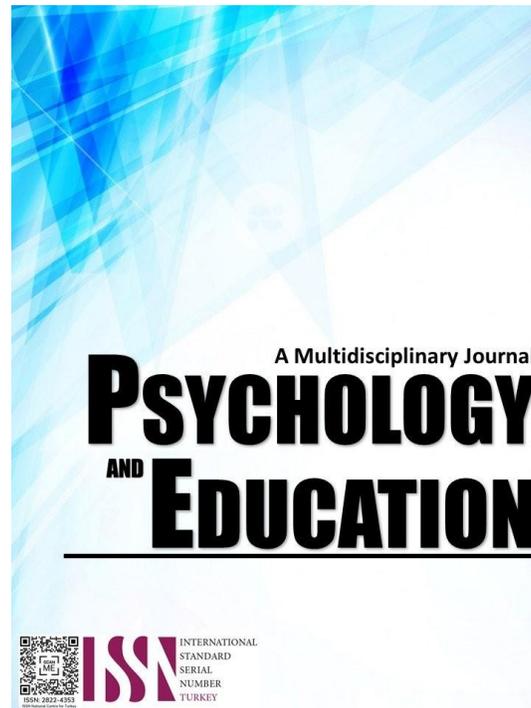


# MILLENNIAL ENGINEERS' JOB SATISFACTION, SUPERIORS' TRANSFORMATIONAL LEADERSHIP, MOTIVATIONAL CAPABILITIES, AND WORK ENGAGEMENT: A STRUCTURAL MODEL



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## Millennial Engineers' Job Satisfaction, Superiors' Transformational Leadership, Motivational Capabilities, and Work Engagement: A Structural Model

Jesus B. Rangcasajo,\* Nenita Itaa - Prado  
For affiliations and correspondence, see the last page.

### Abstract

As millennials assume increasing leadership roles, understanding the factors shaping their job satisfaction and engagement is essential. This study developed a structural model examining job satisfaction, transformational leadership, motivation capabilities, and work engagement among millennial engineers in Region X – DPWH. Using validated questionnaires, data were collected from 337 millennial engineers through a descriptive-correlational and causal-comparative design. Results showed generally high job satisfaction, with relatedness obtaining the highest mean. Transformational leadership was also rated favorably, with strong scores in inspirational motivation and intellectual stimulation. Motivation capabilities were high, with intrinsic motivation slightly exceeding extrinsic. Work engagement was likewise high, with dedication emerging as the strongest indicator. Correlation analysis confirmed significant positive relationships among the variables, with motivation capabilities showing the strongest association. SEM identified Model 2 as the best fit, resulting in Jess's Model of Work Engagement for DPWH millennial engineers. The study concludes that motivation capabilities and supportive relationships are central to fostering meaningful and engaged engineering professionals.

**Keywords:** *department of public works and highways (DPWH), jess's model of work engagement, job satisfaction, millennial engineers, motivation capabilities, transformational leadership*

### Introduction

As someone who has closely observed the dynamics of workplace environments and team interactions, I've noted that many millennial engineers face unique challenges in their professional settings. Despite their technical skills and innovative ideas, they often feel undervalued or misunderstood within traditional organizational structures. A disconnect exists between millennial employees' motivational drivers and the strategies used by their supervisors, leading to high turnover rates, team destabilization, and high organizational costs. This underscores the need for optimizing leadership styles to better align with millennial engineers, ultimately enhancing their job satisfaction and work engagement.

Future leaders are quickly emerging from the millennial generation, making it central to grasp the factors that affect their job satisfaction and engagement at work in their respective organizations. Previously, the older workforce prioritized traditional values like serving their country and providing for their families, while the younger workforce values self-development and personal growth as the main motivation for working (Zhao, 2018). However, when evaluating younger employees against their middle-aged and older counterparts, it becomes evident that the former prioritize certain qualities, such as opportunities for personal development, salary, clear job responsibilities, diverse tasks, and autonomy, which can greatly affect their job satisfaction and engagement (Lee et al., 2017; Alam & Asim, 2019; & Wann & Duffy, 2022).

In today's modern workforce, there are four main generational cohorts: Baby Boomers, Generation X, Generation Y, and Generation Z. Analysis has projected that the workforce is made up of 66% Baby Boomers, 79% Generation X, 71% Generation Y, and 62% Generation Z since 2018 (Parker et al., 2020). This diversity in the workforce brings about various perspectives, workplace cultures, and management styles, indicating the presence of different types of leaders. According to Dimock (2021), research has shown that each generation possesses unique characteristics, values, and attitudes. Additionally, individuals from the former generations rated certain key leadership qualities as significantly more important than those in the older generation, including the ability to promote good relationships, take responsibility, listen, acknowledge others, show understanding, be approachable, provide clear instructions, and act as a supportive coach (Kurata et al., 2020). After examining multiple literary works, it is essential to analyze the factors influencing multigenerational leadership within the engineering profession in the Philippines.

This study on job satisfaction, engagement, transformational leadership, and motivation among millennial engineers supports SDG 8 by promoting productive employment and SDG 4 by emphasizing continuous professional development. Its findings guide organizations in strengthening leadership and motivation, creating fulfilling work environments that boost productivity, satisfaction, and alignment with sustainable workforce strategies. This quantitative study aims to enhance understanding of millennials' perceptions of job satisfaction and work engagement. Additionally, the study will explore the experiences of professional engineering millennials in terms of workplace job satisfaction, superior leadership skills, and motivational capabilities. The purpose of this study was to identify key factors influencing job satisfaction and work engagement among millennial engineers in Northern Mindanao. Using structural equation modeling, the study focused on evaluating how the superior leadership skills and motivational capabilities of millennial engineers impact their work engagement. It is the first study to assess the effectiveness of multigenerational leadership in engineering industries in Northern Mindanao using this technique. The findings of this study provide a valuable tool for measuring management

practices in engineering industries comprehensively and can be applied to evaluate managerial practices in other industrial sectors globally.

### Research Questions

This study aimed to develop a structural model on factors influencing job satisfaction and work engagement among millennial engineers in Region X – Northern Mindanao, and evaluate how millennial engineers' superior transformational leadership skills and motivational capabilities impact their work engagement. Specifically, the study sought to answer the following questions:

1. What is the level of job satisfaction in terms of:
  - 1.1. existence;
  - 1.2. relatedness; and
  - 1.3. growth?
2. What is the level of assessment of the leadership skills of their work superiors in terms of:
  - 2.1 intellectual simulation;
  - 2.2 idealized influence;
  - 2.3 inspiration, motivation, and
  - 2.4 individual consideration?
3. What is the level of assessment of their superior's motivation capabilities in terms of:
  - 3.1 intrinsic; and
  - 3.2 extrinsic?
4. What is the level of employee work engagement among millennial engineers?
  - 4.1 vigor;
  - 4.2 dedication; and
  - 4.3 absorption?
5. Is there a significant relationship between employee engagement and:
  - 5.1 job satisfaction,
  - 5.2 superior transformational leadership; and
  - 5.3 motivation capabilities?
6. Which of the independent variables, singly or in combination, best predicts engagement?
7. What structural model best fits the millennial engineers' work engagement?

### Methodology

#### Research Design

The researcher used quantitative methods as the research method and a descriptive correlational and causal comparative research design. A descriptive design details the characteristics of the phenomenon being studied. It can provide practical solutions to the real-world problems and experiences of the participants. The design does not seek to explain or interpret a phenomenon but rather describes the experiences or events of the participants (Eddins, 2024). A descriptive study seeks to outline a phenomenon and its attributes, focusing more on what happened rather than exploring how or why it occurred (Tagud et al., 2023). While data for this type of study can be collected qualitatively, it is often analyzed statistically, identifying relationships through measures such as frequencies, percentages, and averages.

Canivel (2023) said that a technique for determining the cause-and-effect relationship between a dependent and an independent variable was causal-comparative research. This relationship was typically only suggested because we cannot completely control an independent variable. As a result, the study was descriptive rather than conducting an experiment; it examined the relationships between various variables in which the independent variable already exists. It also established whether independent variables have a direct influence on the dependent variable and why. This included determining the causes of specific occurrences (on non-occurrences). A causal-comparative study's primary goal is to investigate the effects, consequences, and causes of additional features of comparative causal studies that do not select participants at random to save time and money.

The last problem answered by Structural Equation Modeling. A method to study cause-and-effect interactions among variables in diverse disciplines is structural equation modeling (SEM). The linear relationship between latent and observable variables is also found using SEM. A hypothesized model showing directional and non-directional correlations between latent and observable variables is built using SEM. SEM is frequently employed to decide whether a model must consider covariation and variation of latent and visible factors (Karakaya-Ozyer & Aksu-Dunya, 2018). Furthermore, once analysis methods are performed correctly, SEM can be used to solve two significant problems: theory creation and construct confirmation.

Measurement and structural models are the two core parts of SEM (Karakaya-Ozyer & Aksu-Dunya, 2018). The measurement model, which uses confirmatory factor analysis to determine whether the data fit the suggested model, validates this. The measurement model connects latent variables and numerous observable variables. The structural model shows how the model's latent variables are related.

The same approach was used to identify the dependent variables, such as job satisfaction, superior leadership, and motivational capabilities, that are the most accurate predictors of millennial engineers' work engagement and to create a structural model.

## Respondents

The participants in this study include millennial engineers who are currently employed in various District Engineering Offices in Region X. The participants have ages between 30 and 44 years old to be considered part of the millennial generation. Also, the participants are Engineers in line and have three years or more of work experience. The study aimed to include a diverse sample of engineers from different backgrounds, levels of experience, and job roles.

The study employed proportionate stratified random sampling, a standard statistical technique that divides a population into distinct subgroups, or strata, based on some shared characteristics (Fleetwood, 2023), where each stratum's sample size corresponded to its population size of the stratum considering the procedure,  $n = (n/N) * ns$ , where  $n$  = sample,  $N$  = population size, and  $ns$  = stratum size. The formula was designed and reviewed by Hayes et al. (2020) and was modified to simplify the interpretation of each symbol. Researchers obtained a sample population that does not accurately represent the entire population under study using stratified random sampling (Hayes, 2023).

The sample size was determined using Raosoft, which is a web-based tool used for calculating the appropriate sample size needed for a survey or research study. The calculator takes into account various factors such as population size, desired confidence level, margin of error, and expected proportion or response rate. Data collection was conducted anonymously to protect participants' privacy and confidentiality.

## Instrument

Data for this study were collected from self-administered surveys. Four (4) sets of questionnaires were used to gather the data for this study to measure millennial job satisfaction, superior leadership, motivational capabilities, and millennial engineers' work engagement. They are the adopted Minnesota Satisfaction Questionnaire (MSQ) Short Form, Multifactor Leadership Questionnaire (MLQ), Intrinsic and Extrinsic Motivation Survey, and Utrecht Work Engagement Scale.

**Job Satisfaction.** The survey instrument used was the Minnesota Satisfaction Questionnaire (MSQ), developed and approved for use by the Vocational Psychology Research, University of Minnesota, used to gauge job satisfaction among millennial engineers. The MSQ was developed in 1967 by Weiss et al. Weiss et al. (1967, as cited in Inayat & Khan, 2021) suggested that the MSQ helps obtain a more individualized representation of job satisfaction, due to its 20 facets of job satisfaction, than do other measures of job satisfaction. The 20 facets align closely with the Herzberg motivational two-factor theory. This scale has been widely used in the literature, being a well-known and stable instrument over time, with previous research yielding excellent coefficient alpha (Martins & Proença, 2014, as cited in Tran, 2025).

The MSQ is designed to assess an employee's satisfaction with their job. The survey was designed to provide specific information on the existence, relatedness, and growth of a job that an individual finds rewarding. The MSQ uses a Likert-type scale from 1 (very dissatisfied) to 5 (very satisfied) and can be analyzed on three different dimensions: Existence, Relatedness, and Growth.

**Superior Transformational Leadership.** Survey participants were requested to complete the instruments for this study, the Multifactor Leadership Questionnaire (MLQ 5X). This measurement was made on a 5-point Likert scale (1= strongly disagree, 5 = strongly agree) and can be analyzed on four different dimensions: Intellectual Stimulation, Idealized Influence, Inspirational Motivation, and Individual Consideration.

The MLQ has proven to be one of the principal instruments for measuring transformational, transactional, and passive-avoidant leadership (Avolio & Bass, 2004, as cited in Mathes, 2024). The 45 items measure key leadership and effectiveness behaviors that make up the MLQ 5X short questionnaire. (Bass & Avolio, 1995, as cited in Mathes, 2024). The MLQ has been the primary means to distinguish leadership styles within the full range model over the past twenty-five years (Mind Garden, Bass, and Avolio, 1993, 1999, 2004, as cited in Mathes, 2024).

**Motivational Capabilities.** On a five-point Likert scale, from 1 (Strongly Disagree) to 5 (Strongly Agree), respondents were asked to rate their level of agreement with each item. They were analyzed on two different dimensions: Intrinsic and Extrinsic.

The researcher espoused and adopted the questionnaire of Mafini and Dlodlo (2014). It answered the level of employees' motivation in terms of extrinsic and intrinsic. Extrinsic Motivation was based on tangible rewards, and these were financial, such as a raise in salary, a bonus for reaching some quota, or paid time off. The prizes may be a better office, verbal praise, public recognition, awards, promotions, and additional responsibility. On the contrary, Intrinsic Motivation is internal to the person, offered to oneself, and driven by personal interest or enjoyment in work itself, according to Sengupta (2020).

**Work Engagement.** The Utrecht Work Engagement Scale is the fourth tool in this study. The dependent variable in this study, millennial engineers' engagement in the workplace, can be analyzed on three different dimensions: vigor, dedication, and absorption. This evaluation included 17 items that were initially evaluated on a seven-point Likert-type scale before being converted to a five-point scale with ratings ranging from one to five, with five denoting "Strongly Agree."

## Procedure

The researcher upholds the following procedures to obtain the desired data for this study.

First and foremost, instrument preparation. For the teacher participants, the survey forms were created. An identification number was written in the upper left corner of each questionnaire. Second, approval was sought from the Dean of the School of Business, Management and Accountancy before distributing the survey to the intended participants and collecting the data. The researcher personally delivers formal letters to the Dean requesting authorization to distribute test surveys and questionnaires to the teacher participants. The letter's content includes the timeline for the execution of the study.

