

ASSESSING OPERATIONAL CONSTRAINTS AND THEIR EFFECTS ON LABOR PRODUCTIVITY: EVIDENCE FROM LAUNDRY SMES IN TULUNGAGUNG, INDONESIA

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Abstract

Laundry micro, small, and medium enterprises (MSMEs) play an important role in meeting the growing demand for time-efficient household services in Tulungagung, Indonesia. However, operational inefficiencies in laundry services may limit labor productivity, particularly during the ironing and packaging processes. Although productivity in MSMEs has been widely discussed, limited studies have specifically examined operational constraints and their implications for labor productivity in small-scale laundry businesses. This study aims to assess operational constraints affecting labor productivity in laundry MSMEs in Tulungagung, Indonesia, with particular emphasis on the packaging process. A descriptive research approach was employed using primary and secondary data. Primary data were obtained through direct field observations and interviews with laundry operators, while secondary data were used as supporting information. The analysis focused on the work process, human resource requirements, work systems, equipment utilization, and work-related fatigue. Productivity-related activities were classified into productive, effective, and non-value-adding activities, and descriptive analysis was applied to identify operational constraints and productivity-related inefficiencies. The findings indicate that inefficient workstation layout, repeated movements to retrieve garments and packaging materials, limited accessibility of supporting equipment, electricity interruptions, limited flexibility of ironing equipment, and physical fatigue are the main operational constraints. These conditions increase unnecessary movements and physical workload and may reduce the efficiency of working time. The study contributes practical insights for laundry MSMEs by emphasizing workstation reorganization, improved equipment accessibility, better work organization, and measures to minimize operational disruptions as potential strategies for improving labor productivity.

Keywords: Laundry MSMEs, Labor Productivity, Operational Constraints, Workstation Layout, Operational Efficiency



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INTRODUCTION

Economic development within a country is supported by various factors, including business activities and the development of small and medium-sized enterprises (SMEs) and micro, small, and medium-sized enterprises (MSMEs). SMEs play an important role in strengthening a country's economy by contributing to business development, employment creation, and income generation (Fadli & Ramayanti, 2020). For SMEs, the determination of production costs is a critical aspect of business management, particularly because it serves as a fundamental basis for determining the selling price of products or services (Rakhmawati, 2023). Production costs can generally be classified into three major components: raw material costs, labor costs, and overhead costs. An accurate determination of these cost components enables business owners to establish an appropriate cost of production, which subsequently serves as a basis for determining competitive and economically viable selling prices.

Tulungagung is one of the regions in Indonesia with a considerable number of MSMEs operating across various business sectors. The development of entrepreneurship in the region has the potential to contribute to local economic growth, particularly through the creation of employment opportunities. Furthermore, the development of social entrepreneurship can generate positive economic impacts by creating additional employment opportunities for the community (Sartono et al., 2014). The absorption of labor through entrepreneurial activities can support government efforts to create new employment opportunities. From the supply side, the emergence of new businesses contributes to an increase in the availability of goods and services, while from the demand side, the expansion of employment and household income can stimulate consumption and economic activity.

Effective business governance is also an important factor in supporting the sustainable development of MSMEs. Appropriate management practices can facilitate the transformation of a micro-scale business into a small enterprise, subsequently into a medium-sized enterprise, and eventually into a larger business organization (Widhajati et al., 2021). In addition, sustained growth in sales over an extended period can serve as one of the indicators of positive business performance. Therefore, MSMEs require not only adequate market demand but also effective operational management to maintain business continuity and improve their competitiveness.

One of the MSME sectors that has considerable potential in Tulungagung is the laundry service industry. Laundry businesses have become increasingly relevant to the needs of local communities due to changes in lifestyle and the growing demand for practical household services. In particular, residents in Tulungagung tend to seek convenient and time-efficient solutions for meeting their daily needs. This condition is particularly evident in the urban area of Tulungagung and its surrounding districts, where a considerable proportion of the population works as employees, entrepreneurs, and other professionals whose working schedules may limit the time available for household activities, including washing and caring for clothing.

In addition, the presence of several higher education institutions in and around Tulungagung District has contributed to the demand for practical laundry services. Students and residents originating from outside the region may have limited access to household facilities or limited time to perform laundry activities independently. Consequently, laundry services provide an alternative that enables customers to outsource these activities while allocating their time to work, education, and other productive activities.

Despite the growing demand for laundry services, the operational performance of laundry MSMEs may be affected by various constraints throughout the service process. Operational problems such as electricity interruptions, inefficient workplace layouts, inappropriate placement of office and packaging equipment, and the handling of garments that are susceptible to color fading may increase processing time, reduce work efficiency, and ultimately affect labor productivity. These constraints are particularly relevant for small-scale laundry businesses, where limited resources and relatively simple operational systems may make the production process more vulnerable to operational disruptions.

Therefore, assessing operational constraints and their effects on labor productivity is important for improving the efficiency and sustainability of laundry MSMEs in Tulungagung. Identifying the operational factors that contribute most significantly to productivity losses can provide an empirical basis for developing appropriate improvement strategies. Accordingly, this study aims to assess operational constraints and their effects on labor productivity in laundry MSMEs in Tulungagung, Indonesia, and to provide recommendations for improving operational efficiency and productivity.

LITERATURE REVIEW

Productivity

Productivity is an important indicator of operational performance because it reflects the extent to which available resources can be utilized effectively and efficiently to achieve organizational objectives. In a business context, productivity is not merely associated with increasing output, but also with the ability to minimize unnecessary resource consumption, including time, labor, materials, and other operational inputs. Improvements in work methods can reduce wasted time and effort, optimize the allocation of labor, and ultimately support the achievement of business objectives.

In production and service activities, productivity represents a measure of productive efficiency. It describes the relationship between the inputs utilized in a production or service process and the resulting physical output. In general, productivity can be conceptualized as the ratio between output and input. Labor productivity, in particular, focuses on the amount of output generated relative to the labor input required to produce that output. Therefore, an increase in productivity can be achieved either by increasing output using the same amount of input or by maintaining the same level of output while reducing the resources required.

Productivity is also closely related to the efficiency of work processes. Inefficient work methods can result in excessive time consumption, unnecessary physical effort, delays, and inefficient use of operational resources. Conversely, systematic improvements in work methods can reduce unnecessary activities and improve the utilization of available resources. Consequently, time can be allocated more effectively, labor can be utilized according to its capacity, and operational activities can be performed more efficiently.

According to Juliansyah (2014), productivity can be improved through various improvements in work methods that reduce the waste of time, labor, and other inputs. Such improvements are expected to generate higher output while enabling resources to be utilized more effectively and efficiently. Thus, productivity can be viewed as an important basis for evaluating the effectiveness of operational processes and identifying opportunities for improvement within an organization.

In the context of laundry MSMEs, productivity is particularly important because most operational activities rely heavily on human labor. Laundry operations involve a series of interconnected activities, including sorting, washing, drying, ironing, folding, packaging, and delivery or collection. Inefficiencies occurring at any stage of the process may increase processing time and labor requirements, which can subsequently reduce overall productivity. Therefore, the assessment of labor productivity can provide an important basis for identifying operational constraints and determining appropriate improvement measures.

Factors Affecting Productivity

Productivity is influenced by various interconnected factors originating from both the operational environment and the characteristics of the workforce. These factors can be considered as subsystems within the overall productivity system, in which productivity potential and available productivity reserves are embedded. Understanding these factors is important because productivity problems cannot always be attributed to labor performance alone. Operational conditions, equipment, managerial practices, worker characteristics, and the work environment may also determine the level of productivity achieved.

Several factors that may influence productivity include the following:

1. **Equipment and Work Facilities**

The availability, suitability, and condition of equipment used in the work process can influence productivity. Appropriate equipment can facilitate work activities, reduce unnecessary physical effort, shorten processing time, and minimize operational disruptions. Conversely, inadequate or poorly maintained equipment may increase work time and create additional operational constraints.

2. **Level of Workforce Skills**

The skills and competencies of workers determine their ability to perform tasks accurately, efficiently, and consistently. Workers with adequate skills are generally better able to operate equipment, identify potential problems, and complete tasks

within an appropriate time. In service-based businesses such as laundry MSMEs, workforce skills are particularly important because many activities require practical knowledge and direct human intervention.

3. Workers' Ability to Respond to Work Situations

Productivity is also influenced by workers' ability to assess and respond appropriately to situations that arise during the work process. Operational activities may involve unexpected conditions, such as damaged garments, garments susceptible to color fading, equipment problems, or interruptions in the production process. The ability of workers to make appropriate decisions in such circumstances can help prevent errors, minimize rework, and maintain workflow continuity.

4. Cultural and Educational Background

Workers' educational and cultural backgrounds may influence their attitudes, knowledge, communication patterns, and approaches to work. Formal education can provide workers with knowledge and cognitive abilities that support problem-solving and adaptation to workplace requirements. At the same time, environmental and family factors may contribute to the development of workers' attitudes and behaviors toward their occupational responsibilities.

5. Level of Work Interest and Motivation

Workers' interest and motivation toward their jobs can influence their willingness to perform tasks effectively and consistently. A high level of interest in work may encourage employees to demonstrate greater commitment, responsibility, and attention to task quality. In contrast, low motivation may contribute to reduced work engagement, decreased performance, and inefficient utilization of working time.

6. Job Structure and Worker Characteristics

Job structure and individual characteristics, including expertise, age, and, in certain contexts, gender, may influence productivity. Different tasks require different levels of physical ability, technical competence, concentration, and experience. Therefore, the compatibility between worker characteristics and job requirements should be considered when evaluating productivity and allocating work responsibilities.

7. Managerial Factors

Managerial factors represent another important determinant of productivity. Management is responsible for organizing work processes, allocating resources, establishing work procedures, supervising employees, and responding to operational problems. Effective managerial practices can facilitate coordination, reduce unnecessary activities, and ensure that available resources are used efficiently. Conversely, inadequate planning, poor supervision, and inefficient resource allocation may create operational constraints that negatively affect labor productivity.

Overall, these factors indicate that productivity is a multidimensional phenomenon resulting from the interaction between human, technological, operational, and managerial elements. Therefore, efforts to improve productivity should not focus exclusively on

increasing workers' output but should also consider the conditions under which work is performed. For laundry MSMEs, this perspective is particularly relevant because operational constraints such as equipment availability, workplace layout, electricity interruptions, work procedures, and garment-handling risks can interact with workforce characteristics and managerial practices to influence labor productivity.

RESEARCH METHOD

Research Design and Data Collection

This study employed a descriptive research approach using both primary and secondary data to assess labor productivity and identify operational factors that may affect productivity in laundry MSMEs. The use of primary and secondary data was intended to provide a comprehensive description of the existing work processes and the operational conditions encountered by workers.

Primary data were obtained directly from the research setting and included employee productivity data and information obtained through interviews with workers and/or business operators. Data collection was conducted through direct field observations and semi-structured interviews. Field observations were performed to examine the actual work processes, utilization of equipment, workplace conditions, work methods, and operational constraints encountered during laundry activities. Meanwhile, interviews were conducted to obtain additional information regarding workers' experiences, operational problems, and factors perceived to influence productivity.

Secondary data were obtained from relevant supporting sources and were used to complement the primary data. These data included information related to the operational activities of the laundry business and other relevant records available at the research site.

Productivity Measurement

Several approaches can be used to assess productivity depending on the characteristics of the work process and the objectives of the study. In this research, productivity assessment was conducted by classifying workers' activities into three categories: work activities that contribute directly to the process, effective work activities, and non-value-adding activities. This classification was used to identify how workers' available working time was allocated during the operational process.

The observation of work activities enables the researchers to distinguish activities that provide a direct contribution to the completion of work from activities that are necessary for supporting the process and activities that do not provide meaningful value to the output. The proportion of time spent in each category can subsequently be used to identify potential inefficiencies and opportunities for productivity improvement.

The productivity assessment was complemented by statistical data processing to examine variables that may influence labor productivity. Statistical analysis provides a quantitative basis for identifying patterns and relationships among productivity-related variables. According to Aprilian (2010), statistical data processing can be applied to measure and analyze variables affecting labor productivity. Therefore, the combination

of direct observation, interviews, productivity assessment, and statistical analysis was employed to obtain a more comprehensive understanding of the operational constraints affecting labor productivity.

Data Analysis

The collected data were systematically organized and analyzed descriptively. Descriptive analysis was used to characterize the observed work activities, productivity conditions, and operational constraints encountered during the laundry process. The results of the productivity assessment were then interpreted to identify activities that potentially contributed to inefficient use of working time and resources.

The findings from field observations and interviews were also compared with the productivity measurement results to provide a more comprehensive interpretation of the operational conditions. This approach allowed the study to identify potential sources of productivity loss and formulate recommendations for improving work processes and labor productivity in laundry MSMEs.

The overall research procedure consisted of several stages: (1) identification of the research problem, (2) collection of primary and secondary data, (3) observation and classification of work activities, (4) productivity measurement, (5) statistical data processing, (6) identification of operational constraints, and (7) formulation of productivity improvement recommendations.

RESULTS AND DISCUSSION

Figure 1. The Situation Inside the Laundry



Laundry Packaging Process

The laundry packaging process consists of several sequential activities. After garments have undergone the washing and drying stages, they are transferred to a designated container and subsequently moved to the ironing and packaging workstation. At this stage, workers perform ironing, garment arrangement, folding, fragrance application, and final packaging before the garments are prepared for customer collection or delivery.

Several supporting tools and materials are required during the packaging process, including an iron, clothing fragrance, scissors, adhesive tape, plastic packaging, a cutter, an adhesive tape holder, a plastic holder, and other packaging-related equipment. Although these tools support the completion of packaging activities, their arrangement and accessibility influence the efficiency of the work process.

Based on field observations, several operational constraints were identified during the packaging process. These included electricity interruptions, inefficient placement of stationery and packaging equipment, and the handling of garments that are susceptible to color fading. Electricity interruptions directly affect ironing activities and may result in process delays. Meanwhile, the inefficient placement of supporting equipment requires workers to repeatedly move from their primary workstation to retrieve the tools and materials required to complete the packaging process. Such conditions may increase unnecessary movements and contribute to productivity losses.

Garments that are susceptible to color fading also require additional attention during the process. Workers must identify and handle these garments carefully to prevent quality problems. Consequently, the additional attention and handling requirements may increase processing time and workload, particularly when the volume of garments is relatively high.

Human Resources

The packaging operation requires several workers with different responsibilities. Based on observations of the existing operational structure, the human resource requirements can be categorized as follows:

Table 1. Human Resources

Position	Number of Workers
Cashier/Customer Service	1
Washing Section	1–2
Ironing and Packaging Section	1–2

Source: Primary data from field observations and interviews, 2024

The allocation of workers indicates that the ironing and packaging section represents a labor-intensive stage of the laundry process. Workers in this section are responsible for completing several activities consecutively, including ironing, folding, fragrance application, and packaging. The combination of multiple tasks within a single workstation may increase physical workload and create additional movements when tools or materials are not positioned within an appropriate working range.

The relatively limited number of workers also means that operational disruptions can have a direct effect on the continuity of the process. For example, electricity interruptions can temporarily stop ironing activities, while inefficient equipment placement can increase the time required to complete individual packaging tasks. Therefore, improving the organization of the workstation may provide an opportunity to increase labor efficiency without necessarily increasing the number of workers.

Work System

The existing work system in the laundry packaging section presents several conditions that may contribute to inefficient work movements and physical fatigue. The observed conditions include:

1. A relatively tiring sitting position.
Workers perform packaging activities predominantly in a seated position, which may cause discomfort and fatigue, particularly when the activity is performed continuously for an extended period.
2. Repeated movement to retrieve garments.
Workers frequently move back and forth to retrieve garments from different locations. This movement increases the distance traveled during the work process and potentially extends the processing time.
3. Repeated movement to retrieve stationery and packaging materials.
Supporting tools such as scissors, adhesive tape, plastic packaging, cutters, and other materials are not consistently positioned within the worker's immediate reach. Consequently, workers must repeatedly interrupt the primary task to retrieve the required equipment.
4. Packaging plastic stored underneath the table.
The placement of packaging plastic beneath the workstation requires workers to bend or change their working position when retrieving materials. Repeated movements of this type may increase physical workload and reduce work comfort.
5. Accumulation and sorting of garments by type.
Garments tend to accumulate according to their respective categories during the packaging process. If the arrangement is not systematically managed, workers may require additional time to identify and retrieve garments.
6. Limited flexibility of the iron cord.
The restricted movement of the iron cord may limit the worker's range of motion and make ironing activities less flexible. This condition may also increase the physical effort required to complete the task.

These findings indicate that the existing work system contains several unnecessary or repetitive movements. From a productivity perspective, such movements represent opportunities for improvement because the time and effort spent on retrieving tools, materials, and garments do not directly contribute to the value-added transformation of the laundry product.

Work-Related Fatigue

Interviews with laundry operators revealed several forms of physical and operational fatigue associated with the existing packaging system. The main findings included:

1. Lower-back fatigue.

Workers reported discomfort or fatigue in the lower back, which may be associated with prolonged sitting and repeated changes in posture while performing ironing and packaging activities.

2. Electricity interruptions.

Power outages disrupt ironing activities and create interruptions in the workflow. In addition to reducing productive working time, such interruptions may require workers to wait or temporarily shift to other activities.

3. Limited flexibility of the iron.

Workers reported difficulties associated with the limited flexibility of the iron and its supporting cord. This condition may restrict movement and increase the effort required to complete ironing activities.

4. Hand fatigue.

Repetitive ironing, folding, and packaging activities can contribute to fatigue in the hands and arms, particularly when performed continuously and with limited variation in working posture.

Overall, the findings indicate that the main source of difficulty in the laundry packaging process is related to limited accessibility and inefficient reachability of work targets, including garments, ironing equipment, stationery, and packaging materials. Workers are required to perform repeated movements to reach or retrieve items that are not positioned within an efficient working range.

From an operational perspective, these conditions can influence labor productivity because repeated non-value-adding movements consume working time without directly increasing the quantity or quality of packaged laundry. Furthermore, the accumulation of physical fatigue may reduce workers' ability to maintain consistent performance throughout the working period.

The results therefore suggest that improvements should focus not only on worker performance but also on the ****design and organization of the workstation****. Repositioning frequently used tools and packaging materials within the worker's optimal reach area, improving the storage arrangement of garments and packaging materials, and providing greater flexibility in ironing equipment may reduce unnecessary movements and physical workload. In addition, appropriate measures for dealing with electricity interruptions are required to minimize disruption to the ironing process.

These findings support the view that labor productivity is influenced by the interaction between workers, equipment, workplace layout, and operational conditions. Consequently, productivity improvement in laundry MSMEs should be approached systematically by reducing unnecessary movements, improving workstation accessibility, and minimizing operational disruptions rather than focusing solely on increasing the amount of labor input.

CONCLUSION

This study assessed operational constraints and their effects on labor productivity in laundry MSMEs in Tulungagung, Indonesia. The findings indicate that labor productivity in the laundry packaging process is influenced not only by worker performance but also by the interaction between workplace layout, equipment accessibility, work methods, physical workload, and operational disruptions.

The packaging process requires workers to perform several consecutive activities, including ironing, folding, fragrance application, and packaging. The study identified several operational constraints that may reduce work efficiency, particularly electricity interruptions, inefficient placement of stationery and packaging materials, garments that require special handling due to their susceptibility to color fading, and limited flexibility of ironing equipment. These conditions can interrupt workflow and increase the time and effort required to complete packaging activities.

The existing work system also involves several repetitive and non-value-adding movements. Workers frequently move to retrieve garments, packaging materials, and supporting equipment, while packaging plastics are stored beneath the workstation and garments may accumulate before being processed. These conditions increase the distance and frequency of worker movements and may contribute to inefficient use of working time.

Furthermore, interviews revealed several forms of work-related fatigue, including lower-back discomfort, hand fatigue, and difficulties associated with the limited flexibility of the ironing equipment. Electricity interruptions were also identified as a source of workflow disruption. Overall, the findings suggest that limited accessibility and inefficient reachability of work targets constitute important operational problems in the packaging process.

From a practical perspective, improving labor productivity in laundry MSMEs should therefore focus on improving workstation organization rather than relying solely on increasing labor input. Frequently used tools and packaging materials should be positioned within an efficient reach area, garment storage and sorting should be systematically organized, and ironing equipment should provide greater flexibility. Measures to minimize the impact of electricity interruptions should also be considered. These improvements have the potential to reduce unnecessary movements, physical workload, and workflow disruptions, thereby supporting more efficient operations.

Theoretically, this study reinforces the perspective that labor productivity is a multidimensional phenomenon shaped by the interaction of human, technological, operational, and managerial factors. For laundry MSMEs, productivity improvement should therefore be approached as a system-level issue involving workers, equipment, workplace layout, and operational conditions rather than as a problem attributable solely to individual worker performance.

However, this study has limitations. The analysis is primarily descriptive and is based on field observations, interviews, and productivity assessment within the observed

laundry operation. Consequently, the findings provide contextual insights into operational constraints but do not establish the statistical magnitude or causal effect of each constraint on labor productivity. Further research is therefore required to validate these findings using larger samples and quantitative measurements.

Suggestions for future research

Future research should extend the present study in several directions. First, subsequent studies could involve a larger number of laundry MSMEs across different locations in Tulungagung or other regions of Indonesia to improve the generalizability of the findings. Comparative analysis between laundry businesses with different operational scales could also provide a broader understanding of how business size influences labor productivity.

Second, future studies should employ quantitative productivity measurements to determine the magnitude of productivity losses associated with specific operational constraints. Variables such as processing time, worker movement frequency, productive and non-productive working time, daily laundry output, and labor hours could be measured systematically to provide more objective evidence of productivity performance.

Third, future research could investigate the effect of specific operational factors—particularly workplace layout, equipment accessibility, electricity interruptions, worker fatigue, and work method—on labor productivity using inferential statistical techniques. Such an approach would allow researchers to identify which factors have the strongest relationship with productivity and provide a stronger empirical basis for prioritizing improvement interventions.

Fourth, future studies could integrate ergonomic assessment and work measurement methods to evaluate the physical and temporal aspects of the laundry packaging process. The implementation of workstation redesign or improved equipment placement could then be evaluated through a before-and-after comparison to determine whether the proposed interventions actually reduce unnecessary movements, work-related fatigue, and processing time.

Finally, future research could develop and test a comprehensive productivity improvement model specifically for laundry MSMEs. Such a model could integrate operational efficiency, workplace ergonomics, human resource characteristics, equipment management, and managerial practices. This would provide not only a more robust theoretical contribution but also a practical framework that laundry MSME owners can use to systematically improve labor productivity and operational sustainability.

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