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The Influence of Workload, Motivation, and Work Environment on Generation Z Employee Productivity in Cikarang

Sofia Kelani[1]*, Agung Surya Dwianto[2]
[12]Universitas Paramadina, Jakarta, Indonesia
Correspondence: sofia.kelani@students.paramadina.ac.id[1]

Abstract

This study analyzes the influence of workload, work motivation, and work environment on the work productivity of Generation Z employees in the Cikarang manufacturing industry. This phenomenon is important given the unique characteristics of Generation Z, which now dominates the labor market amid demands for industrial efficiency. Using an associative quantitative approach, with purposive sampling techniques involving 240 Generation Z respondents, primary data was collected through questionnaires. Measurement accuracy was ensured using Pearson's corrected item-total correlation for validity ($r \geq 0.30$) and Cronbach's alpha for reliability ($\alpha \geq 0.60$ for exploratory adaptation). Furthermore, before testing the hypothesis through multiple linear regression, all essential diagnostic assumptions, including residual normality, multicollinearity (Tolerance and VIF), and heteroscedasticity, were strictly met. The results indicate that workload and work motivation are significantly associated with employee productivity. Workload, when appropriately managed, may support productivity, while work motivation is associated with maintaining consistent performance in a target-oriented work environment. In contrast, the work environment does not show a statistically significant relationship with productivity in this study. This finding suggests that, within this specific context, the work environment may function as a supporting condition rather than a direct determinant of productivity. Simultaneously, these three variables have a significant effect with a contribution of 54.1%. This study concludes that Generation Z's work productivity is more closely related to optimal work volume and motivation than to physical environmental facilities.

KEYWORDS

workload; work motivation; work environment; work productivity; manufacturing industry; generation Z.

Introduction

The growth of industrial activity in Indonesia, especially in the Cikarang area as a manufacturing center, is not only demonstrated by the increase in the number of production facilities, but also by the increasing complexity of human resource management that demands higher organizational effectiveness. Based on 2021 data from the Investment Coordinating Board (BKPM) and the Bekasi Regency Central Statistics Agency (BPS), the Cikarang industrial area houses more than 1,200 registered manufacturing facilities in various major industrial zones such as MM2100, Delta Silicon and Jababeka (BPS Kabupaten Bekasi, 2021). The massive concentration of factories makes Cikarang a highly relevant location for this study, as it provides a broad and dynamic environment for capturing the specific workplace realities faced by Generation Z manufacturing workers today. This dynamic requires every business entity to prioritize improving employee productivity as a key asset in order to maintain operational efficiency and competitiveness in an increasingly competitive global market.

The global labor market is undergoing a structural transition as Generation Z (those born between 1997 and 2012) enters the workforce. This generation is known for its unique characteristics, including a strong ability to adapt to technology, a preference for job flexibility, and an expectation of immediate feedback and recognition (Sunaryanto & Idrus, 2025). Technological advances and digitalization associated with Generation Z have intensified competition in the workplace, requiring the development of more advanced adaptive skills to maintain competitiveness and relevance in the labor market (Nasa et al., 2022).

The phenomenon of fluctuating work productivity among Generation Z in the Cikarang manufacturing area is a crucial issue for HR management, given the high turnover rate in the region, which is now dominated by young workers. The selection of variables such as workload, motivation, and work environment in this study was not done randomly, but was based on the Job Demands-Resources (JD-R) Theory framework. Amidst the pressure of massive manufacturing industry production targets, workload emerges as the main job demand, while motivation and work environment should function as supporting resources.

In manufacturing organizations, employee productivity is closely related to job demands, particularly workload. Workload reflects the amount of physical and mental effort required to complete a given task within a certain period of time. Worotikan et al. (2023) argue that optimal workload has a positive and significant effect on work productivity in Indonesia's manufacturing sector, while Dudija & Putri (2025) argue that excessive workload triggers burnout through the mediation of work stress in Generation Z. Previous studies show that excessive workload can cause fatigue and exhaustion, which ultimately reduces employee productivity (Soelton & Hardianti, 2020). An imbalance between individual capacity and task demands, whether in the form of overload or underload, can significantly affect organizational outcomes, particularly in terms of employee work performance and job satisfaction (Inegbedion et al., 2020). Therefore, understanding the mechanisms of how the physical and mental dimensions of workload interact is crucial to creating a work system design that not only supports productivity but also maintains the psychological well-being of workers. This is particularly relevant for Generation Z employees in Cikarang, where work motivation and a conducive work environment are needed to mitigate the pressure of workloads in order to maintain competitive productivity (Atinga et al., 2026). Empirical evidence consistently shows that motivated employees demonstrate higher productivity and work engagement (Zaman & Zulganef, 2023). For Generation Z employees, motivational drivers extend beyond financial rewards to include intrinsic motivation, recognition, opportunities for growth, and meaningful work experiences (Sisodia, 2024). Therefore, integrating the human motivation perspective into productivity models is important to ensure that the workload remains challenging but does not exceed the professional capabilities of employees (Worotikan et al., 2023). However, the influence of the work environment on productivity has produced inconsistent findings in previous studies. Some studies report that supportive physical and non-physical work environments have a positive impact on employee performance (Malt & Nasution, 2025). Conversely, other studies show that for Generation Z employees, work environment factors can serve as basic or hygienic factors that prevent dissatisfaction rather than directly increasing productivity (Rorensia et al., 2025). A conducive work environment is essential for employee productivity (Yandi, 2022). In industrial areas such as Cikarang, the work environment is not only assessed in terms of physical facilities, but also in terms of flexibility and psychosocial comfort that can mitigate the pressures of daily tasks (Mandalahi et al., 2022). It has now become an element of the modern work environment that can encourage the vitality and creative self-efficacy of employees, which in turn optimizes organizational productivity in a sustainable manner (Yang et al., 2025).

