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LEAN MANAGEMENT AS A DRIVER OF EMPLOYEE PRODUCTIVITY IN TEXTILE ENTERPRISES: EVIDENCE FROM UZBEKISTAN

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ABSTRACT. The study investigates the application of lean management principles as a strategic tool for enhancing employee productivity in textile enterprises, with particular reference to Uzbekistan's rapidly developing textile sector. Drawing on established motivational theories, including Maslow's hierarchy of needs, Herzberg's two-factor theory, McGregor's Theory X and Theory Y, Vroom's expectancy theory, and Pink's self-determination framework, the study establishes a theoretical relationship between lean management practices and employee performance. The current state of human resource management at NT Holding, a major textile enterprise in the Namangan region, is analyzed, with particular attention to staff turnover, the relatively low value-added time ratio, and the need to develop systematic kaizen and cross-training programs. An integrated three-layer optimization model is proposed, encompassing structured training and cross-training, mechanisms for enhancing employee participation in management processes (kaizen circles and visual management), and an improved incentive system aligned with lean principles. The findings indicate that full implementation of the proposed model could reduce staff turnover by 25–35%, increase labor productivity by 20–30%, and raise the value-added time ratio from the current 35–45% to 65–75%. The study contributes to the literature on the application of lean management in developing economies and provides a basis for practical recommendations for textile enterprises in Central Asia.

Keywords: lean management, employee productivity, kaizen, textile industry, Uzbekistan, human resource management, motivation, cross-training, value stream.

ANNOTATSIYA. Tadqiqotda lean management (tejamkor boshqaruv) tamoyillarini to'qimachilik sanoati korxonalarida xodimlar mehnat unumdorligini oshirishning strategik vositasi sifatida qo'llash imkoniyatlari O'zbekistonning jadal rivojlanayotgan to'qimachilik tarmog'i misolida o'rganilgan. Maslouning ehtiyojlar iyerarxiyasi, Gertsbergning ikki omilli nazariyasi, MakGregorning X va Y nazariyalari, Vrumning kutish nazariyasi hamda Pinkning o'zini o'zi belgilash konsepsiyasi kabi motivatsion nazariyalarga tayangan holda lean management amaliyotlari va xodimlar faoliyati samaradorligi o'rtasidagi nazariy bog'liqlik asoslangan. Namangan viloyatidagi yirik to'qimachilik korxonalaridan biri — NT Holdingda inson resurslarini boshqarishning amaldagi holati tahlil qilinib, xodimlar almashinuvi darajasi, qo'shilgan qiymat yaratiladigan vaqt ulushining nisbatan pastligi, shuningdek, tizimli kaizen va o'zaro kasbiy tayyorlash dasturlarini rivojlantirish zarurati aniqlangan. Tadqiqot doirasida tizimli o'qitish va o'zaro kasbiy tayyorlash, xodimlarning boshqaruv jarayonlaridagi ishtirokini kengaytirish mexanizmlari (kaizen guruhlari va vizual boshqaruv) hamda lean tamoyillariga muvofiq takomillashtirilgan rag'batlantirish tizimini qamrab oluvchi uch bosqichli integratsiyalashgan optimallashtirish modeli taklif etilgan. Hisob-kitob natijalariga ko'ra, taklif etilgan modelning to'liq joriy etilishi xodimlar almashinuvi 25–35 foizga qisqartirish, mehnat unumdorligini 20–30 foizga oshirish hamda qo'shilgan qiymat yaratiladigan vaqt ulushini amaldagi 35–45 foizdan 65–75 foizgacha yetkazish imkonini berishi mumkin. Tadqiqot natijalari rivojlanayotgan iqtisodiyotlarda lean management yondashuvlarini qo'llash bo'yicha ilmiy qarashlarni boyitadi hamda Markaziy Osiyo to'qimachilik korxonalari uchun amaliy tavsiyalarni shakllantirishga xizmat qiladi.

Kalit so'zlar: lean management, tejamkor boshqaruv, mehnat unumdorligi, kaizen, to'qimachilik sanoati, O'zbekiston, inson resurslarini boshqarish, motivatsiya, o'zaro kasbiy tayyorlash, qiymat oqimi.

АННОТАЦИЯ. Исследование посвящено применению принципов lean management (бережливого управления) в качестве стратегического инструмента повышения производительности труда работников предприятий текстильной промышленности на примере динамично развивающейся текстильной отрасли Узбекистана. На основе признанных мотивационных теорий, включая иерархию потребностей Маслоу, двухфакторную теорию Герцберга, теории X и Y Макгрегора, теорию ожиданий Врума и концепцию самодетерминации Пинка, обоснована теоретическая взаимосвязь между практиками lean management и результативностью деятельности работников. Проанализировано современное состояние управления человеческими ресурсами в NT Holding — одном из крупных текстильных предприятий Наманганской области. Определены уровень текучести кадров, относительно низкая доля времени создания добавленной стоимости, а также необходимость развития системных программ кайдзен и перекрёстного обучения персонала. Предложена интегрированная трёхуровневая модель оптимизации, включающая системное обучение и перекрёстную подготовку работников, механизмы расширения их участия в управленческих процессах (кайдзен-группы и визуальное управление), а также усовершенствованную систему

стимулирования, соответствующую принципам lean management. Согласно результатам расчётов, полное внедрение предложенной модели может способствовать сокращению текучести кадров на 25–35 %, повышению производительности труда на 20–30 % и увеличению доли времени создания добавленной стоимости с текущих 35–45 % до 65–75 %. Результаты исследования расширяют научные представления о применении lean management в развивающихся экономиках и служат основой для разработки практических рекомендаций для предприятий текстильной промышленности Центральной Азии.

Ключевые слова: lean management, бережливое управление, производительность труда, кайдзен, текстильная промышленность, Узбекистан, управление человеческими ресурсами, мотивация, перекрёстное обучение, поток создания ценности.

INTRODUCTION

The global textile industry operates in an environment of intensifying competition, rising consumer expectations, and increasing emphasis on operational efficiency. In this context, lean management — originating from Toyota's production philosophy — has emerged as one of the most widely adopted management frameworks for eliminating waste and maximizing value creation (Womack and Jones, 1996). While lean management tools such as 5S, Value Stream Mapping (VSM), Kanban, and kaizen have been extensively studied in manufacturing contexts, their application to human resource management and employee productivity has received comparatively less attention, particularly in the context of developing economies.

Uzbekistan's textile sector has experienced significant growth following the country's strategic shift toward export-oriented industrialization. The Namangan region, historically recognized as one of Central Asia's textile hubs, hosts numerous large-scale enterprises, including NT Holding — a vertically integrated textile corporation encompassing yarn spinning, weaving, dyeing, and garment production. Alongside favorable demographic conditions and government support, these enterprises have opportunities to further enhance staff retention, labor productivity in line with international benchmarks, and the implementation of modern human resource management practices.

This paper addresses the following research question: How can lean management principles be applied to enhance employee productivity in Uzbekistan's textile enterprises? The study pursues three specific objectives: (1) to establish the theoretical linkage between lean management and employee productivity through established motivational theories; (2) to assess the current state of human resource management at NT Holding; and (3) to propose a practical implementation model for lean-based employee productivity enhancement.

LITERATURE REVIEW

Lean Management and Human Capital. Lean management, as conceptualized by Womack, Jones, and Roos (1990) and subsequently systematized by Womack and Jones (1996), rests on five core principles: value identification, value stream mapping, flow, pull, and continuous improvement (kaizen). While the technical dimensions of lean — VSM, 5S, Kanban, and TPM — have received substantial scholarly attention, the human dimension of lean transformation has gained increasing recognition. Liker and Meier (2006) argue that a key differentiating factor in the effectiveness of lean implementation lies not only in technical tools but also in an organization's approach to people management. Toyota's foundational principle of "Respect for People" — alongside "Continuous Improvement" — underscores that lean management is fundamentally a human-centered philosophy.

The eighth form of waste identified by lean practitioners — the underutilization of employee talent and creativity — directly links lean management to human resource development (Womack and Jones, 1996). Imai (1997) elaborates that kaizen, when effectively implemented, enables employees to evolve from primarily executing assigned tasks to actively contributing to process improvement, thereby creating opportunities to realize additional productivity potential.

Motivational Theories and Lean Management. A rich theoretical foundation from motivational psychology supports the lean approach to employee management. Maslow's (1954) hierarchy of needs suggests that lean practices address the higher-order needs of esteem and self-actualization through recognition systems and employee empowerment. Herzberg's (1959) two-factor theory distinguishes between hygiene factors (salary and working conditions) and motivators (achievement, recognition, and responsibility), aligning with lean's emphasis on non-monetary recognition alongside fair compensation. McGregor's (1960) Theory Y — positing that employees can be intrinsically motivated and capable of self-direction — provides a theoretical foundation for lean's participatory approach, complementing more structured management approaches associated with Theory X assumptions.

More recent motivational frameworks further reinforce the lean-productivity nexus. Vroom's (1964)

expectancy theory predicts that motivation is maximized when employees perceive a clear link between their effort, performance, and reward — a condition that kaizen incentive systems are designed to create. Pink's (2009) self-determination framework identifies autonomy, mastery, and purpose as three key pillars of intrinsic motivation, all of which lean management practices can cultivate through cross-training, skill development, and meaningful contributions to organizational improvement.

Lean Management in Textile Industry Contexts. The application of lean management in the textile and garment sector has been documented across multiple geographic contexts. Islam and Hossain (2019) conducted a longitudinal study of 45 Bangladeshi textile firms implementing lean practices, finding average productivity improvements of 23%, material waste reductions of 18%, and a 62% decrease in customer complaints. Ahmed and Khan (2017) reported similar outcomes in the Pakistani textile sector, with ROI improvements of 15–22% within two to three years of lean implementation. Worley and Doolen (2006) examined human factors in lean textile implementation, concluding that employee engagement and participatory kaizen were among the key factors associated with sustained productivity gains.

In the Central Asian context, research on lean management is still developing. Ergashev (2021) and Toshmatov (2022) have explored specific aspects of lean implementation in Uzbekistan's industrial sector, highlighting opportunities to further develop organizational culture, lean expertise, and incentive structures. These findings suggest that the productivity potential of lean management can be effectively realized through context-sensitive implementation frameworks adapted to the organizational and institutional characteristics of enterprises.

RESEARCH METHODOLOGY

This study employs a mixed-method research design combining a systematic literature review, comparative analysis, and case study methodology. The literature review encompassed peer-reviewed articles published between 2000 and 2024, drawn from the Scopus, Web of Science, and Google Scholar databases using search terms including "lean management," "employee productivity," "textile industry," "kaizen," and "Uzbekistan." The case study focuses on NT Holding, a major textile corporation in Namangan, Uzbekistan.

Primary data were collected through structured observation of production processes, analysis of HR department records covering the period 2022–2024, and semi-structured interviews with production managers and HR specialists. The key performance indicators analyzed include staff turnover rate, labor productivity (value added per employee), absenteeism rate, value-added time ratio, and cross-training coverage. Secondary data sources include ILO reports on textile industry working conditions, World Bank human capital assessments for Uzbekistan, and Gallup's global workplace engagement surveys. Quantitative data were analyzed using descriptive statistics and benchmarking against international textile industry averages.

ANALYSIS AND RESULTS

Current State of Employee Productivity at NT Holding

Analysis of NT Holding's HR data reveals opportunities for further productivity improvement relative to international benchmarks. Table 1 presents the key performance indicators for the period 2022–2024.

Table 1

Key Employee Productivity Indicators at NT Holding (2022–2024)¹

Indicator	2025	2026 (May)	Change	Intl. Benchmark
Total employees, persons	1,039	709	–330 (–32%)	—
Staff turnover rate, %	34%	32%	–2%	8–12%
Absenteeism rate, %	6.3%	6.0%	–0.3%	3–5%
Value-added time ratio, %	40%	42%	+2%	55–65%
Kaizen suggestions/employee/year	0	0	—	5–10
Cross-training coverage, %	10%	12%	+2%	40–55%
Labor productivity, mln UZS/employee	22	24	+9%	2–3x higher

The data reveal three key areas with potential for further productivity improvement. First, the staff turnover rate remains above the international textile industry average of 8–12%, indicating opportunities to strengthen employee engagement and retention mechanisms. Second, the value-added time ratio — the proportion of

¹ Source: NT Holding HR Department records and author calculations. International benchmarks derived from ILO (2018) and Gallup (2023).

total working time spent on activities that directly create customer value — remains in the range of 35–45%, compared with the international benchmark of 55–65%. This indicates considerable potential to increase the proportion of working time devoted to value-creating activities. Third, kaizen suggestion systems have substantial potential for further development compared with Toyota's benchmark of 30–40 suggestions per employee per year (Imai, 1997).

Lean Management Tools and Their Impact on Employee Productivity. Lean management offers a comprehensive toolkit for realizing these productivity improvement opportunities. The 5S methodology — Sort, Set in Order, Shine, Standardize, Sustain — creates the foundational conditions for productive work by optimizing workplace organization and establishing visual order. Studies in textile settings document that 5S implementation reduces unnecessary employee movement by 15–25%, directly increasing productive time (Hirano, 1995). Kaizen circles — small groups of 5–8 employees meeting regularly to identify and solve workplace problems — activate employees' intrinsic motivation by recognizing their expertise and involving them in organizational improvement. Cross-training programs enhance workforce flexibility while simultaneously satisfying employees' needs for skill development and mastery (Pink, 2009).

Gemba walking — the practice of managers visiting the production floor to observe processes and engage directly with employees — addresses both the informational and motivational dimensions of productivity. Lawler (1986) demonstrated that employee involvement in decision-making increases productivity by 20–30%. Visual management systems — displaying real-time performance data transparently on the shop floor — enhance perceptions of fairness by making performance visible and comparable, thereby activating Adams's (1965) equity motivation mechanism.

Table 2

Lean Management Tools and Their Expected Impact on Employee Productivity at NT Holding²

Lean Tool	Motivational Mechanism	Expected Productivity Impact	Implementation Timeline
5S	Autonomy; environmental control (Pink, 2009)	Reduce unnecessary movement by 15–25%	1–3 months
Kaizen circles	Mastery, purpose, intrinsic motivation (Imai, 1997)	Increase suggestions 5–7x; improve processes	3–6 months
Cross-training	Skill development; variety (Hackman & Oldham, 1980)	Increase flexibility; improve employee retention by 15–20%	6–12 months
Visual management	Equity and transparency (Adams, 1965)	Improve attendance indicators by 20–30%	1–2 months
Gemba walking	Recognition; esteem needs (Maslow, 1954)	Increase engagement by 20–30%	1 month
Takt time + goals	Goal clarity; expectancy (Locke & Latham, 1990)	Increase value-added time ratio to 65%+	3–6 months
Kaizen incentive system	Expectancy-reward linkage (Vroom, 1964)	Activate participation; improve employee retention by 25–35%	3–6 months

Proposed Integrated Model for Lean-Based Employee Productivity Enhancement Based on the theoretical framework and diagnostic findings, this study proposes an integrated three-layer model for enhancing employee productivity at NT Holding through lean management principles. The model is structured as follows:

Layer 1 — Structured Learning and Development: This layer focuses on strengthening the foundational human capital base through systematic cross-training (each employee masters at least two adjacent operations within 12 months), mentoring partnerships between senior and junior employees, and quarterly lean management training sessions covering 5S, kaizen, and takt time principles. This layer activates Pink's (2009) mastery dimension and Maslow's (1954) growth needs.

Layer 2 — Participatory Mechanisms: This layer strengthens the participatory dimension of lean management through monthly kaizen circles in each production section, a digital suggestion system with a guaranteed 48-hour response time, daily 15-minute stand-up meetings with visual performance boards, and regular Gemba walks by section managers. This layer activates intrinsic motivation (Deci and Ryan, 1985),

² Source: Compiled by the author based on Liker and Meier (2006), Imai (1997), and motivational theory literature.

equity perceptions (Adams, 1965), and goal clarity (Locke and Latham, 1990).

Layer 3 — Redesigned Incentive System: This layer aligns monetary and non-monetary rewards with lean performance indicators. The proposed wage structure allocates 80% to quantitative output and 20% to quality and kaizen metrics. Non-monetary recognition includes monthly “Best Kaizen Suggestion” awards, certificates, and public acknowledgment on visual boards. A clear career path — Operator → Senior Operator → Team Leader → Section Chief — with explicit lean performance criteria is established. This layer activates Vroom’s (1964) expectancy mechanism and Maslow’s (1954) esteem needs.

Expected Outcomes and Return on Investment. Based on comparative analysis of lean implementations in analogous textile enterprises (Islam and Hossain, 2019; Ahmed and Khan, 2017) and the theoretical predictions of the applied motivational frameworks, the full implementation of the proposed three-layer model is projected to yield the following outcomes within three years: an improvement in staff retention corresponding to a 25–35% reduction in turnover; a 20–30% increase in labor productivity; an improvement in the value-added time ratio from 35–45% to 65–75%; an increase in kaizen suggestions from near-zero to 5+ per employee per year; an expansion of cross-training coverage from current levels to 50%+; and an improvement in the employee engagement index from the current Central Asian average of 12–15% (Gallup, 2023) to 35–45%.

The financial return on investment is estimated as follows: if each of NT Holding’s employees generates an average of five implementable kaizen suggestions annually, each yielding an average efficiency saving of 500,000 UZS, the aggregate annual saving equals: $1,039 \times 5 \times 500,000 = 5,195$ million UZS. The total cost of the kaizen incentive system (bonuses, recognition materials, and training) is estimated at 10–15% of this saving, implying a return on investment ratio of approximately 6–7:1. This indicates that lean-based employee productivity enhancement can serve both as an effective behavioral intervention and as an economically beneficial investment.

CONCLUSION AND RECOMMENDATIONS

This study establishes a theoretical and empirical basis for applying lean management principles as a driver of employee productivity in Uzbekistan’s textile sector. The integration of lean tools — 5S, kaizen, cross-training, visual management, and Gemba walking — with established motivational theories provides a comprehensive framework that addresses both the technical and human dimensions of productivity improvement.

The diagnostic analysis of NT Holding identifies considerable opportunities for productivity improvement relative to international benchmarks, particularly through the further development of lean-based human resource practices. The proposed three-layer integrated model — combining structured development, participatory mechanisms, and redesigned incentives — offers a context-sensitive implementation pathway that accounts for the specific institutional and cultural characteristics of Uzbekistan’s industrial enterprises.

The findings contribute to the literature in three ways. First, they extend lean management theory to the human resource domain within a Central Asian context, thereby contributing to the further development of scholarship in this area. Second, they demonstrate the alignment between lean management practices and major motivational theories, providing a unified theoretical framework. Third, they offer actionable, phased implementation recommendations applicable to textile enterprises across Uzbekistan and comparable developing-economy contexts.

Future research should focus on the longitudinal empirical validation of the proposed model’s outcomes following full-scale implementation at NT Holding, as well as comparative studies across multiple Uzbek textile enterprises to assess the generalizability of the findings.

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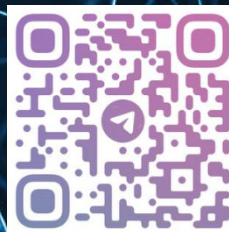
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