Sustainability Leadership and Employee Engagement: A Key Driver of Productivity in Indonesian Companies

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ABSTRACT: The background of this research is the challenge faced by Indonesia's economic development in achieving sustainable growth without increasing carbon emissions. This study aims to analyze the influence of leadership and the implementation of sustainability principles on productivity, with employee engagement as a mediator in public and private companies in Indonesia.

The research adopts a quantitative approach, utilizing data analysis through the Structural Equation Modelling Partial Least Square (SEM PLS) method. The study sample comprises 110 respondents from public and 110 respondents from private companies, with data collected through questionnaire surveys with G*Power 88%. Research variables include sustainability leadership, implementation of sustainability principles, employee engagement, and productivity.

The findings reveal that employee engagement significantly influences employee productivity and mediates the effect of sustainability leadership on employee productivity. These findings highlight the critical role of sustainability-based leadership in fostering employee engagement and enhancing productivity.

The study concludes that Indonesian companies, particularly those oriented toward sustainability, need to prioritize the development of sustainability-based leadership and policies to enhance employee engagement, thereby supporting long-term productivity.

KEYWORDS: G*Power, Human Resource Management, Leadership, SEM PLS, Sustainability.

INTRODUCTION

Indonesia's economic growth faces a crucial challenge: achieving sustainability without exacerbating carbon emissions, which could jeopardize future generations. In alignment with the Brundtland Commission's principles, sustainable development must balance present needs with the long-term availability of resources. Achieving this goal requires active collaboration among public (Tbk) and private enterprises to integrate sustainable business practices into their operations.

The need for sustainable development is reflected in the advancing Earth Overshoot Day (Global Footprint Network, 2023), indicating that human consumption of natural resources is surpassing the planet's ability to regenerate. In 2023, the global date fell on July 27, while Indonesia's was December 3, projected to shift further to November 24 in 2024. These shifts highlight that Indonesia's resource consumption patterns remain unsustainable, signaling the urgent need for significant changes in both production and consumption behaviors.

Indonesia has committed to achieving Net Zero Emissions (NZE) by 2060 or earlier, in line with national climate mitigation efforts. Through its Nationally Determined Contribution (NDC) and Long-Term Strategy for Low Carbon Development 2050, Indonesia emphasizes the transition to clean energy and emission reductions across key sectors, including forestry, land use, and energy.

The participation of the private sector is pivotal in accelerating sustainability initiatives. According to Ayuningsih et al., (2023), private companies play a critical role in climate change mitigation, particularly in funding and investing in clean energy projects. At COP26, private sector commitments exceeded $20 billion, with a focus on expanding renewable energy access for one billion people by 2030 and reducing four billion tons of CO_2 emissions. Collaboration between the government, private sector, and civil society is essential in strengthening clean energy adoption, implementing green technologies, and significantly cutting carbon emissions.

Given the 900 publicly listed companies (IDX Data Services Division, 2023) and 32,193 medium and large-scale manufacturing firms (Badan Pusat Statistik Indonesia, 2023), the corporate sector's contribution to low-carbon and environmentally friendly practices is substantial. However, the primary challenge remains in how companies can implement sustainable policies such as Environmental, Social, and Governance (ESG) principles without compromising profitability.

Strategic ESG implementation can enhance a company's operational efficiency, reputation, and long-term profitability, though short-term financial gains may not always be immediately evident. Nugroho & Hersugondo Hersugondo, (2022) found that ESG disclosure positively impacts Return on Assets (ROA), indicating improved operational performance. However, the implementation of Corporate Social Responsibility (CSR) requires careful management, as excessive CSR spending can negatively impact financial performance.

Wahdan Arum Inawati & Rahmawati, (2023) also found that ESG factors improve financial performance, particularly through environmental efficiencies, social trust-building, and governance improvements that drive transparency and accountability. Furthermore, Leony et al., (2024) discovered that the social aspect of ESG significantly enhances profitability in the food and beverage sector, particularly through community engagement, employee well-being, and stakeholder collaboration.

However, not all studies confirm a positive impact of ESG on financial performance. Tirta Wangi & Aziz, (2024) found that short-term ESG disclosure lacks impact, while profitability remains a strong determinant of company value. These findings suggest that ESG benefits are often realized in the long run, requiring consistent and comprehensive integration into business operations.

Despite its potential, ESG implementation in Indonesia remains inconsistent, with some studies indicating insignificant or even negative impacts on financial performance. Ningwati et al., (2022) found that ESG disclosure does not significantly impact Return on Equity (ROE) and, in some cases, can even negatively influence market perception. Kartika et al., (2023) noted that ESG disclosure does not significantly affect company value (Tobin's Q), indicating that ESG efforts in Indonesia are still in the early stages of adoption. Aulia Fadilah & Yuni Rosdiana, (2024) discovered that ESG implementation in the mining sector lacks significant financial benefits, suggesting the need for a more targeted and strategic approach.

Additionally, several studies highlight ESG's potential drawbacks. Ningwati et al., (2022) found that ESG disclosures, when done merely to comply with regulations, can negatively affect company value. Nareswari et al., (2023) observed that higher ESG scores can reduce ROA and ROE, emphasizing the financial risks of poorly executed sustainability strategies. Eston et al., (2023) reported that ESG negatively impacts bank profitability, underscoring the importance of aligning sustainability initiatives with financial objectives. Jeanice & Kim, (2023) found that ESG implementation in Indonesia remains low, limiting its potential benefits and, in some cases, creating financial burdens.

These findings highlight the need for strategic, well-integrated ESG implementation. Without careful planning and execution, ESG practices risk undermining profitability and failing to meet sustainability objectives.

Beyond corporate performance, employees play a crucial role in sustainability adoption. The Deloitte Global Survey (Parmelee, 2022) found that Gen Z and Millennials prioritize corporate sustainability when choosing employers. 89% of Gen Z and 90% of Millennials strive to reduce their environmental impact and expect companies to align with these values. Yet, only a small percentage believe their employers are genuinely committed to sustainability. Sustainability influences employee retention, with 40% of Gen Z and 25% of Millennials planning to leave jobs within two years if their companies lack sustainability commitments.

Sustainability-driven leadership and employee engagement are critical in retaining younger workers. Employees seek direct involvement in workplace environmental initiatives, requiring leaders to foster an inclusive culture, provide sustainability education, and enable participation in green projects.

Candra & Sundiman, (2020) identified four key elements of sustainability leadership: Harmony Leadership, Ethical Leadership, Personal Value Leadership, Care Leadership. These elements should be embedded in corporate strategies to support sustainable HR management. Similarly, Afsar et al., (2016) found that sustainability leadership fosters employee engagement by creating an inspiring vision and integrating sustainability into corporate culture.

This study underscores the need for Indonesian companies—both public and private—to actively reduce carbon emissions, improve energy efficiency, and implement effective ESG policies. In this context, sustainability leadership is a key driver, not only in enhancing employee engagement and productivity but also in driving sustainability initiatives within organizations.

The research investigates the influence of leadership and sustainability principles on employee productivity, with employee engagement as a mediator. It aims to determine how effective leadership fosters engagement, driving productivity, while also exploring employee engagement's role in sustaining long-term business performance.

RESEARCH METHOD

This study utilizes a quantitative approach to examine the impact of sustainability leadership and the implementation of sustainability principles on employee productivity, with employee engagement acting as a mediating variable. The research focuses on public and private companies in Indonesia, employing a causal research design with a survey approach to collect data.

The data were gathered through a structured questionnaire using a five-point Likert scale. The questionnaire included key indicators such as sustainability leadership, assessed through vision and long-term orientation, and implementation of sustainability principles, covering environmental, social, and governance (ESG) policies. Additionally, employee engagement was measured based on emotional commitment and dedication, while employee productivity was evaluated through efficiency and achievement of work targets.