This study contributes to the literature by examining the effects of workload, work motivation, and work environment on employee productivity, while also providing insight into how these factors may function within established theoretical frameworks. Specifically, this study explores whether the work environment, which is commonly treated as a job resource in the Job Demands–Resources (JD-R) model and as a hygiene factor in Herzberg's Two-Factor Theory, acts as a direct driver of productivity or as a supporting condition in the context of Generation Z employees in the manufacturing sector. By focusing on this distinction, the study provides a more nuanced understanding of how the role of the work environment may vary across different generational and industrial contexts. Therefore, the contribution of this study lies not only in presenting empirical evidence from a specific setting, but also in offering additional perspective on the interpretation of existing theories regarding the role of work environment in influencing employee productivity.

Therefore, this study aims to empirically test and analyze in depth how workload, work motivation, and work environment simultaneously affect the work productivity of Generation Z employees in the manufacturing industry in Cikarang. This approach is expected to make a significant and relevant contribution to the advancement of human resource management in the Industry 4.0 era, utilizing the theoretical framework of the Job Demands –Resources (JD-R) Model (Li et al., 2025), Herzberg's Two-Factor Theory (Alrawahi et al., 2020), and Social Exchange Theory (Ahmad et al., 2023). Therefore, this study not only analyzes the simultaneous effects of workload, motivation, and work environment on productivity, but also provides theoretical insights into whether the work environment functions primarily as a hygiene factor rather than a motivational driver among Generation Z in manufacturing environments.

Literature Review

Workload

Workload is a multidimensional construct that reflects the interaction between task demands and employee functional capacity (Pütz et al., 2022). Workload reflects the level of job demands that employees must meet within a certain period of time, both in terms of the number of tasks and the level of complexity of their completion, thus requiring a balance between organizational expectations and the capacity of the individuals performing the work (Worotikan et al., 2023). Conceptually, workload includes quantitative dimensions related to work volume and time pressure, as well as qualitative dimensions related to the level of difficulty and skill demands in performing tasks (Atnin & Efendi, 2025). In the context of Generation Z employees in the manufacturing sector, a perceived excessive workload has the potential to trigger stress and work fatigue, while an insufficient workload can reduce motivation and work engagement (Manurung et al., 2025). However, when managed proportionally, workload can function as a challenge demand that encourages increased efficiency, engagement, and work productivity among Generation Z employees (Manurung et al., 2025). In the context of this study, workload is measured by task intensity, the time required to complete tasks, and the complexity of work undertaken by Generation Z employees. Real-time monitoring of workload is now crucial to prevent negative impacts on individuals and organizations (Waldherr et al., 2025). Therefore, organizational support and work system design that considers the physical and mental capacity limits of employees are key factors in

maintaining sustainable productivity (Atinga et al., 2026).

Work Motivation

Work motivation is a psychological drive that influences the direction, intensity, and persistence of individuals in achieving work-related goals. This motivation is very important to study because it functions as an intrinsic drive that compels employees to excel, even in the midst of work difficulties. Salvadorinho et al. (2026) argue that the motivation paradigm of Generation Z in the Industry 5.0 era has shifted from transactional aspects to human-centric orientation, sustainability, and resilience. This requires a transformation of manufacturing strategies that are not only efficiency-oriented but also accommodative of employees' ethical values. Zaman & Zulganef (2023) argue that work motivation has a significant and positive influence on employee performance. For Generation Z employees, motivation does not only come from financial rewards, but also from recognition, career development opportunities, and the perceived meaningfulness of work (Sunaryanto & Idrus, 2025). The findings of Zaman & Zulganef (2025) reinforce this finding by proving that work motivation plays an important role in increasing employee commitment and directly improving job performance in the food and beverage (F&B) sector, which employs many Generation Z workers. In line with Herzberg's Two-Factor Theory, motivation functions as a motivator that directly increases productivity through achievement, responsibility, and opportunities for growth, while other factors serve as basic supporters (Alrawahi et al., 2020). From a strategic initiative perspective, Cavalcante et al. (2025) reveal that internal motivations such as the desire to improve organizational productivity and management's belief in innovation are often more dominant drivers than external pressures. This indicates that motivational drivers originating from within the organization (internal drivers) are vital to the successful adoption of new ways of working or digital transformation. Neweduk & Haegeli (2025) found in their study that individual motivation forms a hierarchy and different patterns, ranging from seeking challenges to simply enjoying the atmosphere, which directly influences how a person makes decisions in situations involving risk and uncertainty. Salau et al.(2018) identified that meaningful work and growth opportunities are the main predictive factors in maximizing productivity. Previous studies have shown that employee motivation plays an important role in improving work performance and productivity, especially among young employees who value recognition and career development opportunities (Karinda & Darto, 2025). These findings emphasize that employees will perform at their best not only because of physical facilities, but when they perceive their work to have value and offer a clear path for development. Empirical findings show that high levels of work motivation are positively correlated with the engagement and performance of Generation Z employees, including in target-oriented industrial sectors such as manufacturing (Malt & Nasution, 2025).

