improve the quality of the applicants. Furthermore, successful recruiting and selection are only possible if a qualified HR team is in place (Lu & Rosenthal, 2018),). According to Armstrong (2006), an analysis of the job has been carried out for every job within an organization to realise defining the requirements, preparing the job specifications and descriptions, setting the employment terms and conditions, attracting candidates' interests, and reviewing and assessing the alternative sources of applicants both inside and outside the corporation. Before recruiting for an existing or new position, the job analysis programed frequently produces information that is translated into substantial productivity of the job description and individual specification, which is what should be accomplished and who is doing it. It is necessary to save and fully commit to gathering the necessary information about the type of employment because it records the relevant personal attitudes and attributes, as well as the most in-demand knowledge and skills.

Recruitment and selection have a great impact on the performance of an organization. They are important components of an organization's overall resourcing strategy, which determines and secures the people needed for survival and success in the short to medium term (Elwood & James, 1996). In fact, the basic purpose of recruitment is to build a pool of qualified candidates to enable the selection of a good applicant for the organization by attracting more and more employees to apply, whereas the basic purpose of the selection process is to choose the ideal applicant to fill the various positions in the organization by attracting more and more employees to apply (Gamage et al., 2015).

There is a beneficial and significant association between recruiting and selection and an organization's performance, according to the research (Gamage et al., 2015). For example, Sang (2005) identified a link between recruiting and selection and corporate performance. Ichniowski and Shaw (1999), Katou and Budhwar (2006), and Wright et al. (2005) all found positive effects between recruitment, selection, and performance. Other research, such as those conducted by Syed and Jama (2012), has found that implementing an effective recruitment and selection procedure has a favourable impact on organizational performance.

The hiring methods, according to Gamage et al. (2015), will dictate who is chosen. It will find competent individuals and appropriately link them to the position if it is properly developed. When a suitable selection mechanism is used, the chances of selecting the right person to fill a slot increase. Productivity rises when the best people are chosen for the task. It's no surprise that studies like Terpstra and Rozell's (1993) found a link between extensive recruiting, selection test validation, and the usage of formal selection procedures and business profits. Rauf (2007) discovered that advanced recruitment and selection procedures are related to organizational performance in a positive way.

2.7 Performance Management

Performance management is an essential tool to improve organizational performance and enhance organizational efficiency by managing it excellently (Hashmi et al., 2021a; 2021b). As

Performance management is one of the various practices that include talent management. Collings and Mellahi (2009) characterized talent management as exercises and forms that include the orderly recognizable proof of key positions that differentially contribute to the organization's sustainable competitive advantage, the headway of a talent pool of tall potential and tall performing occupants to fill these parts, and the enhancement of an isolated human resource design to encourage filling these positions with competent occupants and to create beyond any doubt their continued commitment to the goals of the organization. Performance management is one component of ability management and has been characterized as the estimation and administration of employee and organizational execution, with the extreme objective of progressing organizational adequacy (Denisi, 2000; Rashid et al., 2022b). In performance management, upper management sets some targets and objectives for performance expectations for their lower ones, and then consistently measures and reviews those performance results for a specific period for performance expectations for their lower ones, and then consistently measures and reviews those performance results for a specific period of time. At the end, they decide what should be awarded or rewarded to them according to their performances. This can be positive motivation as well as negative, meaning one can be promoted or demoted depending on their performance. This factor has a strong impact on an individual's performance as everyone is psychologically committed to achieving those ambitions; otherwise, he or she has to embrace the disappointment. Performance management systems (PMS) can be characterized by these interrelated and autonomous execution management components, which impact one another to extend representative and organizational execution in order to eventually improve organizational adequacy. Dewettinck (2008) and Dewettinck and Dijk (2013) have characterized performance management framework adequacy as the capacity of the system to advance individual agent results, checking execution, motivation, collaboration, self-esteem, working on the work, and reassurance in performing work obligations. Dewettinck and Dijk (2013) also revealed that workers were more likely to see their execution administration system as viable in the event that its fundamental work was to make strides in employees' capacity to monitor, assess, and adjust their claim execution, compared to laying out clear and challenging objectives to help worker perform well, which means from development origin to result-oriented performance. Dewettinck (2008) himself got similar findings, in that HR experts reported development-oriented performance management systems to be effective at uplifting employee's moral and competency levels. Rici (2016) stated that performance management framework characteristics can be grouped into these four categories reason for the framework, activities, performance measures, and structural characteristics. All the characteristics in each of these four categories are shown in figure 1 elaborated below.

Performance Management System Characteristics

Characteristic	Description
Purpose of performance management systems	
Results oriented	Focus on performance outcomes
Development-oriented	Focus on employee development
Administrative purposes	Focus on administrative purposes to inform decisions
Performance measures	
Relevance of performance measures	Extent performance measures are related to the job
Task performance	Fundamental technical activities important to one's job
Contextual performance	Extra-role behaviors
Achievement of goals or objectives	Extent to which goals or objectives are achieved
Competencies	Attainment of a combination of tacit and explicit knowledge, behavior, and skills that gives one potential for effectiveness
Performance management system activities	
Communication of expectations and importance of employees' effort	Communicate performance expectations and why effort is important
Coaching	Ongoing interactions that focus on improving job performance
Feedback	Provide information on past performance to improve job performance
Recognition	Positive reinforcement in response to a desirable behavior
Goal setting	Setting goals for the position one currently holds
Identification of training needs	Identification of areas in which training is needed
Individual development plans	Personal and professional growth plans to enhance skills, behaviors, and abilities
Career planning	Identification and creation of career paths
Structure of performance management systems	
Number of formal performance reviews	Number of planned conversations between employee and manager about the employee's performance
Number of informal performance reviews	Number of unplanned conversations between employee and manager about the employee's performance
Goal alignment	Aligned employees performance goals with organizational goals and priorities
Link between performance management and rewards systems	Reward system differentiates rewards based on quality of performance
Number of sources of feedback	Number of sources providing performance feedback
Participative decision making	Encourage employees to express their ideas and incorporate employee feedback when making performance decisions

Figure 1: Performance Management Categories

Source: Literature

2.8 Conceptual Model

In relate with the supports that has been recognized from the prior composing, a theoretical system is proposed to examine the interrelation between practices of Human Capital management towards excellence of supply chain management, a pictorial view of our conceptual model is illustrated as in below figure 2:

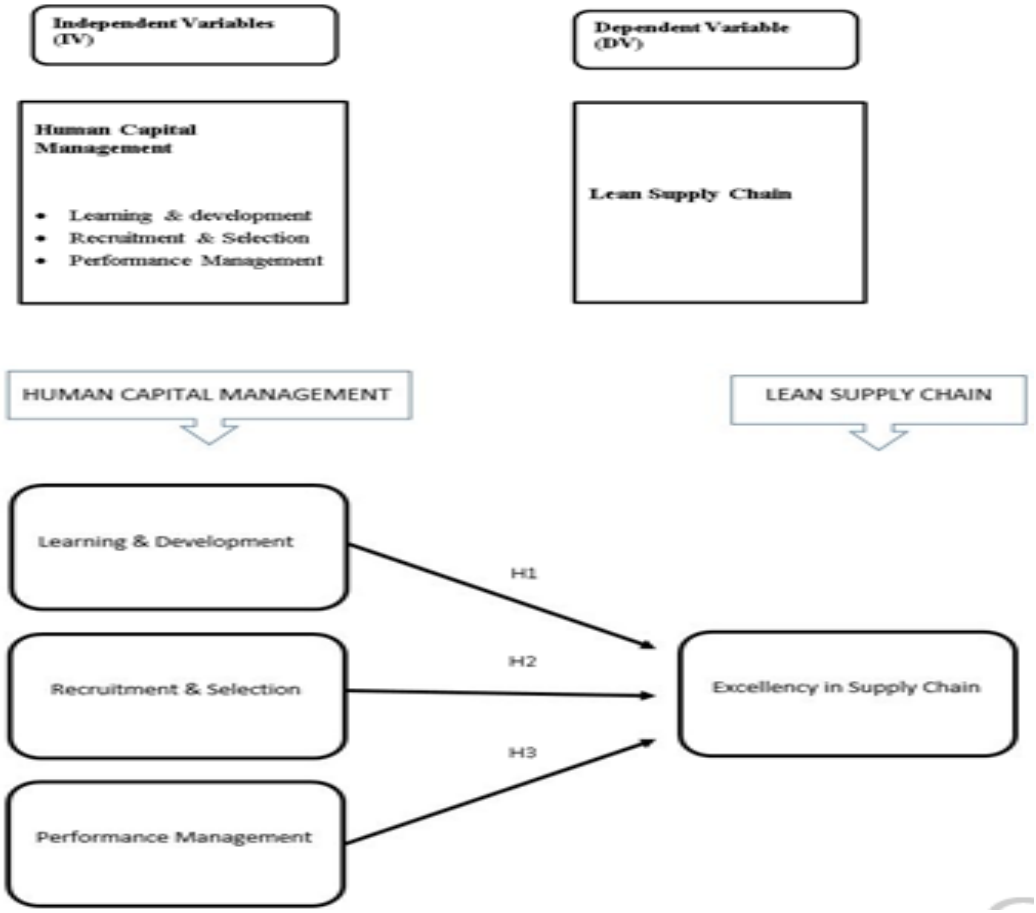

Figure 2: Conceptual Framework

Source: Author's own creation

2.9 Research Hypothesis

Hypothesis 1 Learning & Development has significant impact on Lean Supply chain of any organization.

Hypothesis 2 Recruitment & Selection has significant impact on Lean Supply chain of any organization.

Hypothesis 3 Performance Management has significant impact on Lean Supply chain of any organization.

3. Research Methodology

Research technique essentially implies how a researcher methodically designs a study to form beyond any doubt substantial and true results that straightforwardly address the research desire and goals (Rashid et al., 2022a). In other words, the technique section ought to justify the design choices by portraying that the chosen strategies and methods are the most excellent fit for the research points and objects; a good research methodology provides scientifically sound findings, whereas a poor methodology doesn't (Rashid & Rasheed, 2024). It contains particular methods or strategies utilized to distinguish, select, handle, and analyze data around a theme. In a research paper, the technique allows the reader to critically assess the study's overall validity and reliability (Rashid et al., 2024c).

3.1 Research Approach

Research approaches significantly impact the results of any research work; therefore, it should be a crystal clear approach that will demonstrate further relations and connections between human capital management and the lean supply chain. Research can be recognized after understanding the proper direction towards it (Rashid et al., 2024g); therefore, it is essential to develop a brilliant design and select an approach that contains systematic plans and procedures that possess steps from broad assumptions to detailed methods of data collection, analysis, and interpretation that can unleash the hidden relationship between the management of human capital and the excellence of the supply chain in any organization with the help of a quantitative approach (Rashid et al., 2024d).

3.2 Research Design

In this scenario, we decide to choose a deductive approach to explore the fact that either there is any logical conclusion or it's just a hypothesis, the deductive approach will lead us to specify that thing from one or more statements to reach a logical conclusion, in which methodological choice is quantitative and strategy of experimental will not assist only in identifying the cause and effect of a hypothesis but can also help us in analyzing that relationship to determine more depth in it either there is any systematic connection or not, the time horizon for our study is cross because it is also called snapshot study means phenomenon is for one time only it will help us to complete our research within suitable time (Rashid et al., 2024e).

Positivism Deductive Approach; Quantitative; Experimental; Cross-Al

As this paper is all about investigating the potential impact of HCM on the excellence of supply chain departments in any organization, it was investigated in many organizations of different sectors, which include both HR and supply chain departments, i.e., textile, FMCG, pharmaceuticals, automobile sector, etc. An online survey helped us gather those responses from those people; it not only saved time but also provided authenticity to that data.

3.3 Sampling

It is crucial to select the sampling size and type for that research work, as its feedback has an immense impact on the hypothesis, according to its definition. "The strategy of choosing a little bunch from a bigger group and analyzing the little group (the sample) in order to learn about the large group" (Rashid et al., 2024f) (the population). Therefore, we have chosen the following things for it

3.4 Target Population

Target populations were not top management, who only think strategically, but individuals in middle management (general managers, managers, and executives) who actually drive these variables and possess hands-on experience with the volatility of associate risks, potential opportunities, and threats in them, because the contribution of these middle management one's assists top management in decision-making regarding processes, capacities, and other ground realities.

3.5 Sample Size

The sample size is not large for this paper; however, it is not very small either. A figure of 100 (100) was chosen for participants from different manufacturing organizations that have both departments (i.e., HR and SCM) to explore the connections and get practical responses from them, as each individual has their own level of experience and knowledge for these variables.

3.6 Sampling Technique

A very common technique was used for sampling, which is known as simple random

sampling, to collect data (Rashid et al., 2021).

3.7 Research Instrument of Data Collection

The research instrument for this quantitative research study is online survey forms, which possess the nitty-gritty of both hypotheses. This survey was based on closed-ended questions. And items of the questionnaire will be measured on a 5-point Likert scale ranging from 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree.

3.8 Procedure of Data Collection

New technology and the internet helped gather and manage the online survey forms, from questionnaire distribution to the graphical representation of results. The quantitative approach becomes easy nowadays as we don't have to visit each individual's organization physically but only send a link to it. Nowadays, many researchers use this tool of online forms (which contain each related question for research) to collect results at their own desks from different organizations in even different countries.

3.9 Statistical Technique

Research questions are designed to scale numerically or separately for each variable. Depending on the survey response rate, the questioner helped gather the necessary data. We have used the SPSS Statistical Package for Social Sciences (SPSS) to analyze and explore it further, and tools like regression analysis help to understand the relationship between dependent and independent variables (Rashid et al., 2020a).

3.10 Ethical Considerations

All the information will be confidential and gathered from respondents. Only the researcher has access to the researcher's confidentiality and identity records. This term paper honored the moral measures set by the nonexclusive investigation of morals. By doing so, the participants were educated about all the steps that were to be taken in this research. The members were more vital than the study, and so continuously regarded, the respondents voluntarily provided this information, and it will not be used to expose the dignity of those who took part in the study.

4. Result and Finding

4.1 Results and Findings

In this section, we have discussed the results and findings that were derived from the responses of various professionals of different backgrounds, ages, sexes, etc. As per table 1 and 2 respondents are defined in categories as follows: Females are 25.2%, while Men are 73.5%. Age groups can be seen as 18 to 25 being 57 in number and having a percentage of 38.8, 25 to 35 being 65 in number and having a percentage of 65%. 24 people of the age group 35 to 45 have participated, whose percentage is 16.3%, while the most senior one whose age was detected belongs to the group of 45-55.

Table 1: Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		2	1.4	1.4	1.4
	Female	37	25.2	25.2	26.5
	Male	108	73.5	73.5	100.0
	Total	147	100.0	100.0	

Source: SPSS output

Table 2: Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18 to 25	57	38.8	38.8	38.8
	25 to 35	65	44.2	44.2	83.0
	35 to 45	24	16.3	16.3	99.3
	45 to 55	1	.7	.7	100.0
	Total	147	100.0	100.0	

Source: SPSS output

If we look at the marital status, we can see in table 3 that 19% are married and 81% are single. For qualifications, we can see in Table 4 that many professional respondents from various sectors have shared their views on our research paper, as respondents with Masters were 37, whose percentage is 25.2%. The major portion consists of graduates, whose frequency is 108 and their percentage is 73.5%. We also have two hard workers who have not completed their graduation but are experts in their fields, whose values are 1.4%.

Table 3: Marital Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Married	28	19.0	19.0	19.0
	Single	119	81.0	81.0	100.0
	Total	147	100.0	100.0	

Source: SPSS output

Table 4: Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Graduate	108	73.5	73.5	73.5
	Intermediate	2	1.4	1.4	74.8
	Masters	37	25.2	25.2	100.0
	Total	147	100.0	100.0	

Source: SPSS output

Table 5 below represents the working experience of the respondents.

Table 5: Working Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.0	2	1.4	1.4	1.4
	2.0	16	10.9	11.2	12.6
	3.0	34	23.1	23.8	36.4
	4.0	22	15.0	15.4	51.7
	4.5	1	.7	.7	52.4
	5.0	13	8.8	9.1	61.5
	5.5	1	.7	.7	62.2
	6.0	15	10.2	10.5	72.7
	7.0	10	6.8	7.0	79.7
	8.0	7	4.8	4.9	84.6
	8.5	1	.7	.7	85.3
	9.0	6	4.1	4.2	89.5
	11.0	4	2.7	2.8	92.3
	12.0	4	2.7	2.8	95.1
	13.0	3	2.0	2.1	97.2
	14.0	2	1.4	1.4	98.6
	15.0	1	.7	.7	99.3
	17.0	1	.7	.7	100.0
	Total	143	97.3	100.0	
Missing	System	4	2.7		
Total		147	100.0		

Source: SPSS output

4.2 Validation of Work

To verify and validate the model, one must check its reliability; for that purpose, we had to

run the Cronbach's alpha test on SPSS for our whole variables. As stated by Hashmi et al. (2020b) Cronbach's alpha value should not be less than 0.7. Then, it will be considered as the model is reliable.

4.2.1 Reliability Analysis

Table 6 represents the reliability statics of learning & development

Table 6: Reliability Statics of Learning & Development

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.858	.860	5

Source: SPSS output

Table 6 illustrate that Cronbach's alpha is .858, which is means it is reliable and variable is valid (Rashid et al., 2020).

Table 7: Reliability Statics of Recruitment & Selection

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.735	.744	5

Source: SPSS output

Table 7 Shows that Cronbach's alpha is 0.735, which is also greater than 0.7 so the variable is valid.

Table 8: Reliability Statics of Performance Management

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.856	.859	5

Source: SPSS output

Tables 8 describe the value for reliability of a variable which is 0.856, means the variable is reliable.

Table 9: Reliability Statics of Lean Supply Chain

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.771	.774	5

Source: SPSS output

Table 9 shows that the Cronbach's Alpha value of our variable is 0.771 and greater than 0.7, hence this is also the valid.

4.3 Hypothesis Testing

Each hypothesis was tested on SPSS, where we applied linear regression.

4.3.1 R, R-Square, And Adjusted R-Square

As can be seen in Table 10, the value of R is 0.740 and R square is 0.548, which means there is a strong relationship between dependent and independent variables. R-square shows the accuracy of the regression, and the value we have is 54.8%, the adjusted R-square shows the unbiased accuracy of regression, so we have 53.9% of it (Amirah et al., 2024; Khan et al., 2023a; 2023b).

Table 10: Model Summary

Model	R	R Square	Adjusted R Square	Standard . Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F. Change	
1	.740[a]	.548	.539	.44660	.548	57.814	3	143	.000	2.085

a. Predictors: constant, PM, RS, LD
b. Dependent Variable: LSC

Source: SPSS output

Table 11: ANOVA[A]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	34.594	3	11.531	57.814	.000[b]
	Residual	28.522	143	.199		
	Total	63.116	146			

a. Dependent Variable: LSC
b. Predictors: constant, PM, RS, LD

Source: SPSS output

Table 12: Coefficients[a]

Model		Unstandardized Coefficients		Standardised Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.574	.188		8.377	.000	1.202	1.945					
	LD	.297	.077	.368	3.842	.000	.144	.450	.700	.306	.216	.344	2.911
	RS	.177	.072	.214	2.479	.014	.036	.319	.643	.203	.139	.424	2.361
	PM	.176	.068	.232	2.580	.011	.041	.311	.657	.211	.145	.391	2.559

a. Dependent Variable: LSC

Source: SPSS output

According to Rashid and Rasheed (2022) and Hashmi and Mohd (2020), the sig value should be less than 0.05; our sig values are illustrated in table 12, which defines that all the variables are below the 0.04 sig value and over all sigh value in table 11 is also less than 0.04.

$$LSC = 1.574 + 0.297\ LD + 0.177\ RS + 0.176\ PM$$

4.4 Summary of Hypotheses Testing

This table 13 is illustrating which hypothesis is accepted or rejected.

Table 13: Summary of Hypotheses Testing

H	Hypothesis	Results
H1	Learning and development have a significant impact on the lean supply chain of any organization.	Accepted
H2	Recruitment and selection have a significant impact on the lean supply chain of any organization.	Accepted
H3	Performance management has a significant impact on the lean supply chain of any organization.	Accepted

Source: Based on the SPSS results

5. Conclusion, Limitation, Recommendation and Future Research

5.1 Discussion

The research aimed to explore the critical human resource management (HRM) practices, including learning and development, recruitment and selection, and performance management, and their significant impact on the lean supply chain of organizations. The findings confirm the acceptance of all three hypotheses, emphasizing their essential role in shaping lean supply chain efficiency and effectiveness. Learning and development (L&D) emerged as a pivotal factor in enhancing the lean supply chain. Lean supply chains thrive on continuous improvement, waste reduction, and optimized workflows, all of which are directly influenced by the skill level and adaptability of employees. The acceptance of the hypothesis suggests that investing in employee training, particularly in lean methodologies like Six Sigma, Kaizen, and just-in-time (JIT), equips employees with the knowledge and skills necessary to identify inefficiencies, solve complex

problems, and contribute to operational excellence. L&D also fosters a culture of continuous improvement, which is crucial for sustaining lean practices over time. This finding aligns with previous research that links employee development with supply chain innovation and operational performance (Raja et al., 2021). Thus, for organizations pursuing a lean supply chain, strategically embedding L&D programs focusing on lean principles is crucial to driving sustained competitiveness. Recruitment and selection also play a fundamental role in fostering a lean supply chain. The hypothesis confirms that identifying and hiring individuals with the appropriate skill set and mindset significantly impacts the lean supply chain's success. Lean supply chains require employees who are not only technically proficient but also culturally aligned with lean principles, such as waste minimization, process efficiency, and continuous improvement. The ability to recruit employees who are adaptable, innovative, and possess strong problem-solving skills can streamline lean processes, reduce waste, and enhance overall supply chain responsiveness. This finding supports the view that strategic recruitment aimed at selecting candidates with lean competencies and an understanding of modern supply chain dynamics can directly influence supply chain performance. Moreover, this reinforces the importance of HRM alignment with organizational strategies to achieve lean objectives (Caldwell et al., 2020).

The final significant factor identified is performance management. The study confirmed that effective performance management systems positively affect the lean supply chain by ensuring employees are aligned with the organization's lean goals. In lean environments, performance management is more than just assessing individual productivity; it involves aligning employee performance metrics with lean objectives, such as reducing waste, improving cycle time, and enhancing overall process efficiency. When employees' performance is regularly assessed and aligned with lean goals, organizations can ensure continuous monitoring and improvement in supply chain performance. This reflects the findings of earlier research, which showed that performance management plays a critical role in driving lean success by motivating employees, recognizing improvements, and fostering accountability (Smith & White, 2019). An efficient performance management system encourages transparency, continuous feedback, and real-time adjustments, ensuring that lean practices are sustained throughout the supply chain.

5.2 Implications, Limitations, and Future Research

From a managerial perspective, these findings underscore the need for a holistic approach to integrating HRM practices into lean supply chain strategies. Managers must invest in robust L&D programs, strategic recruitment, and an efficient performance management system to build a workforce that can effectively support lean objectives. Failure to do so can lead to misalignment between human resources and supply chain goals, resulting in inefficiencies, increased waste, and reduced competitiveness.

There were some limitations attached to this study as the sample size was small and the respondents were only one hundred forty-seven (147); therefore, the results can be even more precise and accurate if the number of responses is greater than this number (i.e., 147). If we talk about future research on this subject, I would suggest that there is always room for improvement and further study on any topic. If one can apply the neo-practices of organizational development tools along with these human capital development practices, then the impact would be even gigantic, and the latent nexus between human capital management and the lean supply chain can be further defined uniquely and explicitly.

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