The study population comprises leaders and employees from public and private companies in Indonesia. A purposive sampling technique was used to select participants from various professional backgrounds, including Human Resources, Project Management, Directors, Accountants, IT, ESG, and Sustainability. Respondents were required to work in limited liability companies (PT), both public and private, with at least 100 employees. The selection process considered age, job level, geographical location, business sector, experience, and gender, ensuring a diverse and comprehensive representation of sustainability practices in the workplace.

For data analysis, the study applied Structural Equation Modelling – Partial Least Squares (SEM-PLS) using SmartPLS 4.1.0.9. This method was chosen for its ability to analyze complex causal relationships between multiple variables and indicators. The analysis was conducted in three key stages. First, validity and reliability testing, utilizing Average Variance Extracted (AVE) and Composite Reliability (CR) to ensure the instrument's validity and consistency. Secondly, structural model testing, performed through bootstrapping to identify relationships between latent variables and assess the significance of effects. And finally, mediation analysis, examining how employee engagement mediates the relationship between sustainability leadership and employee productivity.

The model framework, as illustrated in Figure 1, positions Sustainability Leadership (X1) and Implementation of Sustainability Principles (X2) as exogenous variables, while Employee Productivity (Y2) serves as the endogenous variable. Employee Engagement (Y1) acts as both an exogenous and endogenous variable, bridging the relationship between leadership, sustainability practices, and workforce productivity.
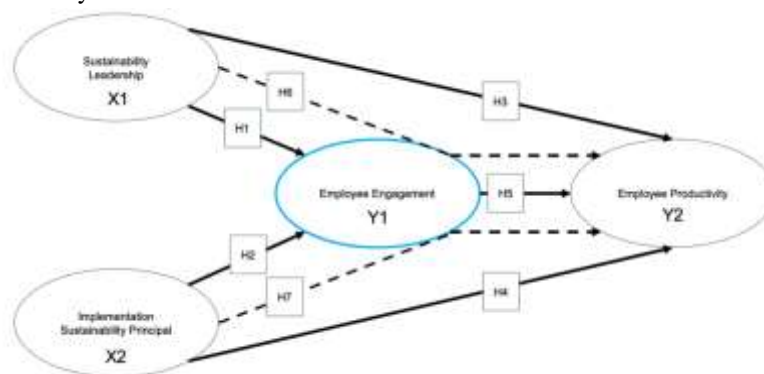

Figure 1. SEM PLS Model

The variables H1 to H7 are outlined in Table 1 below, providing information on which variables are exogenous and endogenous, as well as the relationships between them.

Table 1. Hypothesis Research

Variable	Exogen	Relation	Endogen
H1	Sustainability Leadership	Direct Influence	Employee Engagement
H2	Implementation Sustainability Principal	Direct Influence	Employee Engagement
H3	Sustainability Leadership	Direct Influence	Employee Productivity
H4	Implementation Sustainability Principal	Direct Influence	Employee Productivity

H5	Employee Engagement	Direct Influence	Employee Productivity
H6	Sustainability Leadership	Mediated by Employee Engagement	Employee Productivity
H7	Implementation Sustainability Principal	Mediated by Employee Engagement	Employee Productivity

The variable of sustainability leadership is established as the first construct within the exogenous latent variables or variable (X1), coded with the indicator (SUS) in the structural equation model representation. Sustainability leadership refers to a leadership style that not only prioritizes profitability but also balances economic objectives, social responsibility, and environmental protection. Leaders adopting this approach aim to promote environmentally friendly practices and good corporate governance to ensure social welfare and long-term sustainability. Based on the literature adapted from the works of Di Fabio & Peiró, 2018); Mazutis & Abolina, (2019), the indicators of sustainability leadership encompass the following five key dimensions:

a. **Commitment to Sustainability**
   o Leaders demonstrate a strong commitment to designing sustainability and environmentally friendly policies (SUS1).
   o Leaders actively encourage practices that reduce environmental impact in the company's operations (SUS2).

b. **Effective Resource Management**
   o Leaders strive to optimize efficiency in the management of company resources (SUS3).
   o Leaders support the use of more environmentally friendly resources (SUS4).

c. **Long-Term Vision**
   o Leaders develop a strategic vision oriented toward long-term sustainability (SUS5).
   o Leaders set specific, clear, and measurable sustainability goals (SUS6).

d. **Building a Sustainable Culture**
   o Leaders foster a culture of sustainability in the workplace by involving all employees (SUS7).
   o Leaders encourage active participation of employees in the company's environmental initiatives (SUS8).

e. **Stakeholder Engagement**
   o Leaders collaborate with external stakeholders to achieve the company's sustainability goals (SUS9).

Additionally, this study also incorporates control indicators to ensure the consistency of respondents' answers. A statement opposing the SUS7 indicator is used, such as: "Leaders in my company fail to establish a culture of sustainability in the workplace that involves all employees, leading to participation gaps and diminishing the sense of belonging among team members (SUS10)." This statement allows for an evaluation of the respondents' consistency in answering the questionnaire.

The variable of companies implementing sustainability principles is identified as the second construct within the exogenous latent variables (X2) and is coded with the indicator SUSPR in the structural equation model. Sustainability principles at the corporate level refer to the implementation of policies that are not only economically profit-oriented but also address social and environmental responsibilities. Companies adopting these principles aim to ensure their business operations align with global sustainability goals, such as reducing carbon footprints, enhancing social responsibility, and adhering to environmental governance standards. The indicators for assessing the implementation of sustainability principles by companies were developed based on the literature by Madero-Gómez et al., (2023) and various related regulations. These indicators include:

a. **Commitment to ESG Policies**
   o The company integrates Environmental, Social, and Governance (ESG) policies as part of its business strategy (SUSPR1).
   o The company establishes a sustainability vision as part of its strategic business objectives (SUSPR2).

b. **Environmental Responsibility**
   o The company implements environmentally friendly initiatives, such as efforts to reduce carbon emissions (SUSPR3).

o The company promotes energy efficiency and waste management to support environmental preservation (SUSPR4).

c. **Social Responsibility**
   o The company contributes to community welfare through corporate social responsibility (CSR) activities (SUSPR5).
   o The company places special emphasis on the well-being of employees and local communities (SUSPR6).

d. **Transparency and Good Governance**
   o The company ensures transparency in sustainability-related reporting (SUSPR7).
   o The company adheres to international standards for sustainable governance, such as ISO 9001, ISO 14000, ISO 26000, POJK 51, and B-Corp certification (SUSPR8).

e. **Employee Involvement in Sustainability**
   o The company encourages employees to actively participate in various sustainability initiatives (SUSPR9).

The variable of employee engagement is identified as the first construct within the endogenous latent variables (Y1) and is coded with the indicator ENG in the structural equation model. Employee engagement refers to the high emotional and psychological involvement of employees in their work, positively influencing their motivation, productivity, and dedication to the organization. Employees with strong job engagement are likely to make significant contributions to achieving organizational goals. The measurement of employee engagement is adapted from the model developed by Schaufeli et al., (2006) and includes the following three main dimensions:

a. **Vigor**
   o Employees exhibit high energy levels while working (ENG1).
   o Employees remain enthusiastic even when facing various work challenges (ENG2).

b. **Dedication**
   o Employees feel proud of the work they do (ENG3).
   o Employees are deeply involved in completing tasks they consider important (ENG4).

c. **Concentration and Absorption**
   o Employees can fully focus on their work without being easily distracted by external factors (ENG5).
   o Employees become so engrossed in their work that it is difficult to shift to other activities (ENG6).