Meeting the participants on time is the third step. After receiving the Dean's approval, the researcher gathers with each responder personally or online. Informed consent forms were distributed along with the survey forms. One of the foundational principles of research ethics establishes trust between the researcher and the participants by specifying an explicit agreement. With excellent distribution and presentation of the informed consent, respondents can join and be part of this research freely, armed with complete information about what it means for them to take part and that they are given consent before participating in the study. They were informed about the study's procedures, risks, and benefits, and that all information they provided would be confidential.

The next phase of the data gathering mainly involves the preliminary activities before administering the survey questionnaires, during which the ethical considerations in conducting research were observed. Insofar as the ethical considerations are concerned, the researcher is reminded that ethics is a natural characteristic that he must cultivate to make the study credible and valid. Ethical considerations should be given due importance to adherence and attention. Ethical considerations are an essential part of every research study. The researcher must adhere to the research's goal of conveying information and truth and preventing mistakes (Shaw & Satalkar, 2018). Hence, in this study, the researcher observes and adheres to the following protocol assessment indicators and steps, most notably the: inclusion criteria, recruitment, safety, informed consent, risks, benefits, privacy and confidentiality of information, community considerations, and dissemination/data sharing plan statements, among others, as shown below.

In selecting the participants, the research was guided by the principle of justice, which means a just distribution of the relevant measures for participating in this study. The research utilizes predetermined inclusion and exclusion criteria to ensure that there is no sign of bias. The researcher strictly adheres to these criteria: must be an engineer, must be in the research locale, and must provide their full consent to volunteer and be part of this study. In addition, respondents were randomly selected based on the nature and aim of this study.

Moreover, it was explained that the paper does not give them immediate direct benefit from participating in this research study. The anticipated benefit of their participation in this study is that the researcher uses the findings to measure their perception of the extent of burnout they experience during the transition from distance to in-person classes and their assessment of the different affective organizational factors, such as commitment, citizenship behavior, and engagement.

Aside from that, they provide the researcher with valid and reliable data relative to their level of work productivity and performance for policy-making purposes, which may impact the environmental culture of their work. Through their participation, they allow expressing their views on a wide range of issues related to their current work conditions.

In terms of monetary compensation, no expenses incurred in participating in this study. Thus, no reimbursement was paid for expenses related to their taking part in this study.

Before administering the research instruments, a declaration of transparency and conflicts of interest was also discussed. The integrity and credibility of research findings are improved by taking appropriate measures to prevent bias and ensure openness in the execution, reporting, and publication processes. The researcher ensures that the characteristics of ethical research are not overshadowed by secondary interests, such as financial and non-financial considerations that might conflict with the findings. There are no competing interests, including but not limited to receiving research or educational grants, receiving payments for services such as speaking engagements, stock options, board membership, consulting, employment, travel/accommodation/meeting expenses, etc., or receiving non-financial benefits.

The researcher gives out the survey questionnaires after the participants agree to participate. On the other hand, individuals are free to withdraw their consent at any moment. They are no longer able to participate in the study if they decide against it due to predictable reasons such as possible hazards, discomfort, and perceived negative impacts by the participants. Whatever it is, the researcher honors their choice and randomly selects other respondents to participate in the study.

The survey questionnaire's four sections were explained to the target participants. Part 1 asks them to evaluate their level of job satisfaction. Part 2 assesses their superior leadership. Part 3 measures the motivating factor, and Part 4 explores the status of work engagement they experienced in their respective area.

The questionnaire section where they are asked to write down their names is optional; if they want to conceal their identities, they can also adopt a pseudonym. All other questions, except for the name portion, must have a single response. They are asked to fill out the required information in the provided space or tick the box next to the appropriate response. They are all asked to provide honest answers

to every question. The researcher collects all completed surveys and gets in touch with participants about things that are important to this study. They may call the researcher at the number provided if they have any queries, and they will be given immediate attention.

During the administration of the survey questionnaire, the participants are given ample time to answer the survey and test questionnaire and are encouraged to ask for clarifications. If they choose to answer the questionnaires at home, the researcher reminds them that they can contact him for any clarifications that may arise via the contact number 09952950807 and email addresses [jrangcasajo@liceo.edu.ph](mailto:jrangcasajo@liceo.edu.ph), or they can contact Engr. Dominic T. Polancos, MPA, LPT, Director of Research Ethics Board of Liceo de Cagayan University, Carmen, Kauswagan Blvd., 9000 Cagayan de Oro City, through the following Email: [liceoreb@liceo.edu.ph](mailto:liceoreb@liceo.edu.ph) and Tel: +63 9275718184.

The participants' participation in this research study is voluntary, and at any time during the conduct of the study, they are free to withdraw from further participation. Those who agree to participate are to answer the prepared survey questionnaire. It will take only 10 to 15 minutes of their time to answer the said questionnaires.

In terms of community consideration, when utilizing the research questionnaire, the researcher ensures that each item in the specified indicators acknowledged in this study does not indicate any prejudice towards race, gender, sexual orientation and preferences, religion, politics, and culture. The study accentuates the importance of research in the management and administration of public basic education systems, and it aimed to strengthen research by taking into account teacher burnout and how it may be explained by organizational variables, thereby promoting evidence-based decision-making and policymaking in a variety of areas, which leads to further education practice improvement.

After completing the survey questionnaires, the instruments are retrieved. The answers in the questionnaire were considered confidential and used solely for academic purposes. The data are coded and kept in a secure repository. No individual identities are used in any reports or publications resulting from the study. Only research personnel have access, and only those with an essential need to see names or other identifying information would have access to that file. The researcher personally handles the respondents' answers to the survey questionnaire in a confidential manner. The data are appropriately disposed of once the data are finalized, which constitutes the researcher's data protection plan.

The ethical standards of goodwill and respect are frequently linked to the researcher's obligation to protect privacy and secrecy. The researcher ensures that respondents' personal information and details are kept for personal use only, never shared, and never publicized. To put everything in perspective, the participants' personal information and responses are collected and processed in compliance with the Data Privacy Act of 2012 and its corresponding regulations and rules.

All the participants are adequately oriented in terms of sharing and disseminating the research findings. The research findings will probably be shared more broadly, such as via publications, whether digital (journal) or the conventional hardbound made available at the graduate school library, Commission on Higher Education (CHED), and the chosen Higher Education Institutions (HEIs). If given a chance to be selected and present this study and participate in research conferences, the findings will also be shared.

The findings of this study can be presented at research conferences or congresses focusing on educational trends in today's modern world if the researcher is given a chance. The researcher highly accepts that attending such academic events is a great way to be exposed to the latest studies and ideas related to the education field. If there is a chance for this study to be published in a journal, the researcher is more than willing to do so because it will not be limited to the researcher's field, and the discoverability will be increased for people outside of the researcher's immediate circle of contacts and colleagues. Furthermore, preserving this work in the permanent archives of educational research is highly beneficial.

## **Data Analysis**

The following statistical tools are used to make the analysis and interpretation of data easier:

For problems 1, 2, 3, and 4, the researcher employs descriptive statistics analysis, such as the mean and standard deviation, to quantify the level of job satisfaction, superior leadership, motivation capabilities, and NF engineers' work engagement. The mean (average) is considered the definitive and reasonable measure of central tendency (S, 2011; Khorana et al., 2022). Using the mean, the researcher answers the statement of problems one to four.

Standard Deviation. The researcher needed insight regarding how much variation existed in the responses from the respondents coming from the data set about the mean. It is, for this reason, the researcher utilized standard deviation to quantify the data set's dispersion from the calculated mean (Khorana et al., 2022), which is determined as the square root of the variance (Firoz et al., 2016).

For problem number 5, the researcher used the Pearson  $r$  to establish the relationship among the variables. The researcher used Pearson's Product-Moment Correlation Coefficient, wherein, through this statistical tool, the variable's degree of relationship is identified (Alsaqr, 2021). Notably, Pearson's Product-Moment Correlation Coefficient is used in answering the statement of problem number five (5).

For problem number 6, the researcher used multiple linear regression to identify the variables that predict work engagement. The researcher predicts, determines, and characterizes the relationship between various indicators of the independent variables. It was done statistically only using linear regression, wherein the degree and nature of an influence between domains are determined accordingly.



This discovers whether a relationship or influence between the indicators exists at all (Mirghaderi & Ghiri, 2019; Hair et al., 2019). Using linear regression, the researcher answers the statement of problem number six (6) in this study.

For problem number 7, the researcher used Structural Equation Modeling (SEM) to determine the best-fit model of millennial engineers' work engagement. A hypothesized model showing directional and non-directional correlations between latent and observable variables is built using SEM. SEM is frequently employed to decide whether a model must consider covariation and variation of latent and observable factors (Karakaya-Ozyer & Aksu-Dunya, 2018). Furthermore, once analysis methods are performed correctly, SEM can be used to solve two significant problems: theory creation and construct confirmation.

Measurement and structural models are the two core parts of SEM (Karakaya-Ozyer & Aksu-Dunya, 2018). The measurement model, which uses confirmatory factor analysis to determine whether the data fit the suggested model, validates this. The measurement model connects latent variables and numerous observable variables. The structural model shows how the model's latent variables are related. SEM will provide a solution for Problem 7 on the best model fit for teacher burnout.

## Results and Discussion

This section presents, analyzes, and interprets the data collected from the respondents of the study. The gathered information is systematically organized and displayed through tables and figures to ensure clarity and ease of understanding. Multiple regression analysis, correlation statistics, and descriptive statistics were presented and discussed. Findings are interpreted to provide relevant insights and to explain how the results address the study's problems and hypotheses. Furthermore, the comprehensive presentation and interpretation of the results in this section lay the groundwork for the conclusions and recommendations, which will be discussed in the subsequent section.

### What is the level of job satisfaction in terms of Existence, Relatedness, and Growth?

Table 1. Results of Mean and Standard Deviation for the Participants' Level of Job Satisfaction in terms of Existence

Indicators	Mean	SD	Description	Interpretation
1. I feel that my salary is fair in relation to my workload.	3.83	.927	Agree	Satisfied
2. I am satisfied with how company policies are executed in practice.	4.01	.869	Agree	Satisfied
3. I am satisfied with the working conditions in my workplace.	4.08	.807	Agree	Satisfied
4. I am confident in the stability and security my job offers.	3.85	1.04	Agree	Satisfied
5. The ability to stay active throughout the day.	3.75	1.05	Agree	Satisfied
6. I have access to the tools and resources needed to perform my job effectively.	4.07	.879	Agree	Satisfied
7. I have access to adequate healthcare benefits through my job.	3.67	1.13	Agree	Satisfied
Composite Mean	3.90	.733	Agree	Satisfied

Legend: Scale – Range – Descriptive Rating – Interpretation: 5 (4.51–5.00) – Strongly Agree – Very Satisfied; 4 (3.51–4.50) – Agree – Satisfied; 3 (2.51–3.50) – Neutral – Moderately Satisfied; 2 (1.51–2.50) – Disagree – Less Satisfied; 1 (1.00–1.50) – Strongly Disagree – Not Satisfied.

Table 1 presents the level of job satisfaction of the participants in terms of existence needs. The composite mean of 3.90 with a standard deviation of 0.733 indicates a satisfactory level of job satisfaction, suggesting that employees generally agree that their basic existence-related needs are adequately met in the workplace. The composite SD shows that responses were moderately consistent across indicators, reflecting a generally uniform perception among employees regarding existence-related aspects of their job. This aligns with Alderfer's ERG theory, which states that existence needs—such as fair compensation, job security, and adequate working conditions—form the basic foundation of employee well-being. He and Phatthararuethai Kenikasahmanworakhun (2024) highlighted that meeting these needs contributes significantly to employees' sense of stability and workplace satisfaction.

Among the indicators, Indicator 3, "I am satisfied with the working conditions in my workplace," obtained the highest mean (M = 4.08, SD = 0.807), showing that participants are most satisfied with their working conditions. This is followed by Indicator 6, "I have access to the tools and resources needed to perform my job effectively," which recorded a mean of 4.07 (SD = 0.879). Indicator 2, "I am satisfied with how company policies are executed in practice," also rated highly (M = 4.01, SD = 0.869), indicating favorable views toward policy implementation.

The participants' high ratings for working conditions (M = 4.08) and access to tools and resources (M = 4.07) support claims by Davidescu et al. (2020), who found that fulfillment of fundamental needs enhances retention and reduces turnover. Additionally, the results mirror Miller's (2022) findings on how companies such as Nestlé promote existence satisfaction by providing adequate resources, health programs, and workplace stability. These literature sources reinforce that fair salary, job stability, and supportive working conditions significantly contribute to positive employee attitudes toward their job.

The lowest mean was observed in Indicator 7, "I have access to adequate healthcare benefits through my job," which obtained a mean of 3.67 (SD = 1.13). Although this remains within the high interpretation range, the larger standard deviation reflects more varied employee experiences in terms of healthcare benefits. Indicator 5, "The ability to stay active throughout the day," with a mean of 3.75 (SD = 1.05), also shows moderate variability in responses. Overall, the results indicate that participants experience a satisfied level of job satisfaction regarding existence-related factors. All indicators fall within the high interpretation range, and the composite SD of 0.733 supports that employees generally share similar perceptions of their compensation, working conditions, job stability, and



availability of essential tools and benefits.

Table 2. Results of Mean and Standard Deviation for the Participants' Level of Job Satisfaction in terms of Relatedness

Indicators	Mean	SD	Description	Interpretation
1. I am satisfied with my supervisor's knowledge in decision-making	3.91	.931	Agree	Satisfied
2. I feel that my job allows me to uphold my moral values.	4.10	.844	Agree	Satisfied
3. I appreciate the harmony and cooperation among my colleagues.	3.98	.862	Agree	Satisfied
4. I value the opportunity to assist others in my role.	4.31	.609	Agree	Satisfied
5. I enjoy the chance to direct or lead others in my position.	4.31	.598	Agree	Satisfied
6. I feel respected and valued by my colleagues and superiors.	4.20	.760	Agree	Satisfied
7. I have meaningful interactions and communication with others in my workplace.	4.11	.695	Agree	Satisfied
<b>Composite Mean</b>	<b>4.13</b>	<b>.591</b>	<b>Agree</b>	<b>Satisfied</b>

Legend: Scale – Range – Descriptive Rating – Interpretation: 5 (4.51–5.00) – Strongly Agree – Very Satisfied; 4 (3.51–4.50) – Agree – Satisfied; 3 (2.51–3.50) – Neutral – Moderately Satisfied; 2 (1.51–2.50) – Disagree – Less Satisfied; 1 (1.00–1.50) – Strongly Disagree – Not Satisfied.