Work Environment

The work environment is defined as all physical and non-physical conditions that surround employees in carrying out their work activities, including the availability of facilities, safety aspects, the quality of interpersonal relationships, and organizational culture that directly or indirectly influence employee behavior and performance (Marisya, 2022). In the context of Generation Z employees, a safe, comfortable, and supportive work environment plays an important role in maintaining work well-being while supporting optimal task performance, especially in the manufacturing industry, which is characterized by relatively high physical and operational demands (Yandi, 2022). In addition, a flexible and supportive work environment is considered crucial for Generation Z in maintaining a balance between work and personal life (work-life balance) and in reducing the negative impact of high job demands (Malt & Nasution, 2025). In the context of post-pandemic work flexibility, Mandalahi et al.(2022) argue that a flexible work environment has a significant positive impact on employee performance by mitigating work stress and improving work-life balance. On the other hand, understanding responsibilities in the work environment is also an important factor. Kappel et al (2026) highlight the challenges in interpreting workplace regulations, where unclear division of responsibilities between management and employees can lead to neglected safety risks. Conceptually, the work environment encompasses various physical aspects, such as workspace layout, lighting quality, temperature control, and the availability of adequate work equipment, as well as non-physical aspects that include the quality of interpersonal relationships, leadership style, a conducive organizational culture, and the implementation of fair company policies. A positive and supportive work environment is believed to be able to reduce absenteeism, improve overall employee welfare, and create a work climate that encourages collaboration and innovation among Generation Z, thereby ultimately contributing to an increase in collective work productivity.

Work Productivity

In the context of manufacturing operations, Suokko et al.(2025) demonstrated that ergonomic interventions integrated with production process development have a tangible financial and operational impact. Work productivity is a key indicator of organizational success that reflects the comparison between the results achieved (output) and the total resources used (input) in a given unit of time (Yandi, 2022). This concept is often used in a similar way to employee performance, but the focus is slightly different. Work productivity focuses on the efficiency and quantity or quality of work produced, while performance covers a broader range of factors, including behavior and overall work results (Zaman & Zulganef, 2023). Improving work productivity is essential to ensure business continuity and competitiveness (Worotikan et al., 2023). This finding is particularly true when integrating Fourth Industrial Revolution (4IR) technology, which is a key factor in achieving sustainable work productivity (Al-Suwaidi et al., 2025). Work productivity is a key dependent variable in this study, defined as the ratio between the output produced (quantity and quality) and the input used (time, energy, and other resources). In the manufacturing sector, labor productivity is assessed through task completion efficiency, effectiveness in achieving goals, and the quality of work produced by Generation Z employees. Along with the digital transformation of industry, Kassa & Worku (2025) highlight the role of technology in redefining modern productivity. Increased work productivity serves as a significant indicator of management effectiveness in overseeing workloads, maintaining motivation, and fostering an optimal work environment. Maryadi et al. (2026) in their systematic literature review identified that the determinants of employee productivity and performance are multidimensional. They conclude that despite the many variables, work motivation, a conducive work environment, and leadership style remain the three most consistent factors influencing employee performance across various industrial sectors, including manufacturing and state-owned enterprises.

Research Framework and Hypothesis Development

Employee productivity is the main dependent variable in this study, which is based on the human resource management theoretical framework and involves Generation Z workers in the Cikarang manufacturing sector. This study is based on three theoretical frameworks, namely the Job Demands–Resources

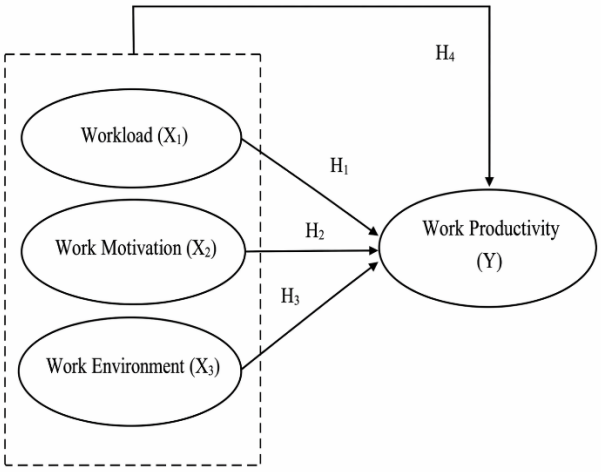

Figure 1. Research Framework

(JD-R) Model, Herzberg's Two-Factor Theory, and Social Exchange Theory (SET). The latest JD-R study by Li et al. (2025) emphasizes that the balance between job demands and job resources can be related to the psychological condition and work productivity of employees. High workloads trigger impairment processes that lead to fatigue and decreased performance, while resources such as social support, autonomy, and an adequate work environment activate motivational processes that increase engagement. In Herzberg's Two-Factor Theory, the latest version of the study by Alrawahi et al. (2020) states that intrinsic motivators such as achievement, recognition, and career development drive work productivity, while hygiene factors serve to prevent dissatisfaction. Thus, work demands, motivation, and the work environment interact dynamically in shaping productive employee behavior, especially in the context of modern manufacturing industries.