Finally, the variable of employee productivity is measured using endogenous latent indicators developed based on the research by Almaamari & Alaswad, (2021). These indicators encompass various aspects of employee performance, including:

a. **Input-Output Ratio**
   o Employees produce significant output relative to the input utilized (PROD1).

b. **Key Performance Indicators (KPI)**
   o Timely completion of tasks (PROD2).
   o Proportion of tasks successfully completed according to targets (PROD3).

c. **Quality of Work Evaluation**
   o Employees demonstrate a high level of work quality (PROD4).
   o Employees' work includes sustainability-oriented solutions (PROD5).

d. **Time Utilization Rate**
   o Employees efficiently utilize their working hours (PROD6).

e. **Engagement and Innovation Assessment**
   o Employees contribute to creating sustainable innovations in the workplace (PROD7).
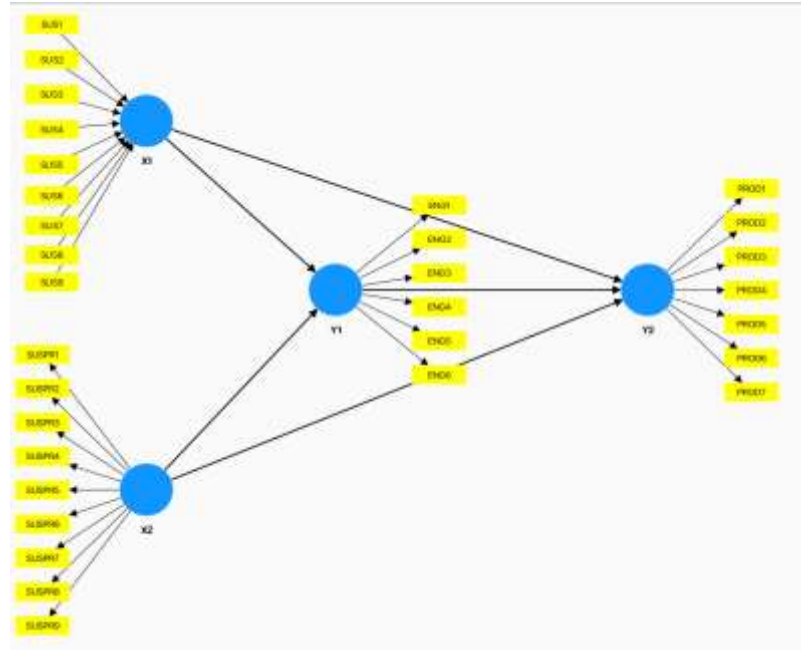
Figure 2. SEM PLS Model on Smart PLS Software

The G*Power application was used to determine the minimum required number of respondents and was downloaded for free from the University of Düsseldorf's[1] website. The 10-times rule requires fewer respondents for SEM-PLS but lacks statistical power, significance level (α), and effect size considerations.

In G*Power, with a power of 88% (0.88), a significance level (α) of 5%, and a medium effect size of 0.15, with five predictors being the maximum for a single variable, the required sample size is 110 respondents. If the power is increased to 95%, the required sample size rises to 116 respondents.

With a minimum power of 80%, 92 respondents are required. This number already exceeds the requirement of the 10-times rule. To reach 116 respondents, more time would be needed, and additional costs for crowdsourcing are likely, as respondents are often bounty hunters who participate in surveys in exchange for a reward. Once the completed questionnaires were reviewed for accuracy, the data was input into the SEM-PLS software, Smart PLS version 4.1.0.9, using the model illustrated in Figure 2 below.

Online and offline outreach were conducted prior to the research targeting the respondent community, to avoid biased understanding of sustainability. These sessions were offered for both paid and free events. The participants came from diverse professional backgrounds (e.g., HR, IT, Project Manager, Technical, Communication, Legal, and others), age groups, and genders, as well as varying locations and job positions (e.g., students, staff, supervisors, managers, and executives or C-level).

The Google Form settings were configured to allow a single response per user, and submissions could not be edited or modified after being submitted, in order to ensure that each respondent could only complete the survey once. The author also opted not to collect email addresses automatically to ensure respondents felt comfortable providing honest answers. However, respondents could voluntarily provide their email addresses if they wished.

RESULT AND DISCUSSION

On Wednesday, January 15, 2025, at 11:00 PM WIB, the questionnaire data collected through Google Forms was transferred to an Excel file to facilitate analysis. A total of 506 respondents started the survey, comprising 309 respondents (61%) from private companies and 197 respondents (39%) from public companies. Achieving a respondent composition of 50% from public companies and 50% from private companies is challenging. Therefore, having a composition of 39% from public companies is considered satisfactory.

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[1] https://www.psychologie.hhu.de/arbeitsgruppen/allgemeine-psychologie-und-arbeitspsychologie/gpower

The respondents were predominantly male, accounting for 369 respondents (73%), and most were aged between 27-46 years, totalling 268 respondents (53%). Meanwhile, respondents under the age of 27 and over the age of 58 accounted for 35 respondents (7%) and 27 respondents (6%), respectively.

In terms of job positions, the responses were well-distributed across all levels, ranging from interns, staff, supervisors/unit heads, managers/department heads, general managers/division heads, vice presidents/group heads, advisors, directors/CxOs, and even commissioners. The largest proportion consisted of respondents in mid-level positions, such as managers/department heads (124 respondents, 24,5%), supervisors/unit heads (88 respondents, 17,4%), and staff (52 respondents, 11,5%). Additionally, high-level positions accounted for 191 respondents (42,9%), including directors/CxOs (98 respondents), vice presidents/group heads (41 respondents), general managers/division heads (59 respondents), and commissioners (18 respondents).

Geographically, although respondents were from regions spanning North Sumatra to Papua, DKI Jakarta emerged as the primary location for the majority of respondents, with 366 respondents (72,3%). Whereas 21 other provinces, such as West Java, Banten, and parts of Sumatra, Kalimantan, and Sulawesi, contributed fewer respondents.

In terms of business sectors based on the Indonesian Standard Industrial Classification (KBLI), the three main sectors were Information and Communication (97 respondents, 19,2%), followed by Financial and Insurance Activities (65 respondents, 12,8%), and Mining and Quarrying (44 respondents, 8,7%). Other sectors, such as Education, Real Estate, Construction, and 15 other industries, showed smaller numbers.

The respondents were excluded, with rules as follows:

a. Respondents who did not check either of the statements "I am willing to participate as a research respondent without any coercion" or "I will provide answers based on the actual conditions."
b. Respondents whose businesses were in the form of cooperatives (*koperasi*), limited partnerships (*CV*), or sole proprietorship limited companies (*PT Perorangan*).
c. Respondents whose businesses employed fewer than 100 employees.
d. Respondents who provided likert scale scores above 3 for both SUS7 and SUS10, or below 3 for both SUS7 and SUS10.
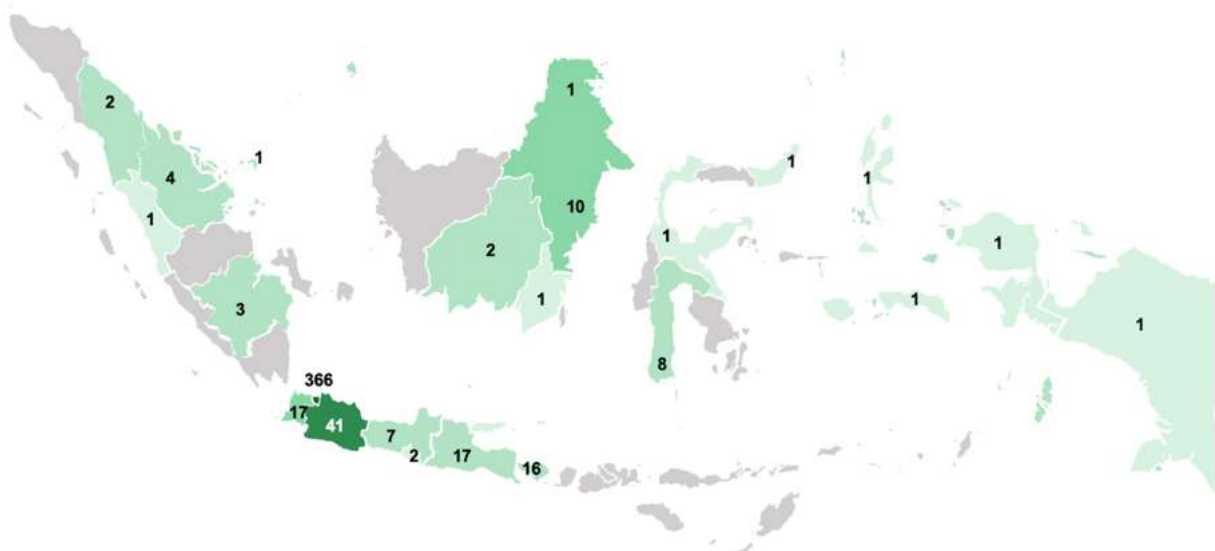
Figure 3. 506 Respondents area

As a result, the final sample consisted of 110 respondents from public companies and 139 respondents from private companies. The smallest sample size was selected, to ensure balanced comparative data, comprising 110 respondents from public companies. For the private company sample, the author chose the first 110 respondents out of the total 139, ensuring the same job position composition as the public company sample.

Table 2. Data clean up process

| Stages	Respondence	a. Responden Statement	b. Company type	c. Number of employee	d. Survey check
Activities	Number of respondence	Excluded if Respondents who did not check either of the statements "I am willing to participate as a research respondent without any coercion" or "I will provide answers based on the actual conditions."	Excluded if Respondents whose businesses were in the form of cooperatives (*koperasi*), limited partnerships (*CV*), or sole proprietorship limited companies (*PT Perorangan*).	Excluded if Respondents whose businesses employed fewer than 100 employees.	Excluded if Respondents who provided likert scale scores above 3 for both SUS7 and SUS10, or below 3 for both SUS7 and SUS10
Public	197	149	146	133	110
Private	309	259	231	163	139
Total	506	408	377	296	249

One of the challenges in selecting respondents from private companies with job profiles equivalent to those from public companies was the potential discrepancy in numbers. To address this, the author used an equivalence approach, for example, considering an advisor equivalent to a vice president and staff equivalent to a supervisor. The author also categorized positions (Indeed Editorial Team, 2024) as follows: Top Management, consisting of commissioners, directors/CxOs, advisors, and vice presidents. Middle Management, including general managers and managers. And Entry Level, comprising supervisors and staff.

The resulting composition was 25,5% Top Management (28 respondents), 40% Middle Management (44 respondents), and 34,5% Entry Level (38 respondents), each for both public and private companies.

PUBLIC COMPANY

After cleaning the data by removing respondents based on the previously defined criteria, the final sample consisted of 110 respondents from public companies. These included 78 male respondents (71%) and 32 female respondents (29%). The majority of respondents were aged between 27–46 years, totalling 65 (59%), followed by those aged 47–58 years, totalling 36 (33%).

In terms of job positions, the largest group was managers/department heads, with 34 respondents (31%), followed by supervisors/unit heads and staff, each with 19 respondents (17,3%). Higher-level positions included directors/CxOs with 14 respondents (12,7%) and vice presidents/group heads with 12 respondents (10,9%). This profile demonstrates a representative sample across various demographics, such as gender, age, position, industry sector, company size, and geographic location.

From an industry sector perspective, Financial and Insurance Activities dominated with 24 respondents (21,8%), followed by Information and Communication with 22 respondents (20%). The remaining 14 sectors each contributed between 1% and 8%.

Most respondents worked in companies with over 1.000 employees, totalling 64 respondents (58,1%), followed by companies with 100–500 employees, totalling 26 respondents (23,6%).

Geographically, DKI Jakarta emerged as the primary distribution centre for respondents, contributing the largest proportion at 77,2% (85 respondents). Respondents from South Sumatra, Central and East Kalimantan, Maluku, and other regions contributed only 1% to 3,6%. The dominance of DKI Jakarta underscores its role as the economic and business hub for public companies in Indonesia.

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Figure 4. 110 Respondents from Public Company

In Run 1, Iteration 1, the indicators ENG5 ("Employees can fully focus on their work without being distracted by other factors"), ENG6 ("Employees become so engrossed in their work that it is difficult to disengage"), and SUS3 ("Leaders strive to improve efficiency in managing company resources") were eliminated due to outer loading values below 0,7. Consequently, Run 1, Iteration 2, was conducted, excluding ENG5, ENG6, and SUS3.

The R-Square value met the criteria for a moderate level, indicating the proportion of variation in the dependent (endogenous) variable that can be explained by the influencing (exogenous) variables. The R-Square for Y2 showed that 45,4% of the variance in Productivity (Y2) could be explained by the exogenous constructs (X1, X2) and the mediator (Y1). The remaining 54,6% of the variance was attributed to factors not included in the model.

Table 3. R-square variable, after run 1, iteration 2, Public Company

No	Variabel	Tipe	R-Square	Citeria
1	X1 (SUS) / Sustainability Leadership	Exogen	-	
2	X2 (SUSPR) / Implementation Sustainability Principal	Exogen	-	
3	Y1 (ENG) / Employee Engagement	Endogen	0,296	Moderate
4	Y2 (PROD) / Employee Productivity	Endogen	0,454	Moderate

Table 4. Run1, Iteration 1 and 2, Public Company

	Outer loadings Run 1, Iteration 1	Outer loadings Run 1, Iteration 2		Outer loadings Run 1, Iteration 1	Outer loadings Run 1, Iteration 2
ENG1 <- Y1	0,858	0,910	**SUS4 <- X1**	0,858	0,847
ENG2 <- Y1	0,858	0,910	**SUS5 <- X1**	0,848	0,840
ENG3 <- Y1	0,865	0,900	**SUS6 <- X1**	0,861	0,861
ENG4 <- Y1	0,831	0,841	**SUS7 <- X1**	0,835	0,845
ENG5 <- Y1	0,694	-	**SUS8 <- X1**	0,786	0,799
ENG6 <- Y1	0,633	-	**SUS9 <- X1**	0,783	0,796
PROD1 <- Y2	0,802	0,803	**SUSPR1 <- X2**	0,823	0,821
PROD2 <- Y2	0,801	0,794	**SUSPR2 <- X2**	0,829	0,827
PROD3 <- Y2	0,865	0,862	**SUSPR3 <- X2**	0,815	0,814
PROD4 <- Y2	0,803	0,804	**SUSPR4 <- X2**	0,790	0,793
PROD5 <- Y2	0,855	0,860	**SUSPR5 <- X2**	0,844	0,847
PROD6 <- Y2	0,793	0,789	**SUSPR6 <- X2**	0,819	0,820

PROD7 <- Y2	0,799	0,805	SUSPR7 <- X2	0,827	0,829
SUS2 <- X1	0,837	0,835	SUSPR8 <- X2	0,815	0,815
SUS3 <- X1	0,695	-	SUSPR9 <- X2	0,859	0,858
			SUS1 <- X1	0,837	0,845

Considering the potential impact on research time and respondent numbers, and given the ensured data quality, the author decided to proceed with evaluating the f-square values. The f² metric is used to assess the relative contribution effect of a latent construct on the dependent variable, accounting for the contribution of other latent constructs in the model.

Table 5. f² evaluation criteria

No	Value	Effect
1	$f^2 < 0,02$	Very small effect (not significant)
2	$0,02 \leq f^2 < 0,15$	Small effect
3	$0,15 \leq f^2 < 0,35$	Medium effect
4	$f^2 \geq 0,35$	Large effect

The f² results indicate that Employee Engagement (Y1) is a key variable in improving Productivity (Y2) in public companies. Sustainability Leadership (X1) has a small contribution to Employee Engagement but may influence Productivity indirectly through Employee Engagement (Y1). Meanwhile, the application of Sustainability Principles (X2) has a very small contribution, warranting further evaluation. Subsequently, reliability and validity checks were conducted.

As on table 6 below, both Cronbach's Alpha (CA) and Composite Reliability (CR) values exceeded 0,7 and in many cases, were greater than 0,9 indicating excellent reliability and internal consistency of the constructs. Whereas Average Variance Extracted (AVE) values greater than 0,5 demonstrated good convergent validity, indicating that the variance of the indicators was well explained by their respective constructs. As on table 7, Heterotrait-Monotrait Ratio (HTMT) values met the discriminant validity criteria, being below 0,9.

With CA, CR, AVE, and HTMT meeting the required thresholds, the model is recommended for further processing, such as bootstrapping. However, before proceeding, the Collinearity Statistics (VIF) values need to be checked.

Table 6. f² results on Public Company

No	Construct	Effect	Note
1	Y1 → Y2 (f² = 0,349)	Significant Effects	Employee Engagement has a large contribution to Productivity, underscoring the importance of employee involvement in improving productivity
2	X1 → Y1 (f² = 0,092)	Small Effects	Sustainability Leadership has a small but significant contribution to Employee Engagement. This indicates that while Sustainability Leadership plays a role in Employee Engagement, it is not dominant
3	X1 → Y2 (f² = 0,003)	Non-Significant Effects	The direct effect of Sustainability Leadership on Productivity is almost insignificant
4	X2 → Y1 (f² = 0,004)	Non-Significant Effects	The application of Sustainability Principles does not have a significant direct effect on either Employee Engagement or Productivity
5	X2 → Y2 (f² = 0,015)	Non-Significant Effects	The application of Sustainability Principles does not have a significant direct effect on either Employee Engagement or Productivity

Variance Inflation Factor (VIF) measures how much the variability of coefficient estimates increases due to multicollinearity. Multicollinearity occurs when two or more independent (exogenous) variables are highly correlated.

Table 7. CA, CR, AVE result on Public Company

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
X1	0,938	0,942	0,948	0,695
X2	0,942	0,948	0,950	0,681
Y1	0,913	0,914	0,939	0,793
Y2	0,917	0,921	0,934	0,668

Table 8. HTMT Public Company

	X1	X2	Y1	Y2
X1				
X2	0,880			
Y1	0,572	0,504		
Y2	0,527	0,499	0,696	

All VIF inner model values, as on table 9, indicate that the relationships between the exogenous constructs (X1, X2) and the endogenous constructs (Y1, Y2) are within the safe range, as they do not approach the critical value of 5. The relationships between the exogenous constructs (X1 and X2) and the endogenous constructs (Y1 and Y2) are unique and do not interfere with one another. The mediation relationship (Y1 → Y2) is also free from multicollinearity (a condition in statistical analysis where two or more independent (exogenous) variables are highly correlated with each other).

Table 9. VIF Inner Model, Public Company

	X1	X2	Y1	Y2
X1			3,261	3,562
X2			3,261	3,274
Y1				1,421
Y2				

Table 10. VIF Outer Model, Public Company

	VIF		VIF
ENG1	4,685	SUS6	3,377
ENG2	4,744	SUS7	2,947
ENG3	3,018	SUS8	2,366
ENG4	2,025	SUS9	2,616
PROD1	2,125	SUSPR1	3,347
PROD2	2,777	SUSPR2	3,427
PROD3	3,315	SUSPR3	2,410
PROD4	2,627	SUSPR4	2,830
PROD5	3,374	SUSPR5	4,139
PROD6	2,507	SUSPR6	3,062
PROD7	2,695	SUSPR7	3,803

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SUS2	3,164	SUSPR8	2,841
SUS4	2,925	SUSPR9	3,104
SUS5	2,913	SUS1	3,151

All VIF outer model indicators as on table 10, have VIF values below 5, indicating no significant multicollinearity that could compromise the model's results. The highest VIF value is for ENG2 (4,744), which is still below the threshold of 5, so no indicators need to be removed. Thus, it can be concluded that no indicators require elimination based on the VIF results. With these all values, the bootstrapping can be processed.

The direct influence of exogenous variables on endogenous variables in public companies can be observed in the table 11:

   a. Sustainability Leadership (X1) has a direct influence on Employee Engagement (Y1) but does not have a direct influence on Employee Productivity (Y2).
   b. Companies Implementing Sustainability Principles (X2) do not have a direct influence on Employee Engagement (Y1) or Employee Productivity (Y2).

Employee Engagement (Y1) has a direct influence on Employee Productivity (Y2).

Table 11. The direct influence of exogenous variables on endogenous variables in public companies

	Research Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (IO/STDEVI)	P Values	Decision
X1 (SUS) ➔ Y1 (ENG)	H1	0,461	0,455	0,191	2,409	**0,016**	Accepted
X1 (SUS) ➔ Y2 (PROD)	H3	0,079	0,091	0,158	0,500	**0,617**	Rejected
X2 (SUSPR) ➔ Y1 (ENG)	H2	0,097	0,113	0,189	0,513	**0,608**	Rejected
X2 (SUSPR) ➔ Y2 (PROD)	H4	0,166	0,161	0,151	1,097	**0,273**	Rejected
Y1 (ENG) ➔ Y2 (PROD)	H5	0,520	0,519	0,085	6,095	**0,000**	Accepted

Table 12. the indirect influence of exogenous variables on endogenous variables in Public Companies.

	Research Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (IO/STDEVI)	P Values	Decision
X1 (SUS) ➔ Y2 (PROD)	H6	0,240	0,236	0,108	2,216	**0,027**	Accepted
X2 (SUS) ➔ Y2 (PROD)	H7	0,050	0,059	0,102	0,496	**0,620**	Rejected

The indirect influence of exogenous variables on endogenous variables in public companies can be observed in the table 12:

• Employee Engagement (Y1) mediates the influence of Sustainability Leadership (X1) on Employee Productivity (Y2)**.**
• Employee Engagement (Y1) does not mediate the influence of Companies Implementing Sustainability Principles (X2) on Employee Productivity (Y2).

PRIVATE COMPANY

The composition of the 110 respondents working in private companies consisted of 82 male respondents (75%) and 28 female respondents (25%). The majority of respondents were aged between 27–46 years, totalling 66 (60%), followed by those aged 47–58 years, totalling 34 (31%).

In terms of job positions, the largest group was managers/department heads, with 34 respondents (30,9%), followed by supervisors/unit heads with 22 respondents (20%) and staff with 14 respondents (14%). Higher-level positions included directors/CxOs with 16 respondents (14,5%), general managers/division heads with 10 respondents (9%), and vice presidents/group heads with 9 respondents (8,2%). In contrast to the profile of respondents from public companies, private company respondents were dominated by the Information and Communication sector, with 27 respondents (24,5%), followed by the Mining and Quarrying sector, with 14 respondents (12,7%). The remaining 16 sectors contributed between 1% and 10%.

Most respondents worked in companies with over 1.000 employees, totalling 54 respondents (49%), followed by companies with 100–500 employees, totalling 36 respondents (32,7%).

Geographically, DKI Jakarta emerged as the primary location for respondents, contributing the largest share at 73,6% (81 respondents). Respondents from South Sumatra, South Sulawesi, North and East Kalimantan, Papua, West Java, and other regions contributed only 1% to 10%. The dominance of DKI Jakarta reinforces its role as the economic and business hub for private companies in Indonesia. This profile demonstrates a representative sample across various demographics, such as gender, age, position, industry sector, company size, and geographic location.

Figure 5. 110 Respondents from Private Company

On the private company, on Run 2, Iteration 1, certain parameters had outer loading values greater than 0,7 necessitating their elimination before proceeding to Run 2, Iteration 2. These parameters were ENG6, PROD2, and SUSPR8.

In the Inner Model List, table 13, the relationship between Sustainability Leadership (X1) and Employee Productivity (Y2) shows high multicollinearity, suggesting that the contribution of X1 to Y2 might overlap with the contributions of other constructs (e.g., X2 or Y1).

In the Outer Model List, table 14, there are parameters with VIF values exceeding five, indicating that multicollinearity is becoming a concern, particularly if the values increase further. These parameters are SUSPR1, SUSPR2, SUSPR7, and SUS1, which have VIF values above five. Therefore, the parameters SUSPR1, SUSPR2, SUSPR7, and SUS1 should be eliminated, and Run 2 of the SEM PLS analysis should be conducted.

Table 13. VIF Inner Model, Private Company

	X1	X2	Y1	Y2
X1			4,263	5,069
X2			4,263	4,263
Y1				1,822
Y2				

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Table 14. VIF Outer Model, Private Company

	VIF		VIF
ENG1	3,539	SUS5	3,868
ENG2	4,838	SUS6	3,342
ENG3	2,767	SUS7	4,310
ENG4	2,228	SUS8	3,473
ENG5	2,259	SUS9	2,547
ENG6	1,330	SUSPR1	6,423
PROD1	2,151	SUSPR2	7,709
PROD2	2,191	SUSPR3	4,429
PROD3	2,340	SUSPR4	3,780
PROD4	2,636	SUSPR5	2,624
PROD5	2,718	SUSPR6	2,496
PROD6	2,415	SUSPR7	5,378
PROD7	2,078	SUSPR8	1,608
SUS2	4,002	SUSPR9	3,249
SUS3	2,555	SUS1	5,547
SUS4	4,096		

On Run 2, Iteration 1, table 15, there were parameters with outer loading values greater than 0,7 necessitating their elimination before proceeding to Run 2, Iteration 2. These parameters were ENG6, PROD2, and SUSPR8. On Run 2, Iteration 2, all outer loading values were above 0,7 however, the bootstrapping process cannot be performed until reliability and validity tests are conducted.

Table 15. Run2, Iteration 1 and 2, Private Company

	Outer loadings Run 2, Iteration 1	Outer loadings Run 2, Iteration 2		Outer loadings Run 2, Iteration 1	Outer loadings Run 2, Iteration 2
ENG1 <- Y1	0,870	0,876	SUS5 <- X1	0,878	0,878
ENG2 <- Y1	0,922	0,926	SUS6 <- X1	0,853	0,853
ENG3 <- Y1	0,864	0,871	SUS7 <- X1	0,874	0,874
ENG4 <- Y1	0,816	0,818	SUS8 <- X1	0,814	0,815
ENG5 <- Y1	0,817	0,806	SUS9 <- X1	0,777	0,778
ENG6 <- Y1	0,455	-	SUSPR1 <- X2	-	-
PROD1 <- Y2	0,742	0,739	SUSPR2 <- X2	-	-
PROD2 <- Y2	0,685	-	SUSPR3 <- X2	0,850	0,842
PROD3 <- Y2	0,828	0,826	SUSPR4 <- X2	0,841	0,850
PROD4 <- Y2	0,839	0,848	SUSPR5 <- X2	0,817	0,833
PROD5 <- Y2	0,812	0,843	SUSPR6 <- X2	0,814	0,831
PROD6 <- Y2	0,768	0,739	SUSPR7 <- X2	-	-
PROD7 <- Y2	0,745	0,769	SUSPR8 <- X2	0,652	-
SUS2 <- X1	0,794	0,794	SUSPR9 <- X2	0,855	0,856
SUS3 <- X1	0,777	0,776	SUS1 <- X1	-	-
SUS4 <- X1	0,865	0,865			

On the R-square result, table 16, a total of 45,8% of the variance in Employee Engagement (Y1) can be explained by the exogenous constructs, namely Sustainability Leadership (X1) and the Application of Sustainability Principles (X2). The remaining 54,2% of the variance is accounted for by factors not included in the model.

For Y2, 54,7% of the variance in Productivity (Y2) can be explained by the exogenous constructs (X1, X2) and the mediator (Y1). The remaining 45,3% of the variance is explained by other factors not included in the model.

Table 16. R-square Run 2, Iteration 2, Private Company

No	Variabel	Tipe	R-Square	Citeria
1	X1 (SUS) / Sustainability Leadership	Exogen	-	
2	X2 (SUSPR) / Implementation Sustainability Principal	Exogen	-	
3	Y1 (ENG) / Employee Engagement	Endogen	0,458	Moderate
4	Y2 (PROD) / Employee Productivity	Endogen	0,547	Moderate

The f^2 results as in table 17, indicate that Sustainability Leadership has a significant effect on Employee Engagement, which in turn positively impacts Productivity. Conversely, the Application of Sustainability Principles does not have a significant direct effect, requiring further evaluation.

Table 17. f^2 results run 2, iteration 2, in Private Company

No	Construct	Effect	Note
1	X1 → Y1 (f^2 = 0.271)	Most Significant Effects	Sustainability Leadership has a medium effect on Employee Engagement, highlighting the importance of leadership in engaging employees.
2	Y1 → Y2 (f^2 = 0.249)	Most Significant Effects	Employee Engagement has a medium effect on Productivity, emphasizing that employee engagement is a key factor in improving productivity.
3	X1 → Y2 (f^2 = 0.040)	Relatively Small Effects	Sustainability Leadership has a small effect on Productivity. This indicates that the influence of X1 on Y2 may be indirect, mediated by Y1 (Employee Engagement).
4	X2 → Y1 (f^2 = 0.000)	Non-Significant Effects	The Application of Sustainability Principles does not have a significant direct contribution to either Employee Engagement or Productivity.
5	X2 → Y2 (f^2 = 0.006)	Non-Significant Effects	The Application of Sustainability Principles does not have a significant direct contribution to either Employee Engagement or Productivity.

The CA and CR values as in table 18, are above 0,7 indicating excellent reliability. Similarly, the AVE values are above 0,5 demonstrating good convergent validity. However, in the HTMT test, some values exceed 0,9. The discriminant validity between X1 and X2 is not met, indicating a significant overlap. This differs from the test on public companies, where this issue was not observed.

Table 18. CA, CR, AVE result on Private Company

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
X1	0,935	0,937	0,946	0,689
X2	0,898	0,901	0,924	0,710
Y1	0,912	0,915	0,934	0,740
Y2	0,883	0,888	0,912	0,633

Table 19. HTMT Private Company

	X1	X2	Y1	Y2
X1				
X2	0,907			
Y1	0,731	0,614		
Y2	0,716	0,633	0,770	

Variance Inflation Factor (VIF) measures how much the variability of coefficient estimates increases due to multicollinearity. Multicollinearity occurs when two or more independent (exogenous) variables are highly correlated.

All indicators in table 21 have VIF outer model ≤ 5, indicating they are free from significant multicollinearity. Whereas for inner model as in table 20, all VIF values are below the threshold of 5, indicating no significant multicollinearity in the structural model. The latent constructs in the model have independent contributions to their respective dependent variables. So no indicators need to be removed based on these VIF results, which can be concluded and the bootstrapping process can be continued.

Table 20. VIF Inner Model, Run 2 Iterate 2, Private Company

	X1	X2	Y1	Y2
X1			3,248	4,128
X2			3,248	3,249
Y1				1,844
Y2				

Table 21. VIF Outer Model Run 2 Iterate 2, Private Company

	VIF		VIF
ENG1	3,532	SUS5	3,680
ENG2	4,816	SUS6	3,327
ENG3	2,745	SUS7	4,263
ENG4	2,214	SUS8	3,244
ENG5	1,975	SUS9	2,499
ENG6	-	SUSPR1	-
PROD1	1,954	SUSPR2	-
PROD2	-	SUSPR3	3,445
PROD3	2,218	SUSPR4	3,443
PROD4	2,625	SUSPR5	2,406
PROD5	2,625	SUSPR6	2,444
PROD6	1,729	SUSPR7	-
PROD7	2,078	SUSPR8	-
SUS2	2,571	SUSPR9	2,625
SUS3	2,532	SUS1	-
SUS4	3,324		

The direct influence of exogenous variables on endogenous variables in private companies can be observed in the table 22 below:
- Sustainability Leadership (X1) has a direct influence on Employee Engagement (Y1) but has no significant direct influence on Employee Productivity (Y2).

- Companies Implementing Sustainability Principles (X2) have no direct influence on Employee Engagement (Y1) or Employee Productivity (Y2).
- Employee Engagement (Y1) has a direct influence on Employee Productivity (Y2).

Table 22. The direct influence of exogenous variables on endogenous variables in Private Companies

	Research Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (IO/STDEVI)	P Values	Decision
X1 (SUS) ➔ Y1 (ENG)	H1	0,691	0,676	0,121	5,690	0,000	Accepted
X1 (SUS) ➔ Y2 (PROD)	H3	0,272	0,258	0,143	1,907	0,057	Rejected
X2 (SUSPR) ➔ Y1 (ENG)	H2	-0,017	0,010	0,152	0,114	0,909	Rejected
X2 (SUSPR) ➔ Y2 (PROD)	H4	0,093	0,083	0,130	0,713	0,476	Rejected
Y1 (ENG) ➔ Y2 (PROD)	H5	0,456	0,486	0,132	3,449	0,001	Accepted

The indirect influence of exogenous variables on endogenous variables in private companies can be observed in the table 23 below. With a p-value below 0.05, the following conclusions can be made:
- Employee Engagement (Y1) mediates the influence of Sustainability Leadership (X1) on Employee Productivity (Y2).
- Employee Engagement (Y1) does not mediate the influence of Companies Implementing Sustainability Principles on Employee Productivity (Y2).

Table 23. the indirect influence of exogenous variables on endogenous variables in Private Companies.

	Research Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (IO/STDEVI)	P Values	Decision
X1 (SUS) ➔ Y2 (PROD)	H6	0,315	0,326	0,104	3,033	0,002	Accepted
X2 (SUS) ➔ Y2 (PROD)	H7	-0,008	0,014	0,078	0,102	0,919	Rejected

CONCLUSION

In both public and private companies, the role of sustainability leadership is highly significant in enhancing employee engagement, even though its influence on employee productivity is indirect. Sustainability Leadership (X1) has been shown to have a direct effect on Employee Engagement (Y1), indicating that leadership styles that prioritize sustainability can foster a supportive work environment that encourages employees' emotional and professional engagement. However, Sustainability Leadership (X1) does not have a direct influence on Employee Productivity (Y2), suggesting that employee engagement is necessary to bridge this influence. This aligns with the findings of Visser et al., (2011), who stated that sustainability-focused leaders emphasizing values such as openness, innovation, and human relationship development can create strong emotional bonds. Insights from previous qualitative survey triangulation reinforce that this success can be achieved through human-centred approaches, such as mentoring, recognition, and fostering collaboration. These measures create a positive work environment, support employee emotional engagement, and contribute to long-term employee-organization relationships.

Meanwhile, the implementation of Sustainability Principles (X2) does not have a direct influence on Employee Engagement (Y1) or Employee Productivity (Y2). This indicates that the application of sustainability policies, such as ESG reporting or CSR programs, while important, is insufficient to directly motivate employees without effective engagement or communication. On the other hand, Employee Engagement (Y1) shows a significant direct influence on Employee Productivity (Y2), emphasizing that employees' emotional and professional engagement is a critical driver of productivity in public companies. This study highlights that the implementation of Sustainability Principles (X2), such as ESG reporting or CSR programs, does not have a direct impact on employee engagement or productivity. This supports the view of Battistella et al., (2020), who argued that sustainability often becomes a managerial agenda that lacks relevance for employees without their direct involvement. These findings are also consistent with insights from qualitative survey triangulation, which stress the importance of a long-term vision as the foundation for sustainability.

A long-term vision provides employees with the context to understand how their work contributes to broader goals, such as the SDGs. When employees recognize the tangible impact of their contributions on global objectives, their emotional engagement increases. This study supports the theory that sustainability requires leadership capable of connecting organizational goals with broader social and environmental impacts.

In this context, the findings support the literature from the Deloitte Global Survey by Parmelee, (2022), which states that younger generations view sustainability as a key factor when choosing a company. A commitment to sustainability helps both public and private companies attract young talent with aligned values, build long-term loyalty, and enhance overall contributions to organizational sustainability.

In both public and private companies, the SEM-PLS analysis in this study indicates that Employee Engagement (Y1) mediates the relationship between Sustainability Leadership (X1) and Employee Productivity (Y2). This means that sustainability leadership (X1) enhances employee engagement (Y1), which, in turn, drives their productivity (Y2). However, Employee Engagement (Y1) does not mediate the relationship between the implementation of Sustainability Principles (X2) and Employee Productivity (Y2). This suggests that Sustainability Principles (X2) implemented by companies are not sufficient to enhance Employee Engagement (Y1) without effective leadership intervention. These findings align with the theory presented by Visser et al., (2011), which asserts that sustainability leadership (X1) contributes to creating an inclusive and sustainability work environment (Y1).

Employee Engagement (Y1) acts as a crucial mediating variable in the relationship between sustainability leadership (X1), sustainability principles (X2), and employee productivity (Y2). This study confirms that employee engagement not only serves as a link but also as an essential element that ensures organizational sustainability positively impacts productivity. These results are consistent with the research of Iqbal et al., (2020), which found that psychological empowerment strengthens the impact of organizational learning on sustainability. Furthermore, Schaufeli et al., (2006) emphasized that employee engagement requires a direct connection to daily work, involving the dimensions of vigor, dedication, and absorption. If the implementation of sustainability principles does not directly impact employees' work experiences, employee engagement is unlikely to act as an effective mediator.

RECOMMENDATION

The author recommends that leaders and companies adopt the PPTx framework (People – Policy – Technology with experience), as described in the author's article (Tjahjanto, 2023) "PPTx for Building Employee Experience" in the book *Best Practices in Human Resource Management in Indonesia in the Society 5.0 Era* by Gerakan Nasional Indonesia Kompeten (GNIK), (2023) . Human Resources (HR) or People are the foundational element in implementing sustainability practices. As the cornerstone for strengthening sustainability systems in the workplace, HR is a critical area of focus for leaders and companies. A positive experience throughout the employee journey—ranging from recruitment, onboarding, training, to operations—should be monitored to ensure it has a beneficial impact. As previously discussed, Employee Engagement (Y1) has a direct influence on Employee Productivity (Y2).
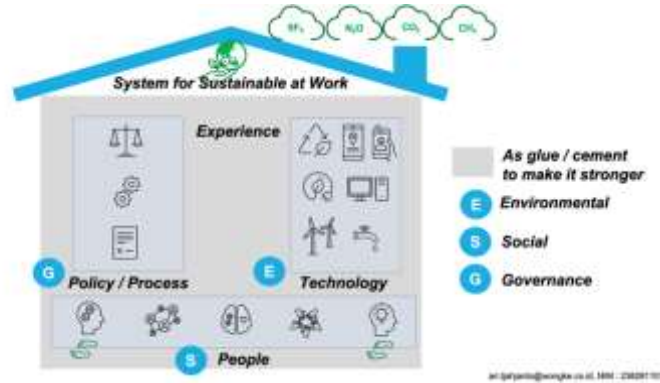
Figure 6. PPTx Framework

Leaders also need to communicate intensively with employees about the company's policies on implementing sustainability principles. This aligns with findings from *Meditari Accountancy Research*. A study conducted by Argento et al., (2022) on IREN, a multi-utility company in Italy with over 7,000 employees, revealed the paradox of sustainability caused by differing perceptions among organizational actors, particularly between directors and middle managers, as well as fragmentation within the Management Control System (MCS)**.** The system is more focused on financial outcomes than social and environmental goals, hindering the comprehensive implementation of sustainability.

This study highlights the importance of effective communication to foster shared understanding, the integration of sustainability indicators into inclusive control systems, and the involvement of all organizational levels in implementing sustainability policies.

One of the key pillars of the PPTx framework is Policy, which helps establish strong governance. For the variable Companies Implementing Sustainability Principles (X2)**,** the indicator of transparency and good governance (Madero-Gómez et al., 2023), specifically the parameter that companies adhere to global standards in sustainability governance, such as ISO 26000 (SUSPR8), it is recommended that leaders and companies follow ISO standards aligned with the SDGs, as shown in the table below.

The Technology pillar also plays a critical role in maintaining system functionality. The comprehensive application of technology, as illustrated in the diagram below on the 360-degree system building block, can be implemented gradually in companies according to their needs. Business processes in line with ISO guidelines can be monitored using technology for Service Level Agreements (SLA) and their KPIs. For example, leaders and companies can monitor energy usage reduction achievements simply by reviewing SLA and KPI dashboards, with reports that can be generated automatically and aligned with the targets.

The integration of such systems will enable leaders and companies to perform accurate analyses. The use of Artificial Intelligence (AI) will further accelerate analysis and predictive processes. Appropriate technology can also assist leaders and companies in producing sustainability reports, such as those following GRI**,** International Finance Reporting Standards (IFRS)**,** POJK 51**,** and others.
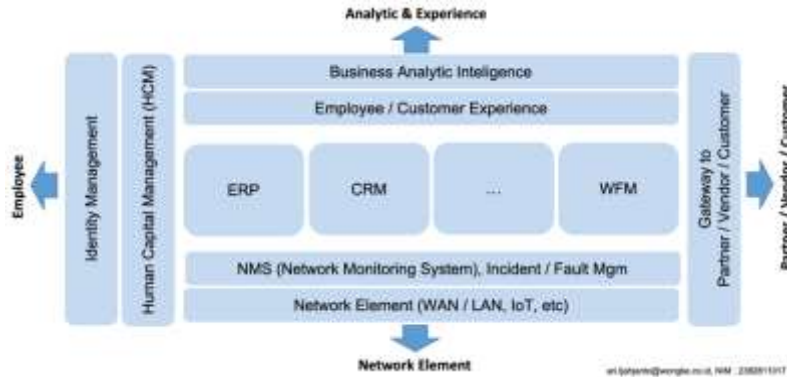
Table 24. Mapping ISO to 17 SDGs

Figure 7. 360-Degree system building block

In summary, leaders and companies can follow six stages to achieve ESG maturity within their organization:

A. **Awareness**

Sustainability leaders must establish a long-term vision for sustainability (Di Fabio & Peiró, 2018; Mazutis & Abolina, 2019), as highlighted in the parameters: "Leaders develop a long-term vision that incorporates sustainability" (SUS5) and "Leaders set clear and measurable sustainability goals" (SUS6).

B. **Strategy**

For companies to implement sustainability principles, a strong commitment to ESG policies is essential (Madero-Gómez et al., 2023). This is reflected in the parameter: "The company integrates ESG policies as part of its business strategy" (SUSPR1), which was included in the survey questionnaire.

C. **Education**

Under the Sustainability Leadership variable (Di Fabio & Peiró, 2018; Mazutis & Abolina, 2019), the indicator for "Building a Sustainability Culture" (SUS7) highlights the importance of leaders fostering a workplace culture that involves all employees in sustainability efforts. Companies and leaders must continuously educate their employees. Technology enables learning anytime, anywhere, across various mobile devices. Features such as Identity Management allow leaders to deliver targeted education to employees effectively.

D. **Data**

Data is crucial for enhancing employee experiences and measuring productivity (Almaamari & Alaswad, 2021). Parameters PROD1 to PROD6 can be transparently measured to gauge productivity. Transparent data is also critical for the variable Companies Implementing Sustainability Principles (X2), specifically the indicator for "Transparency and Good Governance" (SUSPR7), which evaluates the company's practice of transparency in sustainability reporting.

E. **Implementation**

Project management plays a vital role in the successful implementation of sustainability. A study by Toljaga-Nikolić et al., (2020) explored sustainable project management in Serbia's public and private sectors. The study identified key barriers to sustainability implementation, such as limited financial resources for green solutions, lack of understanding of sustainability, inconsistent internal processes, and ineffective stakeholder communication.

As solutions, the study recommends:

   i. Enhancing education and training to raise sustainability awareness.
   ii. Adopting methodologies like Agile to support better collaboration.
   iii. Providing incentives to promote the use of environmentally friendly technologies.

iv. Strengthening project managers' competencies in communication, decision-making, and resource management.

The study emphasized that successful sustainable project management requires a holistic strategic approach and adequate policy support. The implementation aspect is reflected in the Employee Productivity variable through parameters PROD1 to PROD7.

F. Improvement

Continuous improvement is essential, particularly in prioritizing financial aspects for sustainable project upgrades. An article by Hessami et al., (2020), based on a study of sustainability enhancement programs at Texas A&M University, highlighted that project prioritization strategies based on the highest benefit/cost ratio yielded the best performance across financial, environmental, and temporal dimensions.

The study demonstrated that a revolving-fund approach—using savings from initial projects to fund subsequent ones—enables small initial investments to generate substantial impacts. Dynamic systems modeling was used to simulate the interactions of variables and evaluate the performance of different prioritization strategies. Results showed that strategies combining cost-benefit considerations achieved higher efficiency compared to other approaches.

Therefore, it is essential to have a well-designed strategy for sustainability programs to optimize financial, environmental, and operational benefits, particularly under resource constraints.
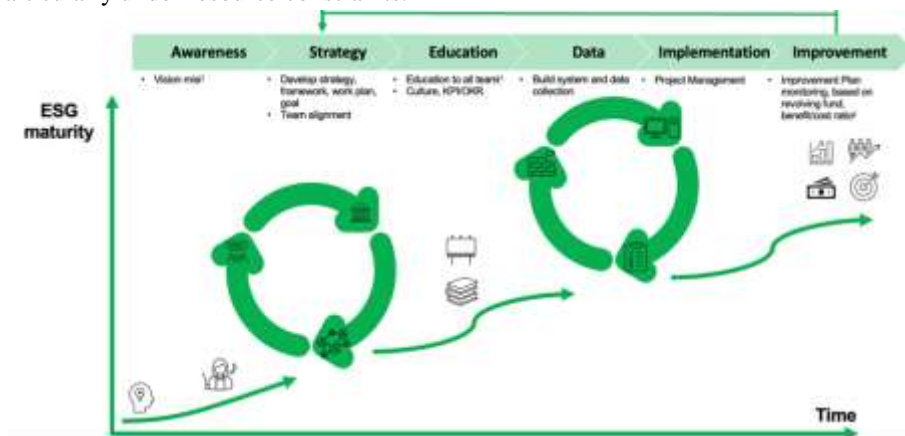

Figure 8. ESG Maturity Journey

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