Table 2 presents the participants' level of job satisfaction in terms of relatedness needs. The composite mean of 4.13 with a standard deviation of 0.591 indicates a satisfactory level of satisfaction. This suggests that employees generally agree that their interpersonal relationships and social interactions within the workplace meet their expectations. The composite SD reflects relatively consistent responses across participants, demonstrating shared perceptions of relatedness factors. These findings strongly support Voet et al. (2022), who emphasized that positive social relationships, teamwork, and supportive interactions significantly enhance job satisfaction.

Among the indicators, Indicators 4 and 5 obtained the highest mean scores, each with a mean of 4.31. Indicator 4, "I value the opportunity to assist others in my role" (SD = 0.609), and Indicator 5, "I enjoy the chance to direct or lead others in my position" (SD = 0.598), show that employees express strong satisfaction regarding opportunities for helping, guiding, or leading others in the workplace. These results highlight the positive influence of prosocial and leadership-related experiences on job satisfaction.

Indicator 6, "I feel respected and valued by my colleagues and superiors," also shows high satisfaction with a mean of 4.20 (SD = 0.760), underscoring the importance of mutual respect and recognition within the organization. Similarly, Indicator 7, "I have meaningful interactions and communication with others in my workplace," recorded a mean of 4.11 (SD = 0.695), reflecting favorable perceptions of workplace communication.

Miller (2022) highlighted that initiatives promoting workplace communication and social integration—such as team collaboration programs and enhanced onboarding—strengthen employees' sense of belonging. This is reflected in the participants' high agreement that they feel respected (M = 4.20) and experience meaningful interactions in the workplace (M = 4.11). These findings are consistent with Alderfer's ERG theory, which emphasizes that fulfilling relatedness needs increases employee motivation and overall workplace satisfaction.

The lowest mean was observed in Indicator 1, "I am satisfied with my supervisor's knowledge in decision-making," with a mean of 3.91 (SD = 0.931). Although this is still interpreted as satisfied, the higher standard deviation indicates more varied views in this area. Indicator 3, "I appreciate the harmony and cooperation among my colleagues," with a mean of 3.98 (SD = 0.862), also reflects slight variability in satisfaction related to teamwork and workplace harmony. Overall, the findings demonstrate that employees experience a satisfied level of job satisfaction regarding relatedness needs. The composite mean of 4.13 and the consistently satisfied indicator means suggest that employees view their interactions, communication, respect, and opportunities to collaborate or lead others positively. The relatively low composite SD supports the interpretation that these perceptions are shared broadly among participants.

Table 3. Results of Mean and Standard Deviation for the Participants' Level of Job Satisfaction in terms of Growth

Indicators	Mean	SD	Description	Interpretation
1. I feel a sense of achievement from my work.	4.02	.811	Agree	Satisfied
2. I value the opportunities for career progression in my role.	3.76	1.119	Agree	Satisfied
3. The manner in which my supervisor manages the team.	3.92	.921	Agree	Satisfied
4. The opportunity to work independently.	4.12	.846	Agree	Satisfied
5. I am satisfied with the opportunity to use my skills and talents.	4.08	.930	Agree	Satisfied
6. The acknowledgement I receive for performing well.	3.91	.868	Agree	Satisfied
<b>Overall Mean</b>	<b>3.96</b>	<b>.689</b>	<b>Agree</b>	<b>Satisfied</b>

Legend: Scale – Range – Descriptive Rating – Interpretation: 5 (4.51–5.00) – Strongly Agree – Very Satisfied; 4 (3.51–4.50) – Agree – Satisfied; 3 (2.51–3.50) – Neutral – Moderately Satisfied; 2 (1.51–2.50) – Disagree – Less Satisfied; 1 (1.00–1.50) – Strongly Disagree – Not Satisfied.

Table 3 presents the participants' level of job satisfaction in terms of growth needs. The composite mean of 3.95 with a standard deviation of 0.688 indicates a satisfactory level of satisfaction. This suggests that employees generally agree that their opportunities for achievement, autonomy, skill utilization, and career development are adequately met. The composite SD reflects moderately consistent responses, indicating that participants share similar views regarding growth-related experiences in the workplace. These results support Tuan Ismail et al. (2023), who explained that growth needs—such as opportunities for autonomy, achievement, recognition, and advancement—strongly influence motivation and job satisfaction.

Among the indicators, Indicator 4, "The opportunity to work independently," obtained the highest mean (M = 4.11, SD = 0.846). This



shows that employees value autonomy in accomplishing their tasks. This is followed closely by Indicator 5, "I am satisfied with the opportunity to use my skills and talents," which recorded a mean of 4.08 (SD = 0.930), indicating that employees appreciate being able to apply their abilities effectively in their roles. Indicator 1, "I feel a sense of achievement from my work," also demonstrated high satisfaction with a mean of 4.02 (SD = 0.810). The high means associated with working independently (M = 4.12) and using skills and talents effectively (M = 4.08) reflect the literature's emphasis on personal development.

The lowest mean was observed in Indicator 2, "I value the opportunities for career progression in my role," which obtained a mean of 3.76 (SD = 1.11). Although still within the high interpretation range, the larger standard deviation indicates more varied perceptions regarding promotions or career advancement. Indicator 6, "The acknowledgement I receive for performing well," recorded a mean of 3.90 (SD = 0.867), reflecting generally positive but slightly varied satisfaction with recognition of performance. Likewise, Indicator 3, "The manner in which my supervisor manages the team," with a mean of 3.91 (SD = 0.920), suggests generally favorable but somewhat diverse opinions about supervisory management. Overall, the results indicate that employees experience a level of job satisfaction regarding growth needs. The composite mean of 3.95 and the consistently high scores across indicators show that employees perceive adequate opportunities for achievement, autonomy, skill use, recognition, and development within the organization. The composite SD of 0.688 supports the observation that these perceptions are relatively uniform among participants.

Karaferis et al. (2022) found that employees thrive when given opportunities for professional development and innovation, while Miller (2022) emphasized the importance of programs—such as innovation ecosystems—that foster employee growth. The participants' responses also align with Alderfer's ERG theory, which allows motivation to continue even when lower-level needs fluctuate. Collectively, the results and literature affirm that growth opportunities significantly enhance workplace satisfaction and employee engagement.

**Table 4. Summary of Results of Mean and Standard Deviation for the Participants' Level of Job Satisfaction**

<i>Sub-variable</i>	<i>Mean</i>	<i>SD</i>	<i>Description</i>	<i>Interpretation</i>
Existence	3.90	.733	Agree	Satisfied
Relatedness	4.13	.591	Agree	Satisfied
Growth	3.95	.688	Agree	Satisfied
<b>Overall Mean</b>	<b>3.99</b>	<b>.620</b>	<b>Agree</b>	<b>Satisfied</b>

*Legend: Scale – Range – Descriptive Rating – Interpretation: 5 (4.51–5.00) – Strongly Agree – Very Satisfied; 4 (3.51–4.50) – Agree – Satisfied; 3 (2.51–3.50) – Neutral – Moderately Satisfied; 2 (1.51–2.50) – Disagree – Less Satisfied; 1 (1.00–1.50) – Strongly Disagree – Not Satisfied.*

Table 4 summarizes the participants' level of job satisfaction across the three sub-constructs of existence, relatedness, and growth. The overall mean of 3.99 with a standard deviation of 0.620 indicates that participants demonstrate a satisfactory level of job satisfaction. The overall SD reflects relatively consistent responses across all dimensions, suggesting a generally uniform perception of job satisfaction among the respondents.

Among the sub-constructs, relatedness obtained the highest mean of 4.13 (SD = 0.591), indicating that employees are most satisfied with interpersonal relationships, communication, cooperation, and feelings of being valued in the workplace. This suggests that social interactions and relational support contribute significantly to their overall satisfaction. Growth recorded a mean of 3.95 (SD = 0.688), showing high satisfaction with opportunities for independence, skill utilization, achievement, and recognition. The SD indicates moderately consistent responses, suggesting that satisfaction with developmental opportunities is generally shared but with slight variation in employee experiences.

Existence obtained a mean of 3.90 (SD = 0.733), also interpreted as satisfied, indicating that employees feel adequately supported in terms of foundational job-related needs such as compensation fairness, working conditions, job security, and available resources. The slightly higher SD suggests more variability in responses, particularly in areas such as healthcare benefits and physical activity opportunities. Overall, the results reflect that employees maintain a uniformly satisfied level of job satisfaction across all three sub-constructs, with relatedness emerging as the strongest area. The overall mean of 3.99 and the moderate variability indicated by the SD of 0.620 show that employees share positive perceptions of their workplace experiences, contributing to a favorable organizational climate.

Recent studies have affirmed that satisfaction of relatedness needs, including positive interpersonal interactions and team cohesion, significantly reduces job burnout and supports organizational commitment. For instance, Lyu and Zhu (2017) and Chen and Li (2018) found that good workplace relationships mitigate emotional exhaustion—a key finding echoed by the higher mean score for relatedness. Similarly, growth factors encompassing autonomy, opportunities for achievement, and skill use are widely documented as central to sustained job motivation and personal fulfillment (Herzberg, 1966, as cited in Bhatt et al., 2022). The satisfied score on growth (mean = 3.95) in the results directly complements this literature, demonstrating a generally uniform perception that developmental opportunities foster satisfaction.

Existence needs, including compensation fairness and safe working conditions, scored slightly lower and with greater variability in the data. This is mirrored in research noting that while hygiene factors such as salary and job security are foundational, their improvement alone does not guarantee satisfaction but rather prevents dissatisfaction (Herzberg, 1966, as cited in Bhatt et al.; Alrawahi et al., 2020). The literature supports the idea that addressing existential needs is necessary for maintaining satisfaction, as evidenced in the moderate



but positive score for existence in the research findings. Furthermore, the result that relatedness scored highest suggests the critical role of interpersonal and social-emotional factors in shaping satisfaction, confirming broader organizational psychology findings that positive social climates improve job embeddedness, commitment, and reduce negative outcomes like burnout.

**What is the level of assessment of the leadership skills of their work superiors in terms of Intellectual Simulation, Idealized Influence, Inspiration, Motivation, and Individual Consideration?**

Table 5. Results of Mean and Standard Deviation for the Participants’ Level of Assessment of the Leadership Skills of their Work Superiors in terms of Intellectual Simulation

Indicators	Mean	SD	Description	Interpretation
1. Reassesses key assumptions to determine work relevance.	3.90	.763	Agree	High
2. Seeks out varied perspectives in problem-solving.	4.04	.728	Agree	High
3. Emphasizes the significance of having a clear sense of purpose.	4.03	.821	Agree	High
4. Allows issues to persist before taking corrective measures.	3.74	.919	Agree	High
5. Encourages me to view issues from multiple perspectives.	3.96	.947	Agree	High
6. Proposes innovative approaches to completing tasks.	4.01	.812	Agree	High
7. Invests time in teaching and mentoring.	3.86	.989	Agree	High
8. Keeps a record of all errors.	3.68	.997	Agree	High
9. Highlights areas where performance falls short of expectations.	3.79	1.07	Agree	High
10. Clearly defines who is accountable for meeting performance goals.	3.86	.985	Agree	High
<b>Composite Mean</b>	<b>3.90</b>	<b>.700</b>	<b>Agree</b>	<b>High</b>

Legend: Scale – Range – Descriptive Rating – Interpretation: 5 (4.51–5.00) – Strongly Agree – Very High; 4 (3.51–4.50) – Agree – High; 3 (2.51–3.50) – Undecided – Moderately High; 2 (1.51–2.50) – Disagree – Low; 1 (1.00–1.50) – Strongly Disagree – Very Low.

Table 5 presents the participants’ assessment of the leadership skills of their work superiors in terms of intellectual stimulation. The composite mean of 3.90 with a standard deviation of 0.700 indicates a high level of agreement, showing that employees generally perceive their superiors as intellectually stimulating leaders. The composite SD reflects moderately consistent responses across indicators. This suggests that leaders consistently encourage critical thinking, creativity, and the exploration of new solutions. These findings are strongly supported by Cardona et al. (2018), who explain that intellectual stimulation inspires employees to question assumptions and approach tasks innovatively. Leaders who stimulate thinking cultivate an environment in which employees feel free to challenge traditional work methods, resulting in improved performance.

Among the indicators, Indicator 2, "Seeks out varied perspectives in problem-solving," obtained one of the highest means ( $M = 4.04$ ,  $SD = 0.728$ ), suggesting that employees observe their superiors actively considering diverse viewpoints when addressing issues. Similarly, Indicator 3, "Emphasizes the significance of having a clear sense of purpose," recorded a mean of 4.03 ( $SD = 0.821$ ), indicating that leaders are perceived to be effective in reinforcing purpose and direction. Indicator 6, "Proposes innovative approaches to completing tasks," also demonstrates high satisfaction with a mean of 4.01 ( $SD = 0.812$ ), showing that leaders encourage creativity and improvement in work processes. Additionally, Ganga et al. (2017) found that when leaders promote intellectual stimulation, employees develop stronger analytical skills and perform tasks more effectively. This parallels the high ratings for items such as proposing innovative approaches ( $M = 4.01$ ) and seeking varied perspectives ( $M = 4.04$ ). Employees in the present study perceive their leaders as individuals who value diversity of thought and encourage collaborative problem-solving.