Based on the Social Exchange Theory (SET) by Ahmad et al. (2023) reinforces this understanding by showing that the reciprocal relationship between organizations and employees plays an important role in shaping behavioral responses. When companies provide fair support, a comfortable work environment, and appreciate employee contributions, individuals tend to respond with higher motivation, loyalty, and increased work productivity. Conversely, an imbalance in exchange, such as high workloads without support, can reduce work engagement (see Figure 1).

Hypothesis Development

Hypothesis development in this study was based on the conceptual framework and theoretical basis used to examine the relationship between the variables of workload, work motivation, and work environment on the work productivity of Generation Z employees. Each hypothesis was formulated to explain the partial and simultaneous effects of independent variables on work productivity in the context of the manufacturing industry.

In the Job Demands–Resources (JD-R) Model perspective, workload is positioned as a job demand that has the potential to function as a work challenge if managed proportionally. Challenging workloads that are still within the professional capacity of Generation Z employees can encourage increased efficiency, competency development, and self-actualization, which ultimately have an impact on increased work productivity. Therefore, the following hypothesis is formulated:

H1: Workload has a significant effect on the work productivity of Generation Z employees in the manufacturing industry in Cikarang.

Moreover, work motivation is regarded as an intrinsic factor that significantly influences work performance and productivity. Based on Herzberg's Two-Factor Theory, work motivation functions as a motivating factor that increases productivity through achievement, recognition, and career development opportunities. Generation Z tends to respond positively to work environments that are able to fulfill their psychological needs and give meaning to their work, so that a high level of motivation is expected to increase their productive contribution. Thus, the following hypothesis is formulated:

H2: Work motivation has a positive and significant effect on the work productivity of Generation Z employees in the manufacturing industry in Cikarang.

The work environment encompasses physical conditions and non-physical psychosocial aspects, such as interpersonal relationships and safety guarantees. In Herzberg's Two-Factor Theory perspective, although physical conditions primarily function as hygiene factors that prevent dissatisfaction, non-physical dimensions (e.g., supportive coworker and supervisor relationships) have the potential to actively facilitate work engagement. Therefore, although its direct driving force may differ from intrinsic motivation, a comprehensive work environment is still hypothesized to have a meaningful association with how Generation Z employees perform their tasks optimally. Therefore, the following hypothesis is formulated:

H3: The work environment has a significant influence on the work productivity of Generation Z employees in the manufacturing industry in Cikarang.

In addition to testing the partial influence, this study also tests the simultaneous influence of the three independent variables on work productivity. Based on Social Exchange Theory, when organizations are able to manage workloads fairly, provide adequate motivation systems, and create a decent work environment, employees tend to reciprocate this treatment through increased engagement and work productivity. Therefore, the following hypothesis is formulated:

H4: Workload, work motivation, and work environment simultaneously have a significant effect on the work productivity of Generation Z employees in the manufacturing industry in Cikarang.

Method

This study uses a quantitative approach to analyze and examine the influence of workload, work motivation, and work environment on the work productivity of Generation Z employees in manufacturing companies in the Cikarang industrial area and its surroundings. A quantitative approach was chosen because it allows for objective testing of the relationship between variables through statistical analysis. The research population consists of Generation Z employees working in the manufacturing sector in the area, but the exact population size is not publicly available, so the sample frame cannot be determined with certainty. Therefore, this study uses purposive sampling, which is selecting respondents who meet certain criteria, namely those born between 1997 and 2012 who belong to Generation Z, work in manufacturing companies, and have at least one year of work experience. To ensure the adequacy of the sample size in multiple linear regression analysis, this study uses a statistical power analysis approach with G*Power software. With three predictor variables, a significance level of 0.05, and a statistical power level of 0.80 to detect moderate effects, the minimum sample size required is 77 respondents (Kang, 2021). Therefore, the final sample size of 240 respondents is considered adequate to produce reliable statistical analysis.

Table 1. Table of Variable Operationalization

Variable	Theoretical Definition	Operational Definition	Code	Indicators	Likert Scale	Reference
Workload (X1)	The difference between organizational demands on employees and employees' capacity/ability to fulfill them, consisting of quantitative (amount of work) and qualitative (level of difficulty) dimensions	Perceptions of Gen Z manufacturing employees in Cikarang regarding task intensity, completion time, and job complexity	BK1	mployees' perceptions of the amount of work that must be completed	5-point Likert scale	Worotikan et al. (2023)
			BK2	The complexity of the task assigned		Atnin & Efendi (2025)
			BK3	Time pressure or tight deadlines		Manurung et al. (2025)
			BK4	Sufficient resources available to complete the work		
			BK5	Level of difficulty of the work faced		
Work Motivation (X2)	Psychological drives that influence the direction, intensity, and persistence of achieving work goals, consisting of intrinsic motivation (personal satisfaction) and extrinsic motivation (external rewards)	Level of internal/external motivation of Gen Z employees to work effectively and enthusiastically in Cikarang manufacturing	MK1	Level of perceived responsibility toward work	5-point Likert scale	Zaman & Zulganef (2023)
			MK2	Work achievements successfully attained		Malt & Nasution (2025)
			MK3	Opportunities available for career advancement		Sunaryanto & Idrus (2025)
			MK4	Recognition received for performance		
			MK5	The challenging nature of the work		
			MK6	Both financial and non-financial rewards		
			MK7	Quality of social relationships at work		
Work Environment (X3)	All physical aspects (temperature, lighting, facilities) and non-physical aspects (co worker relationships, company culture) that affect employee task performance	Gen Z employees' perceptions of the physical and non physical conditions of the Cikarang manufacturing work environment that support/hinder productivity	LK1	Physical conditions of the workplace, including lighting, temperature, cleanliness, and noise levels	5-point Likert scale	Yandi (2022)
			LK2	Availability of adequate work facilities and equipment		Karinda & Darto (2025)
			LK3	Quality of working relationships among employees		Marisya (2022)
			LK4	Relationship with superiors		
			LK5	Work safety and security guarantees		
			LK6	Overall comfort of the work environment		

Variable	Theoretical Definition	Operational Definition	Code	Indicators	Likert Scale	Reference
Work Productivity (Y)	The ratio between the output produced (quantity & quality) and the input resources (time, labor, resources) used during a specific period	Efficiency and effectiveness of Gen Z employees in achieving production targets, work quality and quantity, and resource optimization in Cikarang manufacturing	PK1	Employees' ability to complete tasks according to set targets	5-point Likert scale	Worotikan et al. (2023)
			PK2	Improvement in work results or output achieved		Zaman & Zulganef (2023)
			PK3	Quality of work produced		Al-Suwaidi et al (2025)
			PK4	Efficiency in the use of time and resources		
			PK5	Enthusiasm and initiative shown in work		
			PK6	Punctuality in completing tasks		

Primary data were collected through a structured questionnaire using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree) distributed online using Google Forms. To minimize potential bias in the survey research, procedural steps were taken to ensure the confidentiality of respondents' identities and to separate measurement items between variables in the questionnaire. Because this study used self-report data collected at a single measurement point, the potential for common method bias was also evaluated using Harman's single factor test. The results of the analysis showed that the first factor did not explain more than 50% of the total variance, so common method bias was not a serious problem in this study (Podsakoff Philip M et al., 2024). Data analysis was carried out in several stages, namely descriptive statistical analysis to describe data characteristics, instrument quality testing through validity and reliability tests, and classical assumption testing which included normality testing, multicollinearity using Variance Inflation Factor (VIF), and heteroscedasticity testing. Hypothesis testing was performed using multiple linear regression analysis, with the t-test to test the partial effect of independent variables, the F-test to test the simultaneous effect, and the coefficient of determination (R^2) to see the ability of independent variables in explaining employee productivity variation. The validity of the questionnaire items was assessed using corrected item-total correlations. An item is considered valid if its correlation coefficient is ≥ 0.30, indicating that the item has an adequate level of discrimination and represents the construct being measured (Oktavia & Habib, 2025). The entire statistical analysis process was performed using IBM SPSS Statistics version 26 (see Table 1).

Result and Discussion

Table of Respondent Characteristics

Based on Table 2, primary data collected from 240 respondents shows that the majority of the sample was dominated by individuals aged 22 to 24 years (44.6%). In terms of gender, there was a significant representation of women at 67.5%. The respondents' education levels were concentrated among high school/vocational school graduates (64.6%), with the dominant length of employment being between 1 and 3 years (69.9%). The majority of respondents held positions as staff or operators (93.3%), reflecting the profile of Generation Z operational workers in the manufacturing industry in the Cikarang area.

Validity Test

Table 3 presents the validity test results for all questionnaire items used in this study. Item validity was evaluated using Corrected Item-Total Correlation, which measures the correlation between each item and the total construct score. An item is considered valid if its correlation value is ≥ 0.30, indicating that the item adequately represents the construct being measured. Based on the results shown in Table 3, all items have correlation values above the recommended threshold; therefore, all indicators are considered valid and suitable for further analysis.

Reliability Test

Based on Table 4, the reliability test shows that all research variables have acceptable internal consistency. Although Cronbach's Alpha of 0.700 is generally considered the standard threshold, methodological guidelines stipulate that alpha values between 0.60 and 0.700 are acceptable for exploratory research or when scales are adapted to new contexts, such as assessing Generation Z in a manufacturing environment (Taber, 2018). The Workload construct produced an alpha of 0.644, which meets this acceptable exploratory threshold, while the other variables (Work Motivation, Work Environment, and Work Productivity) showed strong reliability with alpha coefficients well above 0.75. Therefore, this instrument is considered reliable for hypothesis testing.

Test of Classical Assumptions

The normality of the regression model was evaluated visually using a Normal P-P Plot of the regression standardized residuals. As the plotted points closely followed the diagonal line, it was concluded that the residuals are approximately normally distributed, satisfying the normality assumption for multiple linear regression despite the large sample size (N=240).

Multicollinearity Test

The multicollinearity test in Table 5 was conducted to ensure that the independent variables do not have a high correlation with one another.

The collinearity statistics revealed that the Tolerance values for Workload (0.621), Work Motivation (0.418), and Work Environment (0.528) were all substantially greater than the threshold of 0.10. In addition, the Variance Inflation Factor (VIF) values for Workload (1.609), Work Motivation (2.391), and Work Environment (1.895) were all well below themaximum acceptable limit of 10.00. Therefore, it was concluded that there were no multicollinearity issues among the independent variables in this regression model.

Table 2. Respondents' backgrounds

Characteristics	Category	Frequency (n)	Percentage
Age	19 - 21 years	50	20.8
	22 - 24 years old	107	44.6
	25 - 28 years old	83	34.6
	Total	240	100
Gender	Male	78	32.5
	Women	162	67.5
	Total	240	100
Education	High School/Vocational School	155	64.6
	Diploma (D3)	14	5.8
	Bachelor'sDegree (S1)	71	29.6
	Total	240	100
Years of service	1 - 3 years	167	69.9
	4 - 6 years	47	19.6
	> 6 years	26	10.8
	Total	240	100
Position	Staff/Operator	224	93.3
	Supervisor	9	3.8
	Manager	7	2.9
	Total	240	100

Source: Data processed by researchers 2025

Table 3. Validity Test Results

Variable	Instrument	Calculated r	Table r	Note
Workload (X1)	X1.1	0.543	0.300	Valid
	X1.2	0.666		Valid
	X1.3	0.687		Valid
	X1.4	0.678		Valid
	X1.5	0.635		Valid
Work Motivation (X2)	X2.1	0.548		Valid
	X2.2	0.606		Valid
	X2.3	0.680		Valid
	X2.4	0.728		Valid
	X2.5	0.674		Valid
	X2.6	0.589		Valid
	X2.7	0.642		Valid
WorkEnvironment (X3)	X3.1	0.774		Valid
	X3.2	0.766		Valid
	X3.3	0.751		Valid
	X3.4	0.736		Valid
	X3.5	0.653		Valid
	X3.6	0.820		Valid
Work Productivity (Y)	Y.1	0.703		Valid
	Y.2	0.779		Valid
	Y.3	0.715		Valid
	Y.4	0.689		Valid
	Y.5	0.707		Valid
	Y.6	0.796		Valid

Source: SPSS 26 Data Processing Results

Table 4. Reliability Test Results

Variable	Cronbach's Alpha Coefficient	Note
Workload	0.644	Reliable
Work Motivation	0.759	Reliable
Work Environment	0.844	Reliable
Work Productivity	0.827	Reliable

Source: SPSS 26 Data Processing Results

Heteroscedasticity Test

Based on Figure 2 above, the standardized predicted values and standardized residuals are randomly distributed above and below the zero line and do not form a clear pattern such as a funnel or systematic curve. The distribution of residuals appears to be relatively constant across the entire range of predicted values. Therefore, it can be concluded that there is no indication of heteroscedasticity, and the regression model satisfies the assumption of homoscedasticity (see Figure 3).

Multiple Linear Regression Analysis

Based on Table 6, regression analysis shows that workload has a positive and significant effect on employee productivity, β = 0.547, 95% CI (0.409, 0.686). Similarly, work motivation significantly affects employee productivity, β = 0.257, 95% CI (0.144, 0.370). However, the work environment does not significantly affect employee productivity because the confidence interval includes zero β = 0.092, 95% CI (-0.004, 0.187).

t-Test (partial)

Based on Table 7, the t-test results show that:

1. The Effect of Workload (X1) on Work Productivity (Y) Based on the t-test results, a t-value of 7.783 was obtained with a significance level of 0.000. Since the significance value is < 0.05, the first hypothesis (H1) is accepted. This finding shows that Workload has a positive and significant effect on the work productivity of Generation Z employees. This finding indicates that providing an optimal and challenging workload for Generation Z actually encourages an increase in their work output, as long as the workload is still within their professional capacity.
2. The Effect of Work Motivation (X2) on Work Productivity (Y) The Work Motivation variable produced a t-value of 4.480 with a significance of 0.000. Because the significance value is < 0.05, the second hypothesis (H2) is accepted. Empirically, work motivation has a significant positive effect on work productivity. This finding confirms that the internal and external drives felt by employees are the main catalysts in achieving organizational targets in the manufacturing industry.
3. The Effect of Work Environment (X3) on Work Productivity (Y)

The test results for the Work Environment variable show a t-value of 1.884 with a significance level of 0.061. Given that the significance value is > 0.05, the third hypothesis (H3) is rejected. The insignificance of the Work Environment variable (X3) can be explained by the fact that for Generation Z employees in the Cikarang manufacturing sector, physical factors in the work environment (such as temperature or layout) are considered standard facilities (hygiene factors) that must be present, but are not the main drivers (motivators) that directly increase their work productivity compared to challenging workloads or personal motivation.

F Test (simultaneous)

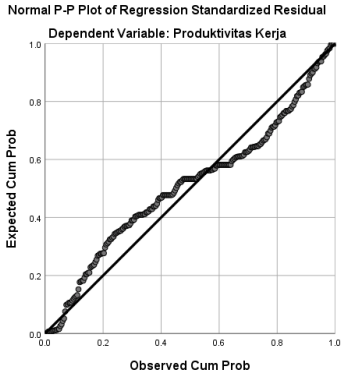

Figure 2. Normal P-P Plot of Regression Standardized

Table 5. Multicollinearity Test Results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	VIF
	B	Std. Error	Beta			Tolerance	
(Constant)	4.081	1.250		3.263	0.001		
Workload	0.547	0.070	0.433	7.783	0.000	0,621	1,609
Work Motivation	0.257	0.057	0.304	4.480	0.000	0,418	2,391
Work Environment	0.092	0.049	0.114	1.884	0.061	0,528	1,895

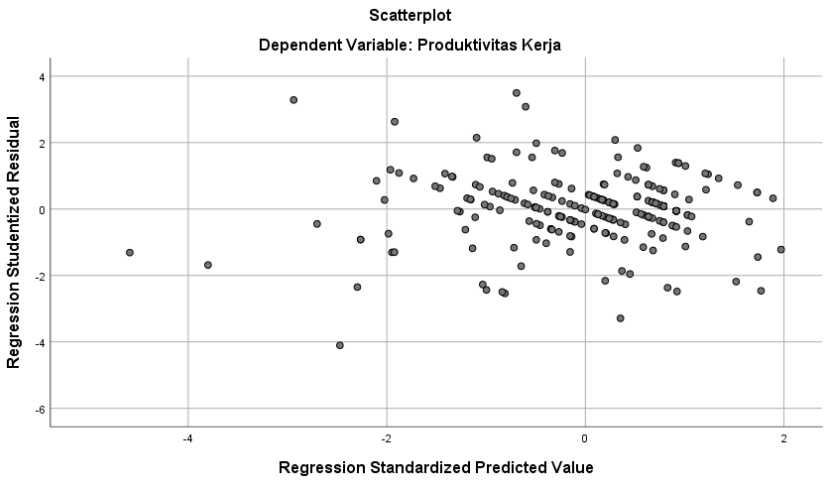

Figure 3. Scatterplot of Heteroscedasticity Test Results

Table 6. Multiple Linear Regression Test

Variable Independent	Regression Coefficient (β)	95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
Constant	4.081	1.617	6.544
Beban Kerja	0.547	0.409	0.686
Motivasi Kerja	0.257	0.144	0.370
Lingkungan Kerja	0.092	-0.004	0.187

Source: SPSS 26 Data Processing Results

Table 7. t-Test Results

Variable	t-Value	P-Value	Significance Level	Description
Workload	7.783	0.000	0.05	Influential
Work Motivation	4.480	0.000	0.05	Influential
Work Environment	1.884	0.061	0.05	Not Influential

Source: SPSS 26 Data Processing Results

Table 8. Results of the F Test

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	1235.161	3	411.720	94.750	.000[b]
Residual	1025.501	236	4.345		
Total	2260.663	230			
a. Dependent Variable: Produktivitas Kerja					
b. Predictors: (Constant), Lingkungan Kerja, Beban kerja, Motivasi Kerja					

Source: SPSS 26 Data Processing Results

Table 9. Results of the Coefficient of Determination Test

Model	R	R Square	Adjusted R-Square	Std. Error of the Estimate
1	0.739[a]	0.546	0.541	2.085

Source: SPSS 26 Data Processing Results

Based on Table 8, it can be concluded that the F test produced a calculated F value of 94.750 with a significance level of 0.000 <0.05. This finding proves that simultaneously, Workload, Work Motivation, and Work Environment have a significant effect on the Work Productivity of Generation Z employees in the Cikarang manufacturing industry.

Coefficient of Determination (R^2)

Based on the results of data analysis in Table 9, an Adjusted R Square value of 0.541 was obtained. This finding shows that the simultaneous contribution of the variables Workload (X1), Work Motivation (X2), and Work Environment (X3) to Work Productivity (Y) is 54.1%. This finding indicates that the research model has a fairly strong level of explanation in explaining the influence of independent variables on dependent variables, where the remaining 45.9% variation is influenced by other factors not included in this study.

Analysis of the Effect of Workload on Work Productivity

The results show that workload plays a significant role in increasing the work productivity of Generation Z employees in the Cikarang manufacturing industry when managed proportionally. This finding indicates that workload is not always perceived as pressure, but can function as a challenge demand, which is a challenging work requirement that encourages engagement and work efficiency. Within the Job Demands–Resources (JD- R) Model framework, workload can function as a challenge demand that encourages work engagement and efficiency when accompanied by adequate resources and support (Li et al., 2025). These results align with Worotikan et al. (2023), who found that an optimal workload can increase productivity in the manufacturing sector. Thus, these findings clarify that the issue of Generation Z employees' work productivity in the manufacturing sector is more related to workload design that is less adaptive to Generation Z characteristics, rather than solely the intensity of work.

Analysis of the Influence of Work Motivation on Work Productivity

Work motivation has been proven to have a positive and significant effect on the work productivity of Generation Z employees, indicating that psychological encouragement plays a central role in maintaining consistent performance in a target-oriented manufacturing environment. These findings show that psychological encouragement acts as the main motivator that maintains consistent performance, especially in the context of routine and target-oriented work. In line with Herzberg's Two-Factor Theory, motivation functions as a motivating factor that directly increases productivity through achievement, recognition, and career development opportunities (Alrawahi et al., 2020). For Generation Z, motivation does not only come from financial compensation, but also from a sense of meaning in their work and opportunities for growth within the organization (Sunaryanto & Idrus, 2025). The results of this study reinforce the findings of Zaman & Zulganef (2023) and Malt & Nasution (2025) , while also indicating that the low work productivity of Generation Z in the manufacturing sector may reflect an organizational motivation system that is not yet fully aligned with the expectations and characteristics of the younger generation.

Analysis of the Influence of the Work Environment on Work Productivity

Partial test results for the third hypothesis (H3) indicate that the work environment does not have a statistically significant effect on productivity (β= 0.092, ρ= 0.061). From a theoretical perspective, this finding is broadly consistent with Herzberg's Two-Factor Theory, which positions the physical environment as a hygiene factor or preventive factor. Alrawahi et al. (2020) argue that hygiene factors serve to prevent dissatisfaction, but do not automatically act as the primary driver of productivity once these basic needs are met. In the context of Cikarang manufacturing, physical facilities are likely considered a minimum standard (baseline condition), so fluctuations in productivity are more influenced by workload and motivation factors than by environmental facilities alone. These results differ from those of Yandi (2022) and Malt & Nasution (2025), who found a positive effect of the work environment on productivity, particularly in service sector contexts. Nevertheless, this interpretation should be approached with caution, as the study does not directly measure the underlying mechanisms of the work environment as a hygiene factor. The non-significant result may also be influenced by other factors, such as limited variability in respondents' perceptions, the scope of measurement used in this study, or the exclusion of relevant variables such as leadership style, organizational support, or compensation systems. Therefore, the findings should be interpreted as context-specific and not generalized without further empirical validation.

Simultaneous Analysis of Workload, Work Motivation, and Work Environment

Simultaneously, the three independent variables contribute 54.1% to work productivity (F = 94.750, p = 0.000). This finding demonstrates a significant relationship between the predictors and employee productivity within the proposed model. Within the conceptual framework, this result aligns with Social Exchange Theory (SET) as proposed by Ahmad et al. (2023), suggesting that a fair reciprocal relationship between the organization and its employees potentially fosters positive behavioral responses. Although the work environment did not show a significant partial effect, its presence remains a relevant organizational context that may support work processes. However, the specific role of the work environment in facilitating or interacting with job demands (challenge demands) and motivation was not explicitly tested through interaction or mediation analysis in this study. Consequently, any interpretation regarding such a facilitative function should be understood as a cautious theoretical possibility rather than an empirically established mechanism. Future research is encouraged to specifically investigate these interactive roles through moderation or mediation approaches to provide more robust evidence.

This study has several limitations that need to be considered for future studies. First, this study is cross-sectional in design, so the relationship between variables is associative and cannot be concluded as an absolute cause-and-effect (causality) relationship. Second, the use of purposive sampling techniques on manufacturing employees in a specific area (Cikarang) limits the generalization of these findings to different industrial sectors or geographic demographics. Third, data were collected through self-report questionnaires, which carry the risk of common method bias. However, alternative explanations need to be considered. Insignificant findings may also be due to the operationalization of the work environment construct, which may not fully capture psychosocial or leadership-related aspects of the environment. Furthermore, given that this model explains 54.1% of productivity variance, approximately 45.9% remains unexplained. Other potential predictors, such as leadership style, compensation systems, work stress, fatigue, or organizational support, may contribute to productivity outcomes and warrant further investigation in future research.

Conclusion

This study concludes that the work productivity of Generation Z employees in the Cikarang manufacturing industry is significantly associated with proportional workload management and the strengthening of work motivation systems. The work environment, however, was found to have no direct statistical link with productivity in this specific sample, suggesting that it functions as a supporting condition (baseline) rather than a primary determinant.

These findings imply that productivity enhancement strategies should prioritize job enrichment and the fulfillment of the psychological needs of the younger workforce. Due to the limitations of the cross-sectional design and the purposive sampling method employed, the relationships identified in this study should be interpreted as statistical associations within a specific context, rather than definitive causal relationships. Future research is encouraged to utilize longitudinal or experimental designs to provide more robust evidence of causality.

Author contributions

Sofia Kelani served as the lead author responsible for conceptualizing the research, collecting field data, performing statistical analysis using SPSS, interpreting results, and drafting the initial manuscript. Agung Surya Dwianto acted as the co-supervisor who provided methodological guidance, conducted a critical review of the theoretical substance, and performed revisions and final editing of the manuscript to ensure academic quality.

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Conflict of interest

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