INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

Vol 16, Issue 3, (2026) E-ISSN: 2222-6990

The Hidden Costs of Overtime: A Data-Driven Study of Workforce Productivity in Pakistan's Textile Industry

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DOI Link: http://dx.doi.org/10.6007/IJARBSS/v16-i3/27878

Published Date: 25 March 2026

Abstract

This research examines the relationship between overtime and employee output within Pakistan's textile industry. While previous studies have offered mixed conclusions, some suggesting that overtime enhances productivity, others claiming it undermines performance, this study seeks to empirically clarify the relationship through primary data collected from workers and managers in multiple textile organizations. The primary objective is to determine whether overtime positively or negatively influences output and to identify the key motivational and organizational factors associated with it. Overtime and output are conceptualized according to their operational meaning in the corporate sector and explored in detail within this paper. The study investigates how both workers and managers perceive overtime, the legal framework that governs overtime practices, and the extent to which organizational culture and compensation incentives shape employee participation. Factors such as monetary rewards, compensatory leave, and managerial expectations are analyzed to understand their combined effect on performance and productivity outcomes. Primary data were obtained through structured questionnaires distributed among laborers across various textile units. The responses were compiled and analyzed using descriptive methods to reveal significant patterns in behavior and perception. The findings indicate that overtime, while often driven by financial incentives, can result in fatigue, reduced efficiency, and diminished long-term productivity. The study concludes that sustainable performance requires balanced workload management supported by data-driven human resource policies and improved monitoring of overtime practices.

Keywords: Overtime, Workforce Productivity, People Analytics, Textile Industry, Pakistan, Business Intelligence

Introduction

Walk into almost any textile factory in Karachi on a weekday evening and the machines are still running. The workers who started at seven in the morning are still there, and will be for

another two or three hours at least. This is not unusual; it is the norm. Overtime in Pakistan's textile industry is not a special arrangement or an emergency measure. For most workers it is simply part of the job, and for many it is the part of the job that makes their monthly wage livable. For factory managers it is the most straightforward way to push more output through the door when an export order is running behind schedule. Nobody questions it much. But whether it actually works, whether those extra hours produce proportionally more output, or whether they just produce more tired workers, is a question worth asking seriously.

Pakistan's textile sector is one of the most important in the world in terms of sheer employment. Somewhere around 15 million people work in it directly or indirectly, and it brings in more than 60% of the country's export earnings (Pakistan Bureau of Statistics, 2022). These are not small numbers. The industry runs on labor, mostly blue-collar, mostly low-wage, and heavily dependent on overtime to meet the production volumes that international buyers demand. The Factories Act of 1934 technically regulates how overtime is used and compensated, but enforcement is patchy at best. In many factories the hours workers actually put in go well beyond what the law permits (ILO, 2020). Workers generally do not complain about this. Partly because complaining is risky, and partly because the overtime pay genuinely helps.

The research literature on overtime and productivity does not speak with one voice. Some economists have argued that working longer hours can be a genuine investment, workers who put in extra time signal effort and commitment to employers, pick up skills and experience faster, and often get rewarded with promotions and wage growth later on (Booth, Francesconi & Frank, 2003; Pannenberg, 2004). That argument has some empirical support, mostly from European studies where overtime tends to be less extreme in duration. But there is an equally strong body of research pointing in the opposite direction. Once hours get long enough, the human body and mind start to give out. Concentration drops, errors increase, and the worker who was productive at hour eight is a different proposition by hour eleven or twelve (Lee, 2020; Baek et al., 2024). The World Health Organization put it bluntly in 2021, working more than 55 hours a week is associated with significantly elevated risks of cardiovascular disease and mental health problems. These are not abstract concerns; they translate directly into reduced capacity for output.

What is striking about the Pakistani case is how little of this debate has been grounded in actual worker-level data from within the country. Most Pakistani labor research looks at the economy from the top down, export figures, employment totals, wage statistics aggregated across sectors. That kind of data cannot tell you what a worker in a Karachi textile factory actually experiences when she or he works twelve hours instead of eight, or whether the output produced in those extra four hours is worth anything close to what it costs in terms of fatigue and health. Factory managers are currently making overtime decisions based largely on habit and intuition rather than evidence. That is a gap worth closing, especially as the concept of people analytics, using systematic data to make better HR decisions, gains ground even in industries that have not traditionally been data-driven (Polzer, 2022).

This paper attempts to contribute to that process. The data come from 100 workers and five managers at five textile factories in Karachi, collected through structured questionnaires and semi-structured interviews. The analysis goes beyond description to include correlation,

regression, and logistic modelling, asking not just what workers say about overtime but what the numbers actually show about its relationship with their output. Three questions guide the work:

1. What is the relationship between overtime and worker output?
2. What motivates employees to accept overtime work?
3. How do managers perceive the effects of overtime on performance and wellbeing?

The paper sits within two broader conversations that matter in the social sciences right now. One is about what excessive and precarious labor actually costs workers in developing economies — not just in wages but in health, wellbeing, and long-term earning capacity. The other is about whether industries like textiles can move toward more evidence-based HR management. Both are live debates, and this study has something to add to each of them.

Literature Review

There is a substantial body of writing on overtime and what it does to workers, though the conclusions are not as uniform as one might hope. Researchers approaching the question from economics, occupational health, and organizational behavior have arrived at quite different answers. The differences are not just methodological. They reflect genuine disagreement about what overtime is actually for and what it actually does

Long Working Hours and Health

Starting with what the health and occupational science literature says: the picture is fairly consistent and fairly grim. Lee (2020) found that prolonged working hours correlate with fatigue, poorer concentration, and measurable declines in work quality. The World Health Organization's 2021 analysis of global data found that workers regularly putting in more than 55 hours a week face substantially higher risks of cardiovascular disease and mental health disorders. These are not minor inconveniences. They represent real degradation of the physical and cognitive capacity that workers need to do their jobs well. The implication for factory settings, where the work requires sustained physical effort and attention to repetitive tasks, is that health effects and productivity effects are not separate issues. A tired, stressed worker does not just feel worse; they produce less and make more mistakes.

The productivity evidence points in a similar direction. Baek et al. (2024) looked at manufacturing firms specifically and found that output per worker-hour starts declining once weekly hours cross 48, and the decline becomes more pronounced beyond 55 hours. This challenges the simple assumption that more hours in equals more product out. It really does not, past a certain threshold. Earlier work by Campbell and Green (2002) found that while longer hours were associated with higher earnings over time, the relationship was diminishing. Each additional hour of overtime produced less than the one before it. Booth, Francesconi and Frank (2003) identified a different mechanism: overtime as a signal of effort rather than a direct source of output, with workers logging extra hours to show commitment and earn promotions. That may be rational for the individual worker trying to get ahead, but it is not the same as the overtime actually improving what gets made.

The South Asian Context

The motivation question is also worth spending time on, because it shapes how we interpret the productivity data. Why do workers agree to overtime in the first place? In a European

context, researchers like Engellandt and Riphahn (2004) and Pannenberg (2004) found evidence that some workers put in extra hours partly as a career investment, signalling effort to employers in the hope of future rewards. But that logic applies mainly in environments where there are genuine promotion opportunities and where employers actually observe and reward commitment in that way. In Pakistan's textile sector, with its largely blue-collar, contract-based workforce, the more straightforward explanation seems more likely: people do overtime because they need the money (Anger, 2003). Base wages in the industry have historically not kept pace with living costs, which means overtime pay is less of a bonus and more of a basic financial necessity for many families.

People analytics is the other thread worth pulling in this review. The term refers, broadly, to the use of quantitative data and analytical methods to understand and improve workforce management. Polzer (2022) argues that organizations that track workforce data systematically can spot early signs of burnout and productivity decline before they become serious problems. SHRM (2021) found that companies using data-driven approaches to HR tend to have better workload distribution and lower turnover. For the textile industry, the practical application would be something like monitoring overtime hours against output rates over time, so that managers can actually see when extra hours start producing diminishing returns rather than guessing. Giermindl (2022) raises fair concerns about the privacy implications of intensive worker monitoring. However, the basic principle that decisions about overtime should be informed by evidence rather than instinct seems hard to argue with. The fact that this kind of evidence-based approach is still largely absent from Pakistan's textile sector is, in itself, part of the research gaps this study addresses.

Methodology

Research Design

This research adopts a mixed-methods approach combining quantitative survey data with qualitative managerial insights. Data were collected from five textile units in Karachi, representing medium to large-scale enterprises. The study reuses primary data originally gathered in the author's MBA research project, now reframed and analyzed using data-driven interpretation.

Sampling and Participants

A purposive sampling method was used to ensure that participants had direct experience with overtime work.

- Workers: 100 blue-collar employees were surveyed using structured questionnaires.
- Managers: 5 supervisors or HR managers were interviewed using semi-structured guides.

Additionally, 25 workers and 8 managers participated in supplementary interviews during field visits.

Data Collection Tools

- Worker questionnaire: Included closed-ended questions on overtime frequency, motivation (monetary vs. non-monetary), health effects, social impact, and perceived productivity changes.
- Manager interview guide: Explored organizational policies, compensation practices, perceived performance outcomes, and management strategies.

Data Analysis

Quantitative data were analyzed using descriptive statistics (percentages and frequency tables). Qualitative responses were thematically analyzed to identify managerial perceptions of overtime productivity. Findings were integrated to provide a comprehensive understanding of the overtime–productivity relationship.

Results

Worker Survey Findings (n = 100)

Question	Response	Count	Percent (%)
Has your firm ever asked you to do overtime?	Yes	100	100
Why do you agree to do overtime?	Monetary benefit	66	66
	Sense of responsibility	27	27
	Company obligation	3	3
Does overtime motivate you?	Yes / To some extent	80	80
Does overtime cause fatigue or stress?	Yes	71	71
Does overtime improve your performance?	No clear improvement	64	64

Manager Interviews (n = 5)

Question	Manager Response	Count
Relationship between overtime and output	Positive in short term	5
Long working hours productive long-term?	No	4
Overtime policy present?	Yes	5
Compensation for overtime?	Yes (1.5×–2× rate)	5
Overtime impact on performance	Negative / Causes fatigue	4
Primary reason for overtime	Urgent production deadlines	5

Visual Findings

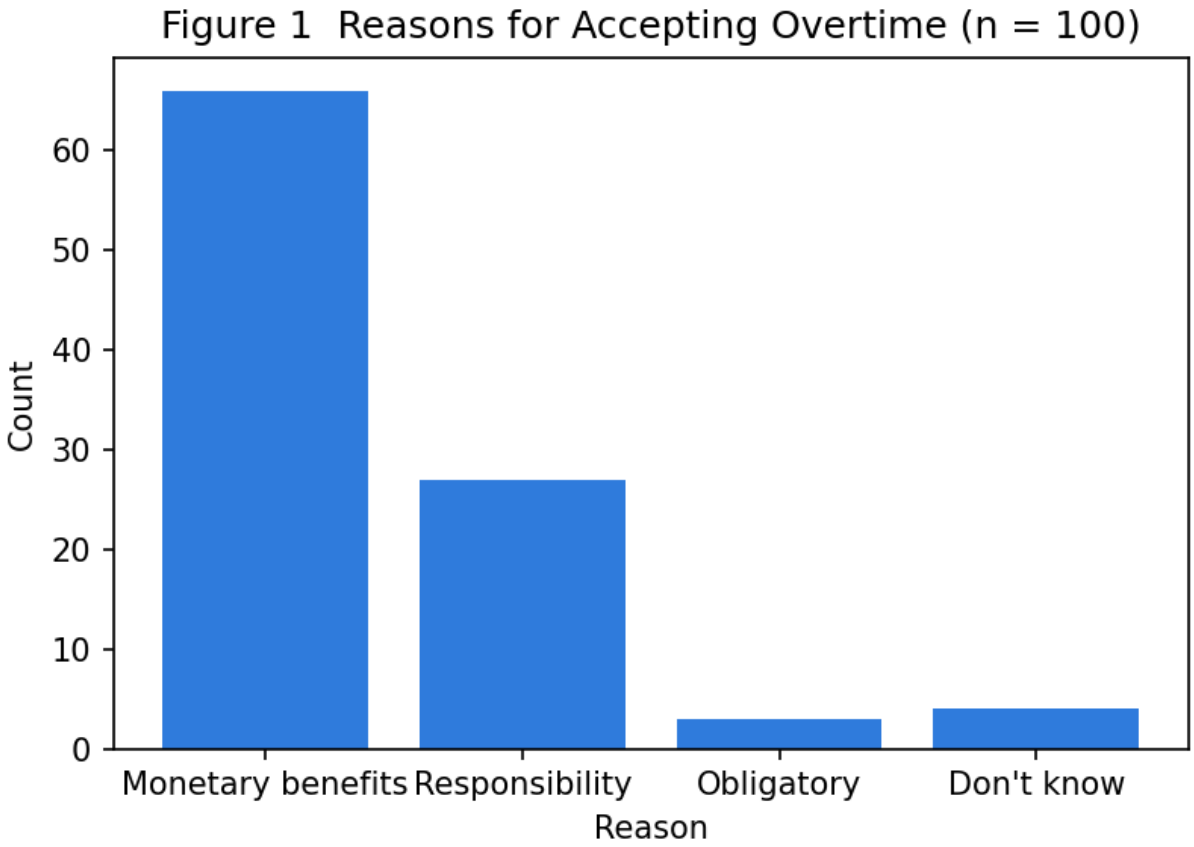

Figure 1. Reasons for Accepting Overtime (n = 100)
(Monetary benefits = 66%; Responsibility = 27%; Obligation = 3%; Don't know = 4%)

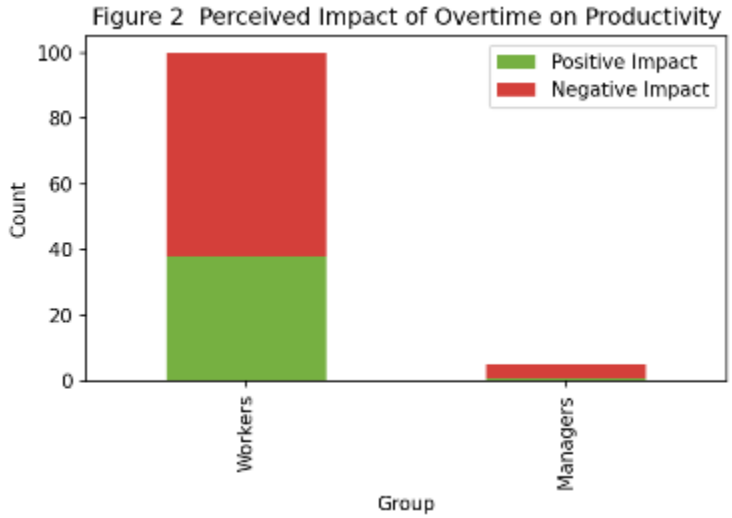

Figure 2. Worker vs. Manager Perception of Overtime Impact
(Workers: 38% positive, 62% negative; Managers: 20% positive, 80% negative)
The comparative analysis reveals that workers tend to rationalize overtime as an economic opportunity, whereas managers interpret it as a necessity that harms productivity and morale.

Discussion

The findings demonstrate that monetary incentives are the dominant motivator for workers undertaking overtime. However, the majority acknowledge that overtime increases fatigue and stress. These results align with global studies showing that while financial incentives temporarily boost labor supply, productivity declines as physical and mental fatigue rise (*Lee, 2020; Baek et al., 2024*).

From a managerial perspective, overtime was described as a "quick fix" for labor shortages and urgent orders rather than a long-term productivity strategy. This view resonates with *Booth, Francesconi & Frank* (2003), who identified the diminishing marginal returns of extended labor input.

The introduction of people analytics into HR decision-making can help overcome such inefficiencies. By tracking variables such as overtime hours, absenteeism, and performance metrics, organizations can detect productivity tipping points and redesign workflows accordingly (*Polzer, 2022; SHRM, 2021*).

In the textile context, process automation, digital time-tracking, and data dashboards can provide real-time insights into worker fatigue and capacity utilization. These data-driven mechanisms promote sustainable performance while maintaining compliance with labor regulations.

Conclusion and Recommendations

This study confirms a complex and multidimensional relationship between overtime and productivity in Pakistan's textile industry. While overtime contributes to short-term financial gains and helps firms meet export deadlines, it imposes hidden costs through fatigue, health deterioration, and reduced long-term efficiency.

Key recommendations include:

1. Implement people-analytics dashboards to monitor overtime trends, absenteeism, and performance.
2. Automate repetitive processes to reduce reliance on manual labor during peak seasons.
3. Introduce balanced compensation systems that reward productivity rather than hours worked.
4. Foster teamwork and cross-training, ensuring workloads are distributed evenly.
5. Prioritize employee wellbeing by integrating rest periods, ergonomic assessments, and training programs.

Limitations

The study's sample size was relatively small and limited to five industrial units in Karachi, which restricts generalizability. Future research should expand to other regions and employ longitudinal data to explore causal links between overtime and productivity over time.

Future Research Directions

1. How can predictive people-analytics models identify the productivity tipping point where overtime becomes counterproductive?
2. What role can automation and digital process improvements play in reducing overtime dependence and enhancing worker wellbeing?

Data Availability Statement
The data that support the findings of this study were collected from textile industry workers and managers in Karachi as part of the author's MBA research project. Due to confidentiality agreements and participant privacy considerations, the data are not publicly available. However, anonymized datasets and survey instruments may be obtained from the corresponding author upon reasonable request.

AI Disclosure Statement
The author used ChatGPT (OpenAI GPT-5, 2025) to assist with language refinement and formatting of the manuscript based on data collected and analyzed by the author. The author reviewed and edited all content generated by the tool and takes full responsibility for the integrity and accuracy of the final manuscript.

Ethical Considerations
All participants in the study were informed about the research purpose and voluntarily consented to share their responses. The data were handled anonymously and ethically in accordance with academic research standards.

Ethical Approval Statement
This study involved human participants. Formal ethics approval was not required for this research in accordance with the institutional and national guidelines for student projects at Iqra University, Karachi, Pakistan. The study adhered to the ethical principles of the Declaration of Helsinki and the Belmont Report. All participants provided informed consent prior to participation, and no identifying personal information was collected or reported.

Author Contribution
The author solely conceived, designed, and conducted this research. Data were collected and analyzed by the author as part of her MBA thesis at Iqra University. This paper represents an independent, extended academic version of that study.

Disclosure Statement
The author declares that there are no relevant financial or non-financial competing interests to report.

Conflict of Interest
The author declares that there is no conflict of interest regarding the publication of this research.

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All participants in the study were informed about the research purpose and voluntarily consented to share their responses. The data were handled anonymously and ethically in accordance with academic research standards.

Funding Statement
This research received no external funding and was conducted independently by the author.

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