The lowest mean was observed in Indicator 8, "Keeps a record of all errors," which obtained a mean of 3.68 ( $SD = 0.997$ ). Although still within the high range, the higher standard deviation suggests more varied perceptions among employees regarding error documentation practices. Indicator 9, "Highlights areas where performance falls short of expectations," recorded a mean of 3.79 ( $SD = 1.07$ ), reflecting relatively high variability in how employees perceive performance-related feedback. Indicator 4, "Allows issues to persist before taking corrective measures," with a mean of 3.74 ( $SD = 0.919$ ), also indicates differing levels of agreement regarding leaders’ timeliness in addressing concerns.

Furthermore, Shafi et al. (2020) highlighted the significance of intellectual stimulation in prompting innovation—something essential in dynamic work settings. The respondents’ agreement that their leaders emphasize purpose ( $M = 4.03$ ) and encourage multiple viewpoints ( $M = 3.96$ ) aligns with literature that identifies intellectual stimulation as a driver of creativity and adaptability. Overall, the results show that employees maintain a high level of positive assessment of their superiors’ intellectual stimulation skills. The composite mean of 3.90 reflects strong agreement that leaders encourage critical thinking, innovation, purposeful work, and diverse perspectives. The composite SD of 0.700 suggests that while perceptions are generally consistent, certain leadership behaviors—particularly those related to error handling and performance correction—exhibit more variability in employee experiences.

Table 6 presents the participants’ assessment of the leadership skills of their work superiors in terms of idealized influence. The composite mean of 3.88 with a standard deviation of 0.840 indicates a high level of agreement. This suggests that employees generally perceive their superiors as leaders who model appropriate behavior, uphold values, and inspire confidence. The composite SD reflects moderate variability in responses, showing that while most employees share positive perceptions, experiences differ somewhat across specific leadership behaviors. Among the indicators, Indicator 1, "Shares their core values and beliefs," recorded one of the highest means ( $M = 4.03$ ,  $SD = 0.925$ ), indicating that employees recognize their leaders as individuals who openly share guiding principles.



Indicator 9, "Prioritizes the group's interests over personal gain," also shows a high level of agreement (M = 4.00, SD = 0.971), suggesting that leaders are perceived as selfless and group-oriented. Indicator 10, "Leads a group that achieves its goals efficiently," obtained a mean of 3.99 (SD = 0.992), showing confidence in leaders' ability to guide teams effectively.

Table 6. Results of Mean and Standard Deviation for the Participants' Level of Assessment of the Leadership Skills of their Work Superiors in terms of Idealized Influence

Indicators	Mean	SD	Description	Interpretation
1. Shares their core values and beliefs.	4.03	.925	Agree	High
2. Makes me proud to be associated with them.	3.90	.982	Agree	High
3. Focuses solely on addressing errors, grievances, and shortfalls.	3.53	.951	Agree	High
4. Considers the ethical and moral implications of decisions.	3.90	.952	Agree	High
5. Exudes confidence and authority.	3.86	1.01	Agree	High
6. Collaborates with me effectively.	3.81	.906	Agree	High
7. Conducts themselves in ways that earn my respect.	3.94	1.01	Agree	High
8. Motivates me to exceed my initial expectations.	3.89	.974	Agree	High
9. Prioritizes the group's interests over personal gain.	4.00	.971	Agree	High
10. Leads a group that achieves its goals efficiently.	3.99	.992	Agree	High
<b>Composite Mean</b>	<b>3.88</b>	<b>.840</b>	<b>Agree</b>	<b>High</b>

Legend: Scale – Range – Descriptive Rating – Interpretation: 5 (4.51–5.00) – Strongly Agree – Very High; 4 (3.51–4.50) – Agree – High; 3 (2.51–3.50) – Undecided – Moderately High; 2 (1.51–2.50) – Disagree – Low; 1 (1.00–1.50) – Strongly Disagree – Very Low.

The lowest mean was observed in Indicator 3, "Focuses solely on addressing errors, grievances, and shortfalls," which obtained a mean of 3.53 (SD = 0.951). Although this still falls within the high interpretation range, the content of the item suggests that leaders may be perceived as more corrective than supportive at times. Indicators 5 and 7, "Exudes confidence and authority" (M = 3.86, SD = 1.01) and "Conducts themselves in ways that earn my respect" (M = 3.94, SD = 1.01), reflect high means but also show the greatest variability due to the larger standard deviations. These values indicate that perceptions of respect and authority differ more widely among employees.

Avolio et al. (2018, as cited in Khan et al., 2022) describe idealized influence as the charismatic dimension of transformational leadership, where leaders earn the trust and admiration of followers. The high score for sharing core beliefs (M = 4.03) reflects this. According to Mittal (2015), leaders exhibiting idealized influence communicate compelling visions that build confidence among followers. This aligns with the respondents' perceptions that their leaders motivate them to exceed expectations (M = 3.89) and prioritize the group's interests (M = 4.00). Employees appear to recognize their superiors as ethical, trustworthy, and mission-driven.

Furthermore, Supratman et al. (2021) emphasized that charismatic leaders build employee commitment through clear communication and confidence, supported by the result that leaders earn respect (M = 3.94) and lead goal-oriented groups (M = 3.99). This suggests that leaders guide employees through influence rather than positional authority. Johnson (2019) also stresses that idealized influence reinforces ethical work climates. With employees agreeing that leaders consider moral implications (M = 3.90), the findings support the notion that ethical leadership is central to fostering trust and credibility.

Overall, the results demonstrate a high level of positive assessment of leaders' idealized influence. The composite mean of 3.88 suggests that employees generally view their work superiors as ethical, principled, and capable leaders who foster motivation and trust within the group. The composite SD of 0.840 indicates moderately varied experiences, particularly in areas related to authority, respect, and corrective leadership behaviors. Thus, the study's results closely mirror the literature: leaders who model integrity and competence elevate organizational effectiveness and employee engagement.

Table 7. Results of Mean and Standard Deviation for the Participants' Level of Assessment of the Leadership Skills of their Work Superiors in terms of Inspiration and Motivation

Indicators	Mean	SD	Description	Interpretation
1. Speaks with optimism about prospects.	4.03	.895	Agree	High
2. Communicates enthusiastically about necessary achievements.	4.06	.947	Agree	High
3. Provides a clear and compelling vision for the future.	3.93	1.01	Agree	High
4. Stresses the need for a shared mission.	3.98	1.00	Agree	High
5. Conveys confidence in achieving objectives.	4.01	.978	Agree	High
6. Enhances my motivation to succeed.	3.98	.969	Agree	High
7. Clarifies rewards tied to meeting performance goals.	3.77	1.11	Agree	High
8. Employs leadership styles that fulfill needs.	3.89	1.01	Agree	High
9. Efficiently meets organizational demands.	3.98	.999	Agree	High
10. Expresses appreciation when expectations are met.	3.92	.945	Agree	High
<b>Composite Mean</b>	<b>3.94</b>	<b>.880</b>	<b>Agree</b>	<b>High</b>

Legend: Scale – Range – Descriptive Rating – Interpretation: 5 (4.51–5.00) – Strongly Agree – Very High; 4 (3.51–4.50) – Agree – High; 3 (2.51–3.50) – Undecided – Moderately High; 2 (1.51–2.50) – Disagree – Low; 1 (1.00–1.50) – Strongly Disagree – Very Low.

Table 7 presents the participants' assessment of the leadership skills of their work superiors in terms of inspirational motivation. The composite mean of 3.94 with a standard deviation of 0.880 indicates a high level of agreement, suggesting that employees generally



perceive their leaders as capable of inspiring, motivating, and communicating clear expectations. The composite SD shows moderate variability in responses, indicating that while employees share positive views overall, experiences differ somewhat across specific behaviors. This aligns strongly with Bass and Riggio (2006, as cited in Mburu et. al, 2024), who explain that transformational leaders motivate followers by inspiring a shared mission.

Among the indicators, Indicator 2, "Communicates enthusiastically about necessary achievements," obtained the highest mean ( $M = 4.06$ ,  $SD = 0.947$ ), indicating that leaders are seen as enthusiastic communicators who energize employees about essential goals. Indicator 1, "Speaks with optimism about prospects" ( $M = 4.03$ ,  $SD = 0.895$ ), and Indicator 5, "Conveys confidence in achieving objectives" ( $M = 4.01$ ,  $SD = 0.978$ ), also show strong agreement, demonstrating that leaders are perceived as optimistic and confident in achieving both individual and organizational goals.

Indicators 3, 4, and 6 also recorded high levels of satisfaction. Indicator 3, "Provides a clear and compelling vision for the future" ( $M = 3.93$ ,  $SD = 1.01$ ), and Indicator 4, "Stresses the need for a shared mission" ( $M = 3.98$ ,  $SD = 1.00$ ), show that leaders effectively highlight vision and collective purpose. Indicator 6, "Enhances my motivation to succeed," obtained a mean of 3.98 ( $SD = 0.969$ ), reflecting employees' recognition of leaders' ability to boost motivation. The lowest mean was observed in Indicator 7, "Clarifies rewards tied to meeting performance goals" ( $M = 3.77$ ,  $SD = 1.11$ ). Although still in the high interpretation range, the higher SD indicates more varied perceptions regarding the clarity of performance-based rewards. Indicator 8, "Employs leadership styles that fulfill needs" ( $M = 3.89$ ,  $SD = 1.01$ ), and Indicator 9, "Efficiently meets organizational demands" ( $M = 3.98$ ,  $SD = 0.999$ ), likewise show notable variability in responses.

Kouzes and Posner (2017, as cited in Wilson Heenan et al., 2023) emphasized that leaders must articulate clear values and display commitment to those values in order to inspire teams. The high ratings for enthusiasm in communicating achievements ( $M = 4.06$ ) and optimism about the future ( $M = 4.03$ ) support this claim. Leaders appear to energize their teams by creating a positive and future-oriented atmosphere.

Northouse (2010, as cited in Billups, 2016) further explained that inspirational leaders elevate followers' self-belief and teamwork. This is reflected in the results, where employees agree that leaders enhance their motivation to succeed ( $M = 3.98$ ). Huo et al. (2020, as cited in Safdar, 2022) likewise argued that leaders who instill confidence help improve job satisfaction and commitment.

Research by Valldeu et al. (2021) revealed that Millennials place strong value on inspirational motivation when facing organizational challenges. This matches the findings showing that employees respond positively to leaders expressing appreciation ( $M = 3.92$ ) and emphasizing shared mission ( $M = 3.98$ ).

Overall, the findings indicate that employees perceive their leaders as effective in motivating and inspiring them toward organizational goals. The composite mean of 3.94 reflects high agreement across indicators, suggesting strong leadership performance in communicating vision, fostering confidence, encouraging shared mission, and promoting motivation. The composite SD of 0.880 shows that while the general perception is positive, some leadership behaviors—particularly those involving reward clarity—vary in consistency among employees' experiences.

Table 8. Results of Mean and Standard Deviation for the Participants' Level of Assessment of the Leadership Skills of their Work Superiors in terms of Individual Consideration

Indicators	Mean	SD	Description	Interpretation
1. Concentrates on anomalies, mistakes, and deviations from norms.	3.91	.893	Agree	High
2. Boosts my determination to work harder.	3.31	1.10	Undecided	Moderately High
3. Allows problems to escalate before getting involved.	3.77	1.02	Agree	High
4. Steers clear of involvement when crucial issues surface.	3.99	.901	Agree	High
5. Is unavailable when required.	3.60	1.16	Agree	High
6. Waits for things to go awry before intervening.	3.55	1.08	Agree	High
7. Adheres to the belief of "If it ain't broke, don't fix it."	3.63	1.04	Agree	High
8. Avoids making decisions.	3.36	1.17	Undecided	Moderately High
9. Is slow to respond to urgent inquiries.	2.66	1.13	Undecided	Moderately High
<b>Composite Mean</b>	<b>3.56</b>	<b>.647</b>	<b>Agree</b>	<b>High</b>

Legend: Scale – Range – Descriptive Rating – Interpretation: 5 (4.51–5.00) – Strongly Agree – Very High; 4 (3.51–4.50) – Agree – High; 3 (2.51–3.50) – Undecided – Moderately High; 2 (1.51–2.50) – Disagree – Low; 1 (1.00–1.50) – Strongly Disagree – Very Low.

Table 8 presents the participants' assessment of the leadership skills of their work superiors in terms of individual consideration. The composite mean of 3.56 with a standard deviation of 0.647 indicates a high level of agreement, suggesting that employees generally perceive their leaders as showing concern for individual needs and supporting their development. The composite SD reflects moderate variability, indicating that perceptions differ somewhat across specific leadership behaviors. This suggests employees perceive their leaders as providing personalized support, though variability exists. Anthony (2017) highlights that individual consideration involves coaching, mentoring, and recognizing followers' unique needs—an area where employees report mixed experiences.

Among the indicators, Indicator 1, "Concentrates on anomalies, mistakes, and deviations from norms," obtained a high mean ( $M = 3.91$ ,  $SD = 0.893$ ), showing that leaders are observed as attentive to errors and deviations. Indicator 3, "Allows problems to escalate



before getting involved" (M = 3.77, SD = 1.02), and Indicator 4, "Steers clear of involvement when crucial issues surface" (M = 3.99, SD = 0.901), also demonstrate high agreement, suggesting that leaders' involvement is noticed but may vary in timeliness. Indicators 5, 6, and 7, including being unavailable when required (M = 3.60, SD = 1.16), waiting for things to go awry before intervening (M = 3.55, SD = 1.08), and adhering to the belief of "If it ain't broke, don't fix it" (M = 3.63, SD = 1.04), likewise show high agreement but with some variability, reflecting that employees perceive both supportive and reactive behaviors.

The lowest means were observed in Indicator 2, "Boosts my determination to work harder" (M = 3.31, SD = 1.10), Indicator 8, "Avoids making decisions" (M = 3.36, SD = 1.17), and Indicator 9, "Is slow to respond to urgent inquiries" (M = 2.66, SD = 1.13). These items fall within the moderately high range, indicating that employees experience less consistent support and responsiveness from their leaders in these areas.

Messmann et al. (2021) note that leaders enhance employee growth by supporting independence in tasks and valuing opinions. This is moderately reflected in the findings, although lower means for boosting determination (M = 3.31) and responsiveness (M = 2.66) indicate inconsistency.

Sahai (2020) emphasizes coaching as a driver of motivation and confidence. The present results show employees agreeing that leaders address deviations (M = 3.91) and solve issues (M = 3.77), aligning with literature stating that leaders must guide individuals through challenges. Aube (2015) found a strong positive relationship between individualized attention and job satisfaction, especially among younger employees. With Millennials valuing mentorship (Howe, 2014, as cited in Aubé, 2015), the variability in this study suggests that while some leaders offer individualized support, others fall short—highlighting an opportunity for improvement.

Overall, the findings indicate that employees perceive a high level of individual consideration from their leaders, with the composite mean of 3.56 reflecting general agreement. The composite SD of 0.647 suggests that while perceptions are generally positive, some variability exists, particularly regarding leaders' responsiveness, decision-making, and motivational behaviors.

Table 9. Summary of Results of Mean and Standard Deviation for the Participants' Level of Assessment of the Leadership Skills of their Work Superiors

Sub-variable	Mean	SD	Description	Interpretation
Intellectual Simulation	3.90	.700	Agree	High
Idealized Influence	3.88	.840	Agree	High
Inspirational Motivation	3.94	.880	Agree	High
Individual Consideration	3.56	.647	Agree	High
Composite Mean	3.82	.651	Agree	High

Legend: Scale – Range – Descriptive Rating – Interpretation: 5 (4.51–5.00) – Strongly Agree – Very High; 4 (3.51–4.50) – Agree – High; 3 (2.51–3.50) – Undecided – Moderately High; 2 (1.51–2.50) – Disagree – Low; 1 (1.00–1.50) – Strongly Disagree – Very Low.

Table 9 summarizes the participants' assessment of the leadership skills of their work superiors across the four sub-constructs of transformational leadership. The overall mean of 3.82 with a standard deviation of 0.651 indicates a high level of agreement, suggesting that employees generally perceive their superiors as demonstrating positive leadership behaviors. The composite SD reflects moderate consistency across the sub-constructs, showing that perceptions are generally shared but vary slightly among specific leadership dimensions.

Among the sub-constructs, Inspiration Motivation obtained the highest mean of 3.94 (SD = 0.880), indicating that leaders are most effective in inspiring and motivating employees toward achieving organizational goals. Intellectual Simulation follows closely with a mean of 3.90 (SD = 0.700), showing that employees perceive their leaders as encouraging critical thinking, innovation, and problem-solving. Individual Consideration recorded a mean of 3.56 (SD = 0.647), also interpreted as high, suggesting that leaders generally attend to the personal and developmental needs of employees, although some variability exists.

Idealized Influence obtained the lowest mean of 3.88 (SD = 0.840) and falls near the moderate-high range, indicating that employees perceive their leaders' ethical modeling, confidence, and inspirational behaviors positively but with slightly greater variability compared to other sub-constructs. Overall, the findings suggest that employees recognize their work superiors as exhibiting high levels of transformational leadership across all dimensions, with the overall mean of 3.82 reflecting strong agreement. The composite SD of 0.651 indicates that while employees share generally positive perceptions of leadership, experiences differ somewhat depending on specific leadership behaviors, particularly in the areas of idealized influence and individual consideration.

Recent empirical research strongly supports these findings. Transformational leadership has consistently been linked to enhanced employee commitment, engagement, and innovative behavior in organizations worldwide. Specifically, intellectual stimulation—where leaders encourage critical thinking and creativity—has been shown to positively influence employee willingness to propose new ideas and challenge the status quo (Rehmani et al., 2023; Karamally & Robertson, 2023).

Inspirational motivation, which scored the highest mean (M = 3.94), is widely regarded as a transformational leadership trait that enhances employees' drive, optimism, and collective purpose. Recent work by Rehmani et al. (2023) and Jiatong et al. (2022) confirms that inspirational motivation is a pivotal factor in stimulating employee engagement and organizational performance. Furthermore, for inspirational motivation, Wahab and Din (2024) demonstrated that leaders who communicate compelling visions and foster enthusiasm



significantly increase employees’ commitment and innovative output. Similarly, Tan (2025) found that both idealized influence and inspirational motivation have the strongest positive impact on employee motivation and ultimately organizational performance.

Idealized influence—leaders serving as ethical role models—has been shown to cultivate employee trust and shared organizational values. Moon and Lim (2025) concluded that idealized influence is critical for shaping organizational culture and improving collective performance in modern organizations. Moreover, individual consideration—leaders providing personalized support and mentoring—was highlighted by Adem et al. (2021), who found that individualized consideration strongly predicts job satisfaction and motivation, especially among teachers. Ribeiro et al. (2018) observed that individualized attention from superiors helps foster affective commitment and higher job performance, though, as seen in the results, there can be more variability in the perceived consistency of this dimension.

Across all four dimensions, recent meta-analytical work (Nguyen, Hooi, & Avvari, 2021) confirms that transformational leaders empower employees, help manage change, and cultivate climates of psychological safety and innovation. The results, noting consistently high ratings, illustrate that transformational leadership is highly valued and resonates with modern empirical findings.

**What is the level of assessment of their superior’s motivation capabilities in terms of Intrinsic and Extrinsic?**

Table 10. Results of Mean and Standard Deviation for the Level of Assessment of their Superiors’ Motivation Capabilities in terms of Intrinsic

Indicators	Mean	SD	Description	Interpretation
1. My superior allows me significant freedom in deciding how to perform my tasks and manage any issues that arise.	4.13	.801	Agree	High
2. My supervisor often asks for my suggestions when dealing with work-related challenges.	3.93	.922	Agree	High
3. I frequently experience a sense of achievement from my work.	3.78	1.01	Agree	High
4. The job I've selected aligns with my career goals.	3.90	.851	Agree	High
5. Overall, I am quite content with my job.	3.90	.841	Agree	High
6. I feel I have significant input in determining how my work is executed.	3.90	.860	Agree	High
7. My colleagues recognize my proficiency in what I do.	3.99	.690	Agree	High
8. I can freely share my thoughts and viewpoints at work.	3.88	.885	Agree	High
9. I've had the opportunity to acquire new and interesting skills in my role.	4.12	.717	Agree	High
10. My emotions and opinions are considered at the workplace.	4.08	.762	Agree	High
Composite Mean	3.90	.637	Agree	High

Legend: Scale – Range – Descriptive Rating – Interpretation: 5 (4.51–5.00) – Strongly Agree – Very High; 4 (3.51–4.50) – Agree – High; 3 (2.51–3.50) – Undecided – Moderately High; 2 (1.51–2.50) – Disagree – Low; 1 (1.00–1.50) – Strongly Disagree – Very Low.

Table 10 presents the participants’ assessment of their superior’s motivation capabilities in terms of intrinsic motivation. The composite mean of 3.90 with a standard deviation of 0.637 indicates a high level of agreement, suggesting that employees generally perceive their superiors as effectively supporting intrinsic motivation in the workplace. The composite SD reflects relatively consistent responses across all indicators, showing shared perceptions of leaders’ motivational behaviors. This aligns strongly with Self-Determination Theory, which emphasizes the role of autonomy, competence, and relatedness in fostering intrinsic motivation (Ryan & Deci, 2002, as cited in Davis, 2023). The highest-rated indicator—freedom in decision-making (M = 4.13)—mirrors the claim of Nabi et al. (2017), who found that autonomy significantly increases employees’ internal motivation and commitment.

Among the indicators, Indicator 1, "My superior allows me significant freedom in deciding how to perform my tasks and manage any issues that arise," recorded the highest mean (M = 4.13, SD = 0.801), indicating that employees value autonomy and perceive that their superiors provide opportunities for independent decision-making. Indicator 9, "I've had the opportunity to acquire new and interesting skills in my role" (M = 4.12, SD = 0.717). Indicator 10, "My emotions and opinions are considered at the workplace" (M = 4.08, SD = 0.762), also shows high agreement, highlighting that employees perceive skill development opportunities and consideration of personal input as important aspects of intrinsic motivation.

The findings support the assertion made by Lanfranchi and Narcy (2022) that employees experience stronger motivation when tasks align with personal values and when workplaces allow continual competence development. Additionally, Hancock et al. (2022) explain that intrinsic motivation thrives when employees perceive their work as meaningful and aligned with personal goals—consistent with respondents’ agreement about career alignment (M = 3.90) and job satisfaction (M = 3.90).

Indicators 2, 3, 4, 5, 6, 7, and 8 all obtained means ranging from 3.78 to 3.99, reflecting high agreement and demonstrating that employees perceive their superiors as encouraging participation, recognizing proficiency, and supporting career alignment and job satisfaction. The standard deviations, ranging from 0.690 to 1.01, indicate some variability in experiences, particularly regarding individual sense of achievement (Indicator 3, SD = 1.01) and solicitation of suggestions (Indicator 2, SD = 0.922).

Furthermore, Millennials' desire for challenging work and opportunities for growth (Weyland, 2011, as cited in Hee & Rhung, 2019) is reflected in the high mean for developing new skills. The literature also suggests that intrinsic motivation is essential for sustaining long-term engagement and performance (Hoxha & Ramadani, 2024), echoing employees’ perception that their superiors provide autonomy and meaningful involvement.



However, variability in indicators such as sense of achievement ( $SD = 1.01$ ) suggests some inconsistency in how intrinsic motivators are delivered. This aligns with Daşkin et al. (2023), who noted that intrinsic motivation may decrease when employees feel overwhelmed or when tasks exceed perceived competence. Overall, the findings strongly support the literature: intrinsic motivation is effectively nurtured when leaders provide autonomy, growth opportunities, emotional consideration, and meaningful work experiences. Overall, the results suggest that employees perceive their superiors as exhibiting strong intrinsic motivation capabilities. The composite mean of 3.90 indicates a high level of agreement that leaders foster autonomy, skill development, recognition, and employee involvement. The composite  $SD$  of 0.637 shows that these perceptions are generally consistent across participants, reflecting a positive and supportive work environment.

Table 11. Results of Mean and Standard Deviation for the Level of Assessment of the Superior’s Motivation Capabilities in terms of Extrinsic

Indicators	Mean	SD	Description	Interpretation
1. I am satisfied with my salary and workload.	3.53	1.08	Agree	High
2. I am content with the benefits package provided by my employer.	3.66	1.08	Agree	High
3. I am pleased with the vacation and leave policy at my workplace.	3.75	1.10	Agree	High
4. The compensation policy in my job seems equitable.	3.58	1.03	Agree	High
5. I am content with the facilities available for my work.	3.62	1.02	Agree	High
6. I am satisfied with the working conditions within my organization.	3.61	1.07	Agree	High
7. I am content with the overall quality of my work life.	3.83	.834	Agree	High
8. Teamwork in the organization is effective.	3.76	.909	Agree	High
9. I maintain friendly and professional relationships with my work colleagues.	4.27	.741	Agree	High
10. I have formed the necessary relationships to perform my duties effectively	4.15	.708	Agree	High
11. I am pleased with the professional growth opportunities in my role.	3.92	.742	Agree	High
12. My job offers regular chances for professional development.	3.96	.797	Agree	High
13. My organization is likely to promote me based on my skills and performance.	3.80	1.01	Agree	High
14. The possibility of advancement motivates me to excel in my role.	3.94	.805	Agree	High
15. I am satisfied with my superior’s decision-making skills.	3.75	1.07	Agree	High
Composite Mean	3.90	.637	Agree	High

Legend: Scale – Range – Descriptive Rating – Interpretation: 5 (4.51–5.00) – Strongly Agree – Very High; 4 (3.51–4.50) – Agree – High; 3 (2.51–3.50) – Undecided – Moderately High; 2 (1.51–2.50) – Disagree – Low; 1 (1.00–1.50) – Strongly Disagree – Very Low.

Table 11 presents the participants’ assessment of their superior’s motivation capabilities in terms of extrinsic motivation. The composite mean of 3.90 with a standard deviation of 0.637 indicates a high level of agreement, suggesting that employees generally perceive their superiors as effectively supporting extrinsic motivation through compensation, benefits, working conditions, and professional development opportunities. The composite  $SD$  reflects relatively consistent responses across indicators, demonstrating shared perceptions of extrinsic motivational practices. This aligns with London’s (2009, as cited in Singh, 2016) definition of extrinsic motivation as behavior driven by external rewards such as pay, benefits, recognition, and job stability.

Among the indicators, Indicator 9, "I maintain friendly and professional relationships with my work colleagues," recorded the highest mean ( $M = 4.27$ ,  $SD = 0.741$ ), highlighting that employees value supportive social relationships as part of extrinsic motivation. Indicator 10, "I have formed the necessary relationships to perform my duties effectively" ( $M = 4.15$ ,  $SD = 0.708$ ), also obtained a high mean, emphasizing the importance of collaborative work environments. Indicators 12 and 14, related to professional development and advancement opportunities, obtained means of 3.96 ( $SD = 0.797$ ) and 3.94 ( $SD = 0.805$ ), respectively, indicating that employees perceive these factors as motivating influences.

Indicators 1, 2, 3, 4, 5, 6, and 7, which include satisfaction with salary, benefits, facilities, working conditions, and overall quality of work life, obtained means ranging from 3.53 to 3.83, reflecting high agreement. The higher standard deviations in some of these items ( $SD$ s ranging from 1.02 to 1.10) suggest variability in perceptions of compensation, benefits, and policies. Indicators 11, 13, and 15 also reflect high satisfaction with professional growth, promotions, and workload management.

Employees rated professional relationships very highly ( $M = 4.27$ ), which reinforces Welch and Brantmeier’s (2021) findings that coworker relationships and supervisor support are powerful extrinsic motivators. Similarly, satisfaction with relationships necessary to perform duties ( $M = 4.15$ ) is consistent with Abdifatah et al. (2015), who emphasized that positive work environments increase performance and reduce turnover.

Satisfaction with promotion opportunities ( $M = 3.94$ ) and professional development ( $M = 3.96$ ) aligns with Nabi et al. (2017), who argue that advancement potential significantly increases employee motivation. Furthermore, the importance of salary and benefits—reflected in indicators 1 and 2—is consistent with Clarke’s (2018) Global Shapers Survey, which found that nearly half of young employees prioritize salary as a key factor in job decisions.

Additionally, Charles (2025) asserts that well-designed financial incentives strengthen employee creativity and engagement, echoed in the current study’s high satisfaction with compensation equity ( $M = 3.58$ ) and working conditions ( $M = 3.61$ ). The variability in  $SD$ s (e.g.,  $SD = 1.10$  for leave policies and  $SD = 1.07$  for working conditions) suggests differing perceptions about fairness and consistency of extrinsic rewards. This aligns with Morris et al. (2022), who argue that extrinsic motivation fluctuates depending on employees’



cost-benefit evaluations.

Overall, the findings suggest that employees perceive their superiors as effectively facilitating extrinsic motivation. The composite mean of 3.90 indicates strong agreement that leaders support satisfaction through rewards, benefits, working conditions, teamwork, and opportunities for growth. The composite SD of 0.637 shows that while perceptions are generally positive, some variation exists in experiences related to compensation, benefits, and workload.

Table 12. Summary of Results of Mean and Standard Deviation for the Level of Assessment of the Superior’s Motivation Capabilities

Sub-variable	Mean	SD	Description	Interpretation
Intrinsic	3.91	.638	Agree	High
Extrinsic	3.81	.684	Agree	High
Composite Mean	3.86	.626	Agree	High

Legend: Scale – Range – Descriptive Rating – Interpretation: 5 (4.51–5.00) – Strongly Agree – Very High; 4 (3.51–4.50) – Agree – High; 3 (2.51–3.50) – Undecided – Moderately High; 2 (1.51–2.50) – Disagree – Low; 1 (1.00–1.50) – Strongly Disagree – Very Low.

Table 12 summarizes the participants’ assessment of their superiors’ motivation capabilities across intrinsic and extrinsic dimensions. The overall mean of 3.85 with a standard deviation of 0.626 indicates a high level of agreement, suggesting that employees generally perceive their superiors as effectively motivating them through both intrinsic and extrinsic strategies. The composite SD reflects relatively consistent perceptions among participants, indicating shared experiences regarding their leaders’ motivational behaviors.

Among the sub-constructs, intrinsic motivation obtained the highest mean of 3.90 (SD = 0.637), showing that employees perceive their superiors as supporting autonomy, personal achievement, skill development, and recognition in the workplace. Extrinsic motivation recorded a slightly lower mean of 3.81 (SD = 0.683), indicating that leaders also provide effective support through compensation, benefits, working conditions, and professional development, though with slightly more variability in employee experiences. Overall, the results suggest that employees view their superiors as high-performing in fostering both intrinsic and extrinsic motivation. The overall mean of 3.85 and the moderate composite SD of 0.626 indicate that motivational practices are generally consistent across the organization, contributing positively to employees’ satisfaction, engagement, and performance. A meta-analysis by Lin et al. (2022) found that leadership styles emphasizing intrinsic motivation—such as transformational, servant, ethical, and empowering leadership—are consistently associated with higher levels of employee intrinsic motivation across a wide range of organizational settings. This aligns closely with the high mean for intrinsic motivation, suggesting that superiors who nurture autonomy, skill development, and personal achievement contribute substantially to employee satisfaction and engagement.

Similarly, recent research by Layek and Koodamara (2025) affirms that intrinsic motivation is a key driver of employee job performance and satisfaction. The results, which show intrinsic motivation rates higher than extrinsic, reflect this literature and underscore the importance of supporting employees’ internal growth needs. Regarding extrinsic motivation, Shaikh et al. (2019) observed that external factors—such as compensation, benefits, and working conditions—positively impact motivation and performance, though sometimes less strongly than intrinsic motivators. The slightly lower mean for extrinsic motivation suggests that, while effective, extrinsic factors might exhibit more variability due to differences in how they are distributed or perceived.

Furthermore, broader literature emphasizes that the consistency in motivation-related practices (reflected here in the low composite standard deviation) fosters a collective sense of fairness and cohesion within organizations (Brand & Walker, 2022). When superiors are perceived to apply motivational strategies, employee satisfaction and organizational commitment are consistently higher.

**What is the level of employee work engagement among millennial engineers in terms of Vigor, Dedication, and Absorption?**

Table 13. Results of Mean and Standard Deviation for the Level of Employees’ Engagement among Millennial Engineers in terms of Vigor

Indicators	Mean	SD	Description	Interpretation
1. I feel bursting with energy when I am at work	3.49	.824	Undecided	Moderately High
2. I experience strength and vitality throughout my workday	3.83	.709	Agree	High
3. I am enthusiastic about starting my workday.	3.72	.810	Agree	High
4. I can continue working for long hours without feeling drained.	3.24	1.10	Undecided	Moderately High
5. I remain resilient and mentally strong during difficult tasks.	3.88	.722	Agree	High
6. I persist at work, even when facing challenges and setbacks.	4.01	.643	Agree	High
Composite Mean	3.80	.621	Agree	High

Legend: Scale – Range – Descriptive Rating – Interpretation: 5 (4.51–5.00) – Strongly Agree – Very High; 4 (3.51–4.50) – Agree – High; 3 (2.51–3.50) – Undecided – Moderately High; 2 (1.51–2.50) – Disagree – Low; 1 (1.00–1.50) – Strongly Disagree – Very Low.

Table 13 presents the participants’ level of engagement among millennial engineers in terms of vigor. The composite mean of 3.80 with a standard deviation of 0.621 indicates a high level of agreement, suggesting that employees generally experience energy, resilience, and persistence in their work. The composite SD reflects relatively consistent responses, showing shared perceptions of vigor across participants. These findings align with Schaufeli and Bakker’s (2004, as cited in Maisyuri & Ariyanto, 2021) definition of vigor as high levels of energy and mental resilience, along with willingness to exert effort even during challenges. The high mean for persistence (M = 4.01) strongly reflects this concept.



Among the indicators, Indicator 6, "I persist at work, even when facing challenges and setbacks," obtained the highest mean ( $M = 4.01$ ,  $SD = 0.643$ ), indicating that employees are highly persistent and demonstrate strong determination when encountering work-related difficulties. Indicator 5, "I remain resilient and mentally strong during difficult tasks," also recorded a high mean ( $M = 3.88$ ,  $SD = 0.722$ ), showing that employees feel capable of maintaining focus and resilience under pressure. Indicator 2, "I experience strength and vitality throughout my workday" ( $M = 3.83$ ,  $SD = 0.709$ ), and Indicator 3, "I am enthusiastic about starting my workday" ( $M = 3.72$ ,  $SD = 0.810$ ), further reflect employees' generally high energy and enthusiasm for their work.

The lowest mean was observed in Indicator 4, "I can continue working for long hours without feeling drained" ( $M = 3.24$ ,  $SD = 1.10$ ), which falls in the moderately high range. This suggests that some employees may experience fatigue or reduced stamina during extended work periods. Indicator 1, "I feel bursting with energy when I am at work" ( $M = 3.49$ ,  $SD = 0.824$ ), is also slightly lower than other indicators, indicating variability in the intensity of daily energy levels. Overall, the findings demonstrate that millennial engineers exhibit high levels of vigor in their work. The composite mean of 3.80 reflects strong agreement that employees are energetic, resilient, and persistent. In contrast, the composite SD of 0.621 indicates that these perceptions are generally consistent across the group, with minor variations in endurance and initial energy levels.

Blando et al. (2017) describe vigor as an energetic-behavioral component of engagement, encompassing enthusiasm, stamina, and consistent effort patterns also evident in high ratings for resilience ( $M = 3.88$ ) and vitality throughout the day ( $M = 3.83$ ). Memon et al. (2019) further confirm that vigor involves persistence and mental strength, which mirrors the employees' positive responses.

However, the moderately high score for working long hours without fatigue ( $M = 3.24$ ) supports Sawitri (2024) claim that engaged employees may experience strain when tasks become overwhelming, although they remain committed. Meanwhile, Saragih and Margaretha (2013, as cited in Prahara, 2020) found that employees with high vigor remain enthusiastic even during adversity, consistent with the respondents' reported resilience.

Studies by Maisyuri and Ariyanto (2021) and Carter and Walker (2018) showed that vigor significantly enhances employee performance, reinforcing the finding that millennial engineers' persistence and stamina contribute positively to productivity. Overall, the vigor results are highly consistent with the literature describing engaged employees as energetic, persistent, and mentally strong.

Table 14. Results of Mean and Standard Deviation for the Level of Employees' Engagement among Millennial Engineers in terms of Dedication

Indicators	Mean	SD	Description	Interpretation
1. My work is meaningful and fulfilling.	4.11	.735	Agree	High
2. I am enthusiastic and passionate about my job.	4.00	.848	Agree	High
3. My job inspires and motivates me to improve.	4.07	.723	Agree	High
4. I feel proud of my achievements at work.	4.23	.695	Agree	High
5. My job challenges me positively, making me strive for growth.	4.02	.771	Agree	High
Composite Mean	4.08	.628	Agree	High

Legend: Scale – Range – Descriptive Rating – Interpretation: 5 (4.51–5.00) – Strongly Agree – Very High; 4 (3.51–4.50) – Agree – High; 3 (2.51–3.50) – Undecided – Moderately High; 2 (1.51–2.50) – Disagree – Low; 1 (1.00–1.50) – Strongly Disagree – Very Low.

Table 14 presents the participants' level of engagement among millennial engineers in terms of dedication. The composite mean of 4.08 with a standard deviation of 0.628 indicates a high level of agreement, suggesting that employees generally perceive their work as meaningful, motivating, and engaging. The composite SD reflects relatively consistent responses, indicating that perceptions of dedication are shared across participants. This aligns with Schaufeli and Bakker (2004, as cited in Maisyuri & Ariyanto, 2021), who define dedication as being deeply involved in one's work and experiencing feelings of pride, inspiration, and challenge.

Among the indicators, Indicator 4, "I feel proud of my achievements at work" obtained the highest mean ( $M = 4.23$ ,  $SD = 0.695$ ), indicating that feelings of pride and accomplishment are the strongest contributors to dedication. This was followed by Indicator 1, "My work is meaningful and fulfilling" ( $M = 4.11$ ,  $SD = 0.735$ ) and Indicator 3, "My job inspires and motivates me to improve" ( $M = 4.07$ ,  $SD = 0.723$ ), both reflecting high levels of dedication and sense of purpose among millennial engineers. Additionally, enthusiasm and passion for work ( $M = 4.00$ ,  $SD = 0.848$ ) and positive job challenge for growth ( $M = 4.02$ ,  $SD = 0.771$ ) were also rated high, indicating that millennial engineers perceive their work as both engaging and development-oriented.

Overall, the findings indicate that millennial engineers exhibit high levels of dedication in their work. The composite mean of 4.08 reflects strong agreement that employees are motivated, find meaning in their roles, and strive for personal growth. The composite SD of 0.628 suggests that these perceptions are relatively consistent, with minor variability in the intensity of passion and pride experienced by individual employees.

The highest-rated indicator, pride in achievements ( $M = 4.23$ ), is consistent with Blando et al.'s (2017) view that dedication is the emotional dimension of engagement, representing enthusiasm and meaningful involvement. Similarly, employees finding work meaningful ( $M = 4.11$ ) reflects Saks' (2006, as cited in Smith, 2024) argument that engagement occurs when employees find personal meaning and value in their work. Maisyuri and Ariyanto (2021) emphasize that high dedication levels enhance organizational performance, which aligns with employees' high enthusiasm ( $M = 4.00$ ) and motivation to improve ( $M = 4.07$ ). Rochim et al. (2025) and Fan and Cai (2017, as cited in Maisyuri & Ariyanto, 2021) also found dedication to be a strong predictor of both task and contextual



performance. Furthermore, research by Park and Gursoy (2012, as cited in Prahara, 2020) notes that millennials are more likely to disengage if under-challenged. High ratings for positive challenge (M = 4.02) reflect effective engagement strategies that maintain millennial commitment.

Table 15. Results of Mean and Standard Deviation for the Level of Employees' Engagement among Millennial Engineers' in terms of Absorption

Indicators	Mean	SD	Description	Interpretation
1. I frequently become so immersed in my work that time flies by.	4.07	.645	Agree	High
2. While working, I often lose awareness of my surroundings.	3.79	.806	Agree	High
3. I feel joyful and engaged when fully absorbed in my tasks.	3.98	.743	Agree	High
4. I become deeply focused on my work tasks.	3.89	.828	Agree	High
5. I find it difficult to disengage from work, even after hours mentally.	3.55	.918	Agree	High
6. I often continue thinking about work during my personal time.	3.37	1.01	Undecided	Moderately High
7. When I'm deeply involved in my work, I feel a sense of flow.	3.95	.787	Agree	High
8. I sometimes feel that work becomes monotonous and draining.	3.77	.857	Agree	High
9. I enjoy working on complex or challenging tasks that require deep concentration.	3.77	.869	Agree	High
10. I feel a strong connection to my work, even when dealing with routine or repetitive tasks.	3.54	.892	Agree	High
<b>Composite Mean</b>	<b>3.74</b>	<b>.572</b>	<b>Agree</b>	<b>High</b>

Legend: Scale – Range – Descriptive Rating – Interpretation: 5 (4.51–5.00) – Strongly Agree – Very High; 4 (3.51–4.50) – Agree – High; 3 (2.51–3.50) – Undecided – Moderately High; 2 (1.51–2.50) – Disagree – Low; 1 (1.00–1.50) – Strongly Disagree – Very Low.

Table 15 presents the participants' level of engagement among millennial engineers in terms of absorption. The composite mean of 3.74 with a standard deviation of 0.572 indicates a high level of agreement, suggesting that employees generally experience deep involvement and focus in their work. The composite SD reflects relatively consistent perceptions across participants, indicating shared experiences of being fully absorbed in tasks. These results reflect Schaufeli and Bakker's (2004, as cited in Maisyuri & Ariyanto, 2021) definition of absorption as total concentration and deep engagement in tasks. Among the indicators, Indicator 1, "I frequently become so immersed in my work that time flies by," obtained the highest mean (M = 4.07, SD = 0.645), showing that employees often experience a sense of flow during work. Indicator 3, "I feel joyful and engaged when fully absorbed in my tasks" (M = 3.98, SD = 0.743), and Indicator 7, "When I'm deeply involved in my work, I feel a sense of flow" (M = 3.95, SD = 0.787), also indicate high engagement and satisfaction when focused on tasks.

Indicators 2, 4, 5, 8, and 9, with means ranging from 3.55 to 3.89, reflect high agreement, suggesting that employees experience strong focus, occasional mental strain, and enjoyment in challenging or complex tasks. Indicators 6 and 10 recorded slightly lower means (M = 3.37, SD = 1.01; M = 3.54, SD = 0.892, respectively), falling within the moderately high range, indicating that some employees continue thinking about work during personal time or experience difficulty disengaging from routine tasks. Overall, the findings demonstrate that millennial engineers exhibit high levels of absorption in their work. The composite mean of 3.74 reflects strong agreement that employees are deeply involved, focused, and enjoy engaging in challenging tasks. In contrast, the composite SD of 0.572 shows that these perceptions are generally consistent, with minor variability in employees' ability to detach from work outside of office hours mentally. The highest mean—time passing quickly during work (M = 4.07) strongly corresponds to the concept of 'flow' explained by Blando et al. (2017), where employees become fully immersed and reluctant to disengage. Indicators such as joy while engrossed in tasks (M = 3.98) and feeling flow (M = 3.95) further support this.

Lewiuci et al. (2016) and Meilia and Setyowati (2016) found that absorption significantly enhances performance, a pattern matching the high ratings for deep focus (M = 3.89) and enjoyment of complex tasks (M = 3.77). Maisyuri & Ariyanto (2021) also noted that high-absorption employees can lose awareness of their surroundings—mirrored in Indicator 2 (M = 3.79). Lower ratings for difficulty disengaging after hours (M = 3.37) support Gibbons' (2006, as cited in Prahara, 2020) finding that engaged employees struggle to detach mentally, although they treat challenges as temporary and solvable. Overall, the absorption results align with literature depicting highly engaged employees as deeply immersed, focused, and capable of high performance when fully absorbed in their work.

Table 16. Summary of Results of Mean and Standard Deviation for the Level of Employees' Engagement among Millennial Engineers

Indicators	Mean	SD	Description	Interpretation
Vigor	3.80	.621	Agree	High
Dedication	4.08	.628	Agree	High
Absorption	3.74	.572	Agree	High
<b>Composite Mean</b>	<b>3.87</b>	<b>.532</b>	<b>Agree</b>	<b>High</b>

Legend: Scale – Range – Descriptive Rating – Interpretation: 5 (4.51–5.00) – Strongly Agree – Very High; 4 (3.51–4.50) – Agree – High; 3 (2.51–3.50) – Undecided – Moderately High; 2 (1.51–2.50) – Disagree – Low; 1 (1.00–1.50) – Strongly Disagree – Very Low.

Table 16 summarizes the participants' level of engagement among millennial engineers across the three sub-constructs: vigor, dedication, and absorption. The overall mean of 3.87 with a standard deviation of 0.532 indicates a high level of agreement, suggesting that employees generally exhibit strong engagement in their work. The composite SD reflects relatively consistent perceptions across



all dimensions, indicating shared experiences of engagement among the participants. Among the sub-constructs, dedication obtained the highest mean of 4.08 (SD = 0.628), indicating that employees are highly committed, find their work meaningful, and are motivated to achieve personal and professional growth. Vigor recorded a mean of 3.80 (SD = 0.621), reflecting that employees generally experience energy, resilience, and persistence throughout their workday. Absorption obtained the lowest mean of 3.74 (SD = 0.572), demonstrating that while employees are generally immersed and focused on their tasks, there is slightly less intensity compared to dedication and vigor.

Recent studies, such as Hurtienne et al. (2021), identify acceptance, community, education, collaborative environment, and leadership as pivotal engagement drivers for millennials in manufacturing, one of the primary engineering sectors. The pronounced dedication found in the results resonates with findings that millennials seek meaningful work and value team collaboration and leadership opportunities to remain invested and motivated within organizations. This is substantiated by Njoroge et al. (2022), who found that engagement among millennials is strongly influenced by supportive leadership, advancement opportunities, and organizational culture. Moreover, research by Van Hoek (2016) emphasizes that while millennial engineers may have shorter tenures due to frequent job changes for career advancement, their engagement is heightened in environments that offer flexibility, autonomy, and technology integration, enhancing both vigor and absorption. Similarly, work engagement theoretical frameworks (Schaufeli and Bakker’s (2004), as cited in Maisyuri & Ariyanto, 2021; revisited in recent studies) confirm that vigor, dedication, and absorption are essential components of engagement, with millennials showing especially strong dedication when their work aligns with personal values and offers growth potential.

A study by Putra et al. (2025, as cited in Priambada and Wulani, 2025) further supports the findings by establishing an empirical link between vigor, dedication, and absorption and job satisfaction among millennial employees. The study reveals that vigor has a significant positive effect on job satisfaction. At the same time, dedication and absorption demonstrate positive but statistically weaker effects, reinforcing the construct validity observed in the results. Overall, the findings suggest that millennial engineers maintain high levels of work engagement, characterized by strong energy, commitment, and focus. The overall mean of 3.87 and the moderate composite SD of 0.532 indicate that engagement is consistently perceived across participants, with minor variations in absorption and vigor, highlighting the dynamic nature of employees’ daily work involvement.

**Is there a significant relationship between employee engagement, job satisfaction, superior transformational leadership, and motivation capabilities?**

Table 17. Pearson Correlation Between Employee Engagement, Job Satisfaction, Superior Transformational Leadership, and Motivation Capabilities (N = 337)

Variable	r	p	Interpretation
Existence	.404	.000	Significant
Relatedness	.561	.000	Significant
Growth	.574	.000	Significant
Overall Job Satisfaction	.550	.000	Significant
Intellectual Stimulation	.249	.000	Significant
Idealized Influence	.385	.000	Significant
Inspiration Motivation	.368	.000	Significant
Individual Consideration	.172	.002	Significant
Superior Transformational Leadership	.358	.000	Significant
Intrinsic Motivation	.657	.000	Significant
Extrinsic Motivation	.625	.000	Significant
Motivation Capabilities	.676	.000	Significant

Note. *p* ≤ .05 indicates statistical significance.  
 Effect size based on Cohen (1988): *r* ≥ .50 = strong, *r* = .30-.49 = moderate, *r* = .10-.29 = weak.  
 \*Correlation is significant at the 0.01 level (2-tailed).

Table 17 presents the results of the Pearson correlation analysis examining the significant relationships between employee engagement and key organizational variables, including job satisfaction, superior transformational leadership, and motivation capabilities. All correlations were statistically significant (*p* < .01). Job satisfaction sub-constructs were positively correlated with employee engagement. Existence showed a moderate correlation (*r* = .404, *p* < .001), indicating that employees who perceive fair compensation, stability, and adequate resources tend to be more engaged. Relatedness (*r* = .561, *p* < .001) and Growth (*r* = .574, *p* < .001) demonstrated strong positive correlations, suggesting that supportive interpersonal relationships and growth opportunities are strongly associated with engagement. The overall job satisfaction measure also showed a strong correlation with engagement (*r* = .550, *p* < .001). These findings align closely with foundational job satisfaction theories by Locke (1976) and Judge, Locke, and Durham (1997), who define job satisfaction as an emotional and cognitive evaluation of one’s work experiences—strongly influenced by job resources and personal values. The strong correlations indicate that millennials who feel supported in their growth and interpersonal relationships are more likely to exhibit high engagement.

Schaufeli (2014, as cited in Saks & Gruman, 2020) asserts that work engagement is characterized by vigor, dedication, and absorption—three states enhanced when employees feel fulfilled and satisfied. The present study’s results support this theoretical link, demonstrating that higher satisfaction in job factors—such as existence (*r* = .404) and overall job satisfaction (*r* = .550)—corresponds to higher



engagement levels. Harter et al. (2018) emphasize that modern organizations must ensure satisfaction and commitment to retain talented employees. As millennial engineers represent a large portion of the workforce, organizations must understand that employee satisfaction directly influences retention and engagement. Saks & Gruman (2020) further argue that employees must feel enabled and inspired to apply their full capabilities—consistent with the strong associations found in this study.

Superior transformational leadership dimensions showed positive correlations with engagement. Intellectual Stimulation was weak to moderate ( $r = .249, p < .001$ ), while Idealized Influence ( $r = .385, p < .001$ ) and Inspiration Motivation ( $r = .368, p < .001$ ) were moderate. Individual Consideration had the weakest correlation ( $r = .172, p = .002$ ). Overall, superior transformational leadership was moderately associated with employee engagement ( $r = .358, p < .001$ ). Idealized Influence ( $r = .385$ ) and Inspirational Motivation ( $r = .368$ ) exhibit moderate correlations, consistent with prior studies confirming that transformational leadership enhances employee engagement (Ashfaq, 2021; Besieux et al., 2018; Jena et al., 2018; Jha & Malviya, 2017, as cited in Boyd, 2024). Intellectual Stimulation ( $r = .249$ ) and Individual Consideration ( $r = .172$ ) also show positive associations, though weaker, reflecting the varying levels of personalized leadership behaviors experienced by employees.

Millennials respond particularly well to transformational leadership, as they value purpose-driven, ethical, and developmental leadership styles (Williams, 2016). The Millennial Leadership Study (Vidyarthi et al., 2014, as cited in Williams, 2016) notes that millennials prefer leaders who transform individuals and teams—not just processes. This aligns with the findings that transformational leadership supports and inspires millennial engineers to remain engaged. Further, Guillaume et al. (2015) found that diverse teams benefit significantly from transformational leaders who emphasize growth and shared vision. Burns’ (1978, as cited in Ciulla, 2020) definition of transforming leadership—focusing on higher-level goals and moral upliftment—reflects the positive emotional and motivational responses seen in this study’s participants.

Motivation capabilities were strongly correlated with engagement. Intrinsic Motivation ( $r = .657, p < .001$ ) and Extrinsic Motivation ( $r = .625, p < .001$ ) exhibited strong positive correlations, and the combined measure, Motivation Capabilities, showed the highest correlation with engagement ( $r = .676, p < .001$ ). Overall, the results indicate that employee engagement is significantly influenced by job satisfaction, transformational leadership, and motivation capabilities, with motivation capabilities having the strongest relationship. This emphasizes the importance of supportive leadership, meaningful work, and effective motivation strategies in enhancing engagement. Motivation capabilities demonstrated the strongest correlation with employee engagement, with intrinsic motivation  $r = .657$  and extrinsic motivation  $r = .625$ —both large effect sizes according to Cohen (1988, as cited in Martin, 2023). This supports the literature that motivation, both internal and external, is a major determinant of engagement.

Ryan and Deci’s (2002) Self-Determination Theory (as cited in Davis, 2023) explains that intrinsic motivation drives deeper engagement because it fulfills personal needs for autonomy, competence, and relatedness. The strong correlations in this study confirm that when millennial engineers feel motivated by meaningful work, personal growth, and autonomy, they exhibit higher engagement. Similarly, extrinsic motivation—such as rewards, recognition, salary, and benefits—has also been shown to enhance engagement when aligned with employee expectations (Charles, 2025; Good et al., 2022). The significant correlation between extrinsic motivation and engagement supports the literature that financial and structural rewards influence millennials’ workplace attitudes (Clarke, 2018).

The combined motivation capabilities measure ( $r = .676$ ) being the strongest predictor aligns with the argument of Van Iddekinge et al. (2017) and Bos-Nehles et al. (2023) that motivated employees are more productive, committed, and actively involved in organizational tasks. Additionally, Sánchez-Hernández et al. (2019) suggest that millennial motivation is strongly shaped by work–life balance and organizational support, factors that boost engagement.

**Which of the independent variables, singly or in combination, best predicts engagement?**

Table 18. Multiple Regression Analysis Predicting Employees’ Engagement from Job Satisfaction, Superior Transformational Leadership, and Motivation Capabilities (N = 337)

Predictors	B	SE B	$\beta$	t	p	Interpretation
Constant	1.817	.173	—	10.503	.000	Significant
Existence	-.115	.051	-.159	-2.273	.024	Significant
Relatedness	.162	.076	.180	2.136	.033	Significant
Growth	.024	.083	.031	.286	.775	Not significant
Intellectual Stimulation	-.156	.055	-.205	-2.818	.005	Significant
Idealized Influence	.060	.079	.095	.758	.449	Not significant
Inspiration Motivation	-.043	.067	-.071	-.640	.523	Not significant
Individual Consideration	-.052	.037	-.063	-1.387	.166	Not significant
Intrinsic Motivation Capability	.233	.106	.279	2.195	.029	Significant
Overall Motivation Capability	.405	.140	.476	2.882	.004	Significant

Model Fit:  $R = .713, R^2 = .508, Adjusted R^2 = .495, F(9, 327) = 37.53, p < .001$   
 Dependent Variable: Employees’ Engagement

Table 18 shows the results of a multiple regression analysis predicting employees’ engagement from job satisfaction sub-constructs, superior transformational leadership dimensions, and motivation capabilities. The model was statistically significant,  $F(9, 327) = 37.53, p < .001$ , and explained approximately 50.8% of the variance in employee engagement ( $R^2 = .508, Adjusted R^2 = .495$ ), indicating a

large effect size. Among the predictors, Existence had a significant negative effect on engagement ( $B = -.115$ ,  $\beta = -.159$ ,  $p = .024$ ), suggesting that higher perceived focus on basic job satisfaction alone might slightly reduce engagement. Relatedness had a significant positive effect ( $B = .162$ ,  $\beta = .180$ ,  $p = .033$ ), indicating that stronger interpersonal connections and supportive relationships at work increase engagement. Intellectual Simulation negatively predicted engagement ( $B = -.156$ ,  $\beta = -.205$ ,  $p = .005$ ), whereas other transformational leadership dimensions, including Idealized Influence, Inspiration, Motivation, and Individual Consideration, were not significant predictors.

Intrinsic Motivation Capability positively predicted engagement ( $B = .233$ ,  $\beta = .279$ ,  $p = .029$ ), as did Overall Motivation Capability ( $B = .405$ ,  $\beta = .476$ ,  $p = .004$ ), highlighting that employees who perceive strong intrinsic and overall motivational support from their superiors are more engaged. Growth was not a significant predictor ( $B = .024$ ,  $\beta = .031$ ,  $p = .775$ ). This equation indicates that a one-unit increase in  $X_1$  (Existence) predicts a 0.115 decrease in engagement, a one-unit increase in  $X_2$  (Relatedness) predicts a 0.162 increase, a one-unit increase in  $X_3$  (Intellectual simulation) predicts a 0.156 decrease, a one-unit increase in  $X_4$  (Intrinsic Motivation) predicts a 0.233 increase, and a one-unit increase in  $X_5$  (Motivation Capability) predicts a 0.405 increase in engagement, holding all other variables constant.

The regression results show that  $X_2$  (Relatedness) significantly predicted engagement ( $\beta = .180$ ,  $p = .033$ ), while  $X_1$  (Existence) negatively predicted it ( $\beta = -.159$ ,  $p = .024$ ). These patterns support Locke's (1976) assertion that job satisfaction arises when employees' expectations align with job experiences. Relatedness reflects social connections, support, and meaningful interactions—core components in job satisfaction theories by Judge, Locke, and Durham (1997, as cited in Judge et al., 2020). The strong influence of relatedness aligns with Abun et al. (2020), who found that workplace well-being—including peer support and collaboration—predicts engagement.

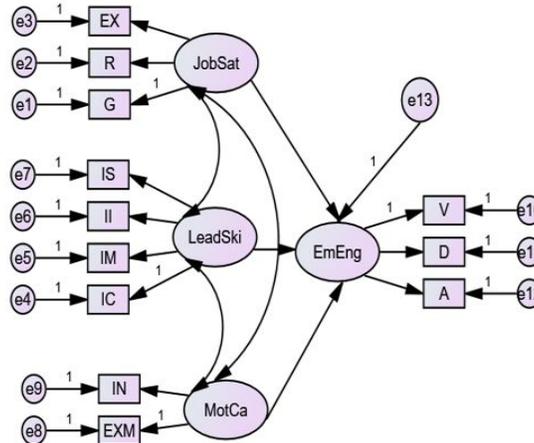
Ibrahim and Hussein (2024) found a moderate but significant correlation between job satisfaction and engagement, confirming that satisfied employees are more likely to display vigor, absorption, and dedication. The present findings mirror this relationship, showing that satisfaction rooted in interpersonal relationships is a key driver of engagement. Conversely, existence negatively predicted engagement, suggesting that an overemphasis on basic needs (e.g., salary, security, resources) may reduce engagement when not balanced with relational or growth-oriented factors. This aligns with the Job Demands–Resources (JDR) model, which states that job resources related to meaning and relationships are stronger drivers of engagement than basic extrinsic factors.

The regression findings indicate that Intellectual Stimulation negatively predicted engagement ( $\beta = -.205$ ,  $p = .005$ ), while other transformational leadership dimensions were not significant predictors. These nuanced results align with Aube (2015), who noted that although transformational leadership is generally linked to engagement, specific dimensions may have varying effects depending on context.

Salanova et al. (2011, as cited in García-Sierra et al., 2015) found a significant link between transformational leadership and engagement, emphasizing that leaders shape employee attitudes. However, when intellectual stimulation overemphasizes complex tasks or innovation pressure, it may overwhelm young professionals such as millennial engineers, accounting for the negative predictive value observed. Chua and Ayoko (2019) found that transformational leadership behaviors influence engagement primarily through motivation. Followers who perceive their leaders as inspirational and supportive are more likely to pursue autonomous goals. The insignificance of Idealized Influence and Inspirational Motivation in the present study suggests that engagement may depend less on emotional inspiration and more on motivation-related factors. Furthermore, Brunetto et al. (2013, cited in García-Sierra et al., 2015) identified managerial support as a predictor of engagement, which is consistent with the weak but positive correlations observed in Problem 5. Thus, the regression results do not contradict existing literature; rather, they reveal that transformational leadership indirectly influences engagement through motivation and workplace support rather than direct behavioral influence.

Motivation capabilities emerged as the strongest predictors of engagement in the regression model, with Intrinsic Motivation ( $\beta = .279$ ,  $p = .029$ ) and Overall Motivation Capability ( $\beta = .476$ ,  $p = .004$ ) demonstrating substantial predictive power. These findings strongly align with Self-Determination Theory (Ryan & Deci, 2002, as cited in Davis, 2023), which states that autonomy, competence, and relatedness drive intrinsic motivation—leading to higher engagement. Chua and Ayoko (2019) predicted that employee motivation mediates the relationship between leadership and engagement, arguing that employees who perceive transformational leadership are more autonomously motivated. This supports the finding that motivation capability outweighs leadership dimensions in predicting engagement. Motivation has repeatedly been identified as a driver of performance and engagement. De Simone (2015, as cited in Stover, 2020) and Hanaysha and Majid (2018) found that motivated employees exhibit higher productivity, organizational commitment, and willingness to exert extra effort—patterns reflected in the strong predictive values observed. Zaeni et al. (2024) further established that employees deeply engaged in tasks show higher performance and cooperation, supporting the interpretation that strong motivational capabilities enable engineers to surpass expectations. Overall, the findings suggest that employees' engagement is most strongly enhanced by motivation capabilities, moderately influenced by workplace relationships (Relatedness), and slightly decreased by Existence and Intellectual Simulation, emphasizing the importance of fostering motivational support and positive workplace interactions to improve engagement.

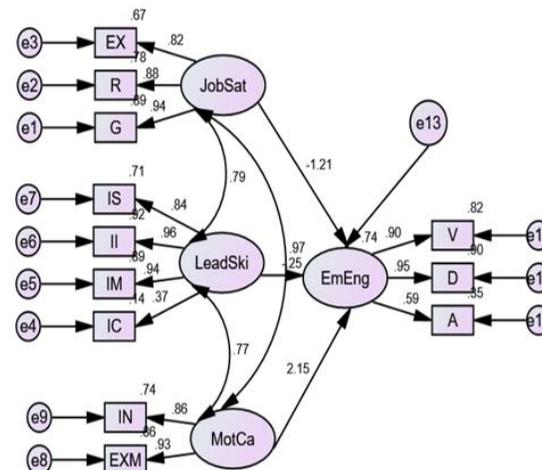
**What structural model best fits the millennial engineers' work engagement?**



**Figure 1. Hypothesized Model 1 of Millennial Engineers' Work Engagement**  
 Legend: E – Existence; R – Relatedness; G – Growth; JobSat – Job Satisfaction; IS – Intellectual Simulation; II – Idealized Influence; IM – Inspiration Motivation; IC – Individual Consideration; LeadSki – Leadership Skills; IN – Intrinsic; EXM – Extrinsic; MotCa – Motivational Capabilities; V – Vigor; D – Dedication; A – Absorption; EmEng – Employees' Engagement.

The hypothesized model illustrates the proposed relationships between the constructs in the study. Job satisfaction, represented by Existence, Relatedness, and Growth, is hypothesized to influence employees' engagement both directly and indirectly. Superior transformational leadership, operationalized through Intellectual Simulation, Idealized Influence, Inspiration, Motivation, and Individual Consideration, is expected to impact engagement, mediated by leadership skills. Motivation capabilities, including Intrinsic and Extrinsic Motivation, are also posited to influence engagement directly. Employees' engagement is measured through three sub-constructs: Vigor, Dedication, and Absorption, which collectively reflect the overall level of engagement among millennial engineers. This model provides a conceptual framework for examining how job satisfaction, leadership behaviors, and motivational factors collectively predict work engagement.

Structural Model 1 presents the tested relationships among job satisfaction, superior transformational leadership, motivation capabilities, and employees' engagement. In this model, job satisfaction—measured through Existence, Relatedness, and Growth—directly influences employees' engagement as well as leadership behaviors. Superior transformational leadership, represented by Intellectual Simulation, Idealized Influence, Inspiration, Motivation, and Individual Consideration, is modeled as a predictor of leadership skills and an indirect contributor to engagement. Motivation capabilities, including Intrinsic and Extrinsic Motivation, are hypothesized to have both direct and indirect effects on engagement. Employees' engagement is operationalized through three sub-constructs: Vigor, Dedication, and Absorption, which together form the overall measure of engagement among millennial engineers. The structural model serves to evaluate the empirical validity of the hypothesized relationships and provides a framework for understanding how job-related factors, leadership, and motivation collectively influence work engagement.



**Figure 2. Structural Model 1 of Millennial Engineers' Work Engagement**  
 Legend: E – Existence; R – Relatedness; G – Growth; JobSat – Job Satisfaction; IS – Intellectual Simulation; II – Idealized Influence; IM – Inspiration Motivation; IC – Individual Consideration; LeadSki – Leadership Skills; IN – Intrinsic; EXM – Extrinsic; MotCa – Motivational Capabilities; V – Vigor; D – Dedication; A – Absorption; EmEng – Employees' Engagement.



Table 19. Regression Weights of Structural Model 1 of Millennial Engineers' Work Engagement

	Path	B	S.E.	C.R.	Beta	P	Interpretation
EmEng	<--- JobSat	-1.046	.618	-1.694	-1.211	.090	Not Significant
EmEng	<--- MotCa	1.904	.632	3.015	2.147	.003	Significant
EmEng	<--- LeadSki	-.573	.239	-2.397	-.247	.017	Significant
G	<--- JobSat	1.000			.944		Reference Sub-construct
R	<--- JobSat	.801	.029	27.240	.881	***	Significant
EX	<--- JobSat	.926	.041	22.649	.821	***	Significant
IC	<--- LeadSki	1.000			.374		Reference Sub-construct
IM	<--- LeadSki	3.432	.478	7.178	.944	***	Significant
II	<--- LeadSki	3.335	.463	7.196	.961	***	Significant
IS	<--- LeadSki	2.434	.347	7.021	.842	***	Significant
EXM	<--- MotCa	1.000			.927		Reference Sub-construct
IN	<--- MotCa	.866	.035	24.671	.861	***	Significant
V	<--- EmEng	1.000			.904		Reference Sub-construct
D	<--- EmEng	1.061	.041	25.589	.948	***	Significant
A	<--- EmEng	.602	.049	12.211	.591	***	Significant

Table 19 presents the regression weights for Structural Model 1 of millennial engineers' work engagement. The model tested the predictive relationships of job satisfaction (JobSat), motivation capabilities (MotCa), and leadership skills (LeadSki) on employees' engagement (EmEng) and its sub-constructs, as well as the influence of higher-order constructs on their indicators. The analysis shows that Motivation Capabilities significantly positively predicted employees' engagement ( $B = 1.904$ ,  $SE = .632$ ,  $CR = 3.015$ ,  $\beta = 2.147$ ,  $p = .003$ ), while Leadership Skills negatively but significantly predicted engagement ( $B = -.573$ ,  $SE = .239$ ,  $CR = -2.397$ ,  $\beta = -.247$ ,  $p = .017$ ).

In contrast, Job Satisfaction did not significantly predict employees' engagement ( $B = -1.046$ ,  $SE = .618$ ,  $CR = -1.694$ ,  $\beta = -1.211$ ,  $p = .090$ ). This finding is supported by Čulibrk et al. (2018), who demonstrated through SEM that job satisfaction often influences engagement indirectly through job involvement rather than direct pathways. Their revised four-factor model similarly revealed weak paths between work characteristics and satisfaction, supporting the current model's weak direct effect.

Regarding the sub-constructs, Growth served as the reference for Job Satisfaction, with Relatedness (R) ( $B = .801$ ,  $SE = .029$ ,  $CR = 27.240$ ,  $\beta = .881$ ,  $p < .001$ ) and Existence (EX) ( $B = .926$ ,  $SE = .041$ ,  $CR = 22.649$ ,  $\beta = .821$ ,  $p < .001$ ) significantly loaded on Job Satisfaction. For Leadership Skills, Individual Consideration (IC) was the reference sub-construct, while Inspiration Motivation (IM) ( $B = 3.432$ ,  $SE = .478$ ,  $CR = 7.178$ ,  $\beta = .944$ ,  $p < .001$ ), Idealized Influence (II) ( $B = 3.335$ ,  $SE = .463$ ,  $CR = 7.196$ ,  $\beta = .961$ ,  $p < .001$ ), and Intellectual Simulation (IS) ( $B = 2.434$ ,  $SE = .347$ ,  $CR = 7.021$ ,  $\beta = .842$ ,  $p < .001$ ) significantly loaded on the higher-order construct.

Similarly, Intrinsic Motivation (IN) ( $B = .866$ ,  $SE = .035$ ,  $CR = 24.671$ ,  $\beta = .861$ ,  $p < .001$ ) significantly loaded on Motivation Capabilities, with Extrinsic Motivation (EXM) as the reference. Finally, for the employees' engagement construct, Vigor (V) served as the reference, with Dedication (D) ( $B = 1.061$ ,  $SE = .041$ ,  $CR = 25.589$ ,  $\beta = .948$ ,  $p < .001$ ) and Absorption (A) ( $B = .602$ ,  $SE = .049$ ,  $CR = 12.211$ ,  $\beta = .591$ ,  $p < .001$ ) significantly contributing to the overall engagement latent variable.

Overall, the model indicates that motivation capabilities are the strongest positive predictor of engagement, leadership skills have a smaller but significant negative effect, and job satisfaction does not directly predict engagement in this structural model. The loading values of the sub-constructs confirm that each higher-order variable is well represented by its respective indicators. Additionally, Zopiatís et al. (2014) found that intrinsic and extrinsic job satisfaction influence organizational commitment more strongly than immediate engagement. This aligns with the non-significant effect observed, suggesting job satisfaction provides a foundational condition but not a direct determinant of engagement.

Leadership Skills demonstrated a significant but negative relationship with engagement ( $\beta = -.247$ ,  $p = .017$ ). Although transformational leadership is generally associated with increased engagement, research by Aube (2015) and Huyler et al. (2024) explains that leadership influence varies depending on employee generational expectations and work contexts. When leadership behaviors emphasize high standards, idealized influence, or intellectual challenge too strongly, younger employees—such as millennial engineers—may interpret these as pressure rather than empowerment, which may explain the negative coefficient.

Motivation Capabilities emerged as the strongest predictor of engagement ( $\beta = 2.147$ ,  $p = .003$ ), consistent with Self-Determination Theory (Ryan & Deci, 2002, as cited in Davis, 2023), