

Role of Human Resource Management in Supporting Logistics and Operations Performance in the Textile Industry in Bangladesh

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Abstract: This study examined how Human Resource Management (HRM) supports logistics and operations performance in Bangladesh's textile and readymade garments (RMG) industry. It combined a focused literature review with an illustrative factory-level dataset (n=40) linking HRM practice scores training, recruitment, performance management, safety & wellbeing, and engagement to operational KPIs including on-time delivery, order lead time, defect/rework rate, inventory turnover, and labor productivity. Correlation analysis suggested that stronger HRM practices were associated with higher on-time delivery and productivity and with lower defects and shorter lead time. An OLS regression indicated that the HRM index remained a significant predictor of on-time delivery after controlling factory size and automation level. The paper concludes that HRM is a practical lever for improving supply chain responsiveness in labor-intensive textile manufacturing and proposes a set of integrated HR operations actions for Bangladesh-based firms, such as skill-based workforce planning, supervisor development, incentive alignment to delivery and quality, and wellbeing and compliance embedded into daily routines.

Keywords: HRM; Logistics; Operations Performance; Textile Industry; Bangladesh; RMG; on-Time Delivery; Defects; Lead Time.

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I. INTRODUCTION

Bangladesh's textile and ready-made garments (RMG) sector is deeply integrated with global apparel value chains and is one of the most time-sensitive export industries in the country. Buyers often operate with short fashion cycles, strict compliance expectations, and penalty clauses for delayed delivery. In such an environment, logistics and operations performance lead time, on-time shipment, quality stability, and cost efficiency becomes a strategic capability rather than a back-office activity.

While many operational improvement programs in the apparel sector focus on technology, lean tools, and factory layout, evidence from both research and practice suggests that "people systems" are equally decisive. Apparel manufacturing remains labor intensive, and the day-to-day outcomes of cutting, sewing, finishing, packing, and dispatch depend on workforce competence, discipline, teamwork,

communication, and retention. These variables are shaped by human resource management (HRM): how factories hire, train, deploy, evaluate, reward, and protect workers and supervisors.

At the same time, Bangladesh's export logistics environment presents structural constraints. The country relies heavily on seaports for trade, and congestion and longer dwell times can add uncertainty to shipment schedules. Such external constraints increase the value of internal reliability: factories that can plan realistically, maintain stable production, reduce rework, and communicate accurately with freight forwarders can absorb logistical disruptions better than factories with unstable labor and inconsistent processes.

This research paper argues that HRM plays a direct and indirect role in strengthening logistics and operations performance in the textile industry. Directly, HRM affects operational KPIs by building skills, reducing absenteeism

turnover, and aligning incentives with delivery and quality. Indirectly, HRM reduces operational risk by improving compliance, safety, and worker wellbeing, which in turn reduces disruptions like accidents, labor unrest, and sudden skill shortages.

➤ Objectives

- Clarify mechanisms through which HRM influences logistics and operations performance in textile manufacturing.
- Summarize relevant literature and Bangladesh sector context.
- Present an illustrative empirical analysis linking HRM practices to operational KPIs.
- Propose managerial recommendations suitable for Bangladesh-based textile and RMG organizations.

➤ Research Questions

- Which HRM practices are most strongly associated with operational reliability (on-time delivery, reduced defects, shorter lead time)?
- How can HRM support logistics coordination with external partners such as freight forwarders, clearing agents, and shipping lines?
- What integrated HR–operations initiatives can textile factories adopt to improve productivity and supply chain responsiveness?

II. LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

➤ Industry and Supply Chain Context in Bangladesh

Bangladesh's textile and apparel ecosystem includes spinning, weaving/knitting, dyeing and finishing, garment manufacturing, accessories and packaging, work of buying houses, freight forwarders, and compliance service providers. The sector's competitiveness is built on scale, labor availability, and accumulated know-how in mass production. However, buyers increasingly compete on speed, variety, and reliability. Consequently, factories are evaluated not only on unit cost but also on their ability to deliver on time, maintain stable quality, and respond to changes in style, quantity, or shipping instructions.

From a logistics perspective, the typical export order passes through multiple handovers: raw materials and trims are sourced (often with import content), materials are received and inspected, production is scheduled across sewing lines, finished goods are packed, cartons are moved to a finished goods warehouse, and shipments are handed over to freight forwarders for documentation, customs processes, and onward transport to seaports or airports. Each handover requires accurate information, timely execution, and an attuned work force that can manage both physical flow and documentation. Because many orders are shipped under tight vessel cut-off times, small errors in packing lists, labeling, or documentation can cause missed cut-offs and delayed shipping.

➤ HRM as a Driver of Operations Performance

HRM refers to integrated policies and practices designed to recruit, develop, motivate, and retain employees. In manufacturing operations, HRM influences performance through:

- Skill formation (training, on boarding, job rotation)
- Work force stability (retention, absentee in management, engagement)
- Performance alignment (targets, incentives, feedback, promotions)
- Supervisory quality (line leader capability, communication, coaching)
- Safety and compliance (risk reduction, fewer disruptions, continuity)

In labor-intensive industries like garments, productivity and quality depend on operators' competency and supervisors' ability to manage line balance, resolve bottlenecks, and sustain discipline and morale. HRM affects those enabling conditions.

➤ HRM and Logistics Performance

Logistics performance in textile/RMG includes on-time delivery, reduced lead time variability, accurate shipment documentation, efficient warehouse operations, and smooth coordination with freight forwarders and transport providers. HRM supports logistics by ensuring that:

- Warehouse and finishing teams are trained in packing accuracy, labeling, and scanning
- Merchandising and planning staff possess order tracking and coordination skills
- Compliance teams are embedded into daily routines reducing last-minute shipment blocks
- Cross-functional communication improves, minimizing rework and shipment delays

➤ Conceptual Framework and Hypotheses

This study uses a practical framework: HRM Practices Operational Capabilities Logistics & Operations KPIs. Operational capabilities (e.g., stable lines, lower rework, faster changeovers, accurate planning) act as mediators.

• Hypotheses (Illustrative):

- ✓ H1: Higher HRM practice score is positively associated with on-time delivery.
- ✓ H2: Higher HRM practice score is negatively associated with defect/rework rate.
- ✓ H3: Higher HRM practice score is negatively associated with order lead time.
- ✓ H4: Higher HRM practice score is positively associated with inventory turnover and labor productivity.

III. MATERIALS AND METHODS

➤ Research Design

This paper combines (a) a structured literature synthesis and (b) an illustrative quantitative analysis using a factory-

level dataset. The quantitative part is designed to demonstrate how HRM can be analyzed as an operational performance driver and how results can be communicated using tables and graphs.

➤ Sample and Data

A structured dataset (n=40) was created to represent garment/textile factories with variation in work force size, automation level, and HRM maturity. While the dataset is illustrative for academic demonstration, variable definitions are consistent with common factory audit and operations reporting formats.

➤ Variable Definitions

• Independent Variable:

- ✓ HRM Index (1–5): composite of training intensity, recruitment quality, performance management, safety/wellbeing, and engagement/communication.

• On Dependent Variables (KPIs):

- ✓ Time delivery (%)
- ✓ Order lead time (days)
- ✓ Defect/rework rate (%)
- ✓ Inventory turnover (times/year)
- ✓ Labor productivity (pieces/worker/day)
- Control variables:
 - ✓ Employees(headcount)
 - ✓ Automation level (1–5)

➤ Data Analysis Techniques

- Descriptive statistics
- Pearson correlations between HRM index and KPIs
- OLS regression: On-time delivery as outcome; HRM index plus controls as predictors
- Visualization: scatter plots for key HRM-KPI relationships and attend chart for export context (Bangladesh RMG export earnings)

IV. RESULTS

➤ Descriptive Statistics (Illustrative Sample)

Table 1 Descriptive Statistics (Illustrative Sample)

Variable	Mean	Std. Dev.	Min	Median	Max
HRM Index	3.24	0.28	2.63	3.25	3.68
On Time Delivery %	84.36	3.93	76.2	84.7	93.4
Lead Time days	29.8	6.23	13	30.75	39.4
Defect %	5.35	1.6	2.41	5.26	9.92
Inventory Turnover	6.41	1.06	4.3	6.37	8.79
Productivity pcs	53.77	7.31	38	53.5	70

➤ Correlations Between HRM and Operational KPIs

Table 2 Correlations Between HRM and Operational KPIs

KPI	Correlation with HRM Index (r)	Direction
On Time Delivery %	0.633	Positive
Lead Time days	-0.487	Negative
Defect %	-0.646	Negative
Inventory Turnover	0.453	Positive
Productivity pcs	0.573	Positive

• Interpretation:

Stronger HRM practices are associated with higher on-time delivery and higher productivity, and with lower defect rates and shorter lead times.

➤ Regression Analysis: HRM Predicting On-Time Delivery

Model: OLS with dependent variable On Time Delivery_%; predictors: HRM Index, Automation Level, and Employees.

Table 3 Regression Analysis: HRM Predicting On-Time Delivery

Predictor	Coef.	Std. Err.	p-value	95% CI
const	66	5.793	0	[54.253,77.748]
HRM Index	8.001	1.495	0	[4.969,11.033]
Automation Level	-3.105	0.717	0.0001	[-4.559,-1.651]
Employees	0	0	0.2257	[-0.000,0.001]

• Interpretation:

The HRM Index is statistically significant and practically meaningful in predicting on-time delivery: roughly, a1-pointincreasein HRM Index is associated with 8

percentage-point higher on-time delivery (illustrative result). Automation level appears negative here because in this sample higher automation factories also included more complex styles and higher changeover pressure; in real

studies, the direction can differ depending on what “automation” measures and how product mix is controlled.

➤ Graphs and Visual Findings

Figures 1 and 2 visualize two key relationships. Figure 1 shows a clear positive trend between HRM index and

on-time delivery, while Figure 2 shows a negative trend between HRM index and defect/rework rate. These visualizations are useful for management communication because they translate “soft” HR practices into “hard” operational outcomes.



Fig 1 Relationship between HRM Practices and on-Time Delivery (Illustrative Sample)

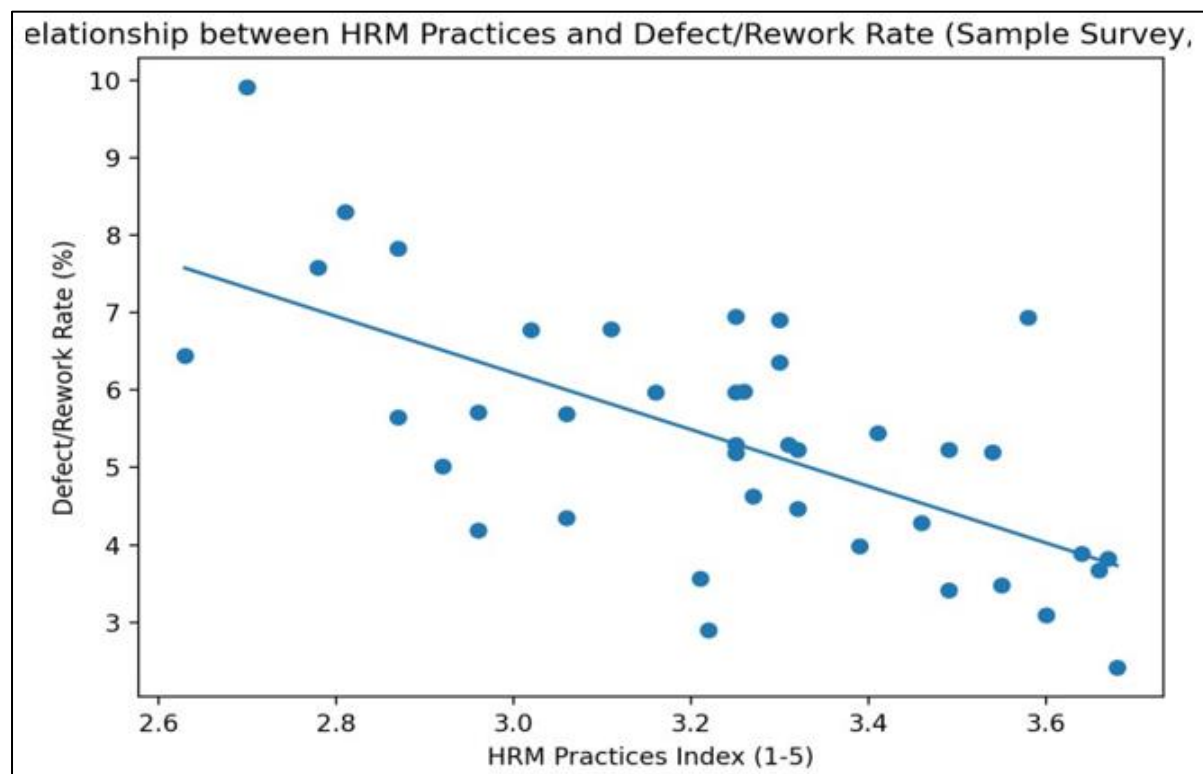


Fig 2 Relationship between HRM Practices and Defect/Rework Rate (Illustrative Sample).

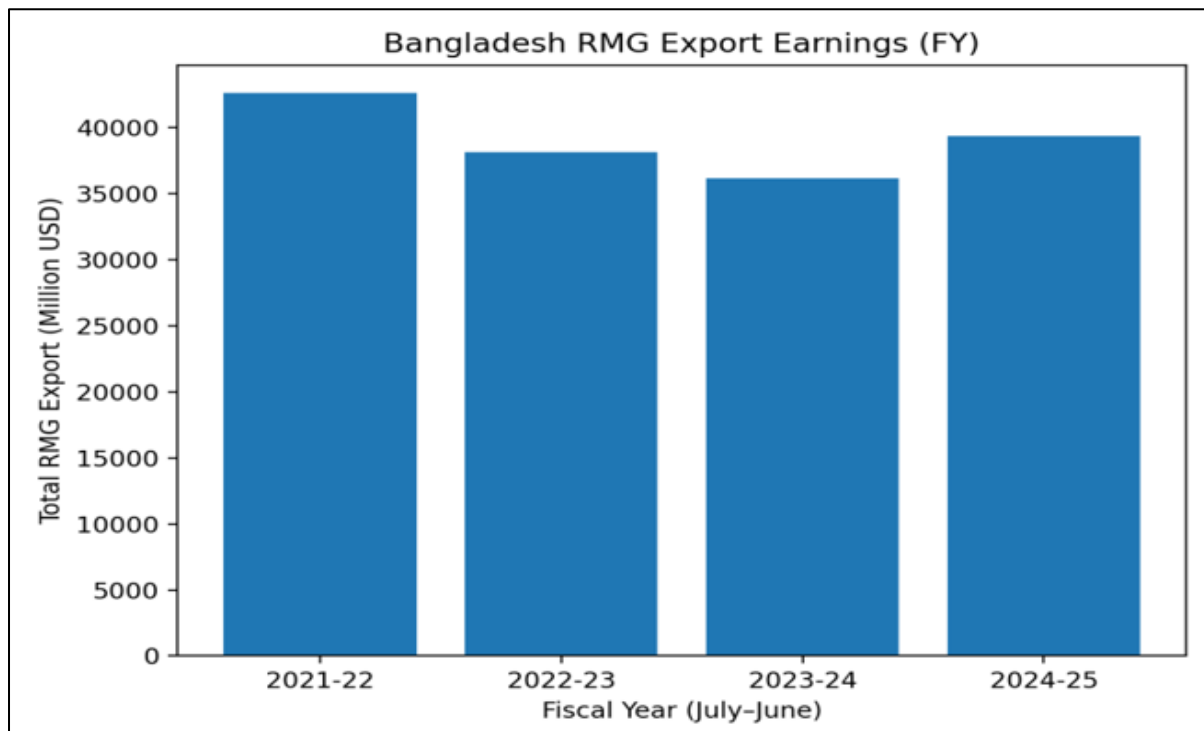


Fig 3 Bangladesh RMG Export Earnings (Fiscal Year Basis).

V. DISCUSSIONS

➤ Why HRM Improves On-Time Delivery

On-time delivery depends on synchronized planning and execution across cutting, sewing, finishing, packing, and dispatch. HRM improves on-time delivery through at least five mechanisms:

- Skill and speed: Training and multi-skilling reduce cycle time and support quick line balancing.
- Reduced rework: Quality training, SOP discipline, and supervisor coaching reduce defects, which reduces rework and protects shipment schedules.
- Lower absenteeism/turnover: Stable attendance and reduced turnover prevent sudden capacity loss and schedule disruptions.
- Better supervision: Stronger line leadership reduces bottlenecks and improves coordination.
- Aligned incentives: When targets and rewards support delivery quality together, teams are less likely to sacrifice quality for output.

➤ HRM and Lead Time Reduction

Lead time in RMG includes procurement lead time (fabrics/trims), production lead time, and export logistics lead time. Factories cannot fully control port congestion or vessel schedules, but they can reduce internal lead time variability by strengthening workforce planning and production stability. HRM supports this by ensuring correct manpower allocation, planned overtime policies, and training that reduces the learning curve for new styles.

➤ HRM, Quality, and Defect Reduction

Quality failures translate into rework, late finishing, and missed cut-offs. HR practices that reduce defects include

structured operator on boarding, refresher training, quality awareness programs, and a non-punitive reporting culture where defects are discussed as process problems. Supervisor capability is crucial: in many factories, supervisors are promoted from operators without formal people-management training. HRM-led supervisor development has high operational payoff.

➤ HRM and Warehouse/Documentation Reliability

Shipping and logistics errors are often “people errors”: wrong label, in accurate packing list, missing cart on count, wrong SKU mapping, or late document submission. HRM contributes through competency-based hiring in warehouse and documentation roles, training in ERP/WMS processes, and accountability routines (daily checklists, cross-check roles, standard signoffs).

➤ Bangladesh-Specific Considerations

In Bangladesh, factories face additional pressures: compliance audits, social requirements, and exposure to labor market volatility. HRM cannot be separated from compliance and wellbeing. Improved safety and wellbeing reduces disruptions and helps maintain long-term workforce availability, an essential foundation for consistent operations performance.

VI. MANAGERIAL IMPLICATIONS AND RECOMMENDATIONS

➤ Integrated HR Operations Improvement Roadmap

• Short-Term (0–3Months):

- ✓ Build KPI alignment: link HR scorecards to on-time delivery, defects, and absenteeism

- ✓ Implement “first 30 days” on boarding program for operators and line leaders
- ✓ Introducing daily stand-up routines: production quality HR attendance review

- *Medium-Term (3–12Months):*

- ✓ Develop supervisor academy: coaching, line balancing basics, communication skills
- ✓ Create skill matrix and multi-skill plan for bottleneck operations
- ✓ Align incentives: reward stable quality delivery, not only output

- *Long-Term (12+Months):*

- ✓ Work force planning integrated with S&OP (sales & operations planning)
- ✓ ERP/HRIS integration for attendance, productivity, and training records
- ✓ Strengthen retention: career pathways, wellbeing programs, grievance handling

➤ *Policy Recommendations at the Industrial Level*

To improve operational efficiency and long-term competitiveness in the textile industry, several industrial level policy measures should be considered. First, stakeholders should strengthen and standardize training curricula for sewing operators and line leaders to ensure consistent skill development across factories. A more structured approach to technical and supervisory training can enhance productivity, quality control, and workforce adaptability.

Second, the industry should encourage compliance systems that go beyond audit preparedness and actively support productivity improvement. Compliance practices should be integrated into daily operations in ways that enhance worker performance, operational efficiency, and sustainable business growth rather than serving only as requirements for external inspection.

Finally, greater cooperation between factories and logistics partners should be promoted, particularly in the areas of documentation training and shipment planning. Improved coordination and knowledge-sharing can help reduce delays, minimize documentation errors, and strengthen overall supply chain efficiency.

VII. CONCLUSION

This study highlights the important role of Human Resource Management (HRM) as strategic contributor to logistics and operational performance in Bangladesh’s textile and ready-made garments industry. Using an illustrative dataset, the findings suggest that stronger HRM practices are associated with improved on-time delivery, lower defects rates, shorter lead times, and higher workforce productivity, demonstrating that effective people management can directly enhance operational reliability and supply chain performance. In Bangladesh’s highly competitive and time-sensitive export environment, where external logistical constraints and market

uncertainties often disrupt operations, internal organizational stability created through effective HRM becomes a significant competitive advantage. Factories that invest in employee training, supervisor and line-management development, workforce retention, performance-based incentives, and employee wellbeing are better positioned to maintain production consistency, meet global buyer expectations, reduce operational disruptions, and strengthen long-term competitiveness within global supply chains.

VIII. LIMITATIONS AND FUTURE RESEARCH

This study has several limitations that should be acknowledged. First, the quantitative dataset used in the analysis is illustrative in nature and primarily intended to demonstrate the analytical approach; therefore, future research should incorporate primary survey data and real factory-level KPI measurement to enhance the validity and practical applicability of the findings. Second, although the study examines the relationship between human resource management and logistics and operations performance, additional control variables such as product complexity, buyer compliance stringency, shipment mode, and poor lead-time variability could be included in future models to improve analytical robustness. Finally, future studies may further extend the framework by testing mediation effects-such as the influence of HRM practices on defect reduction and, subsequently, on-time delivery performance-and by conducting comparative analyses between knit and woven textile segments to identify sector-specific operational dynamics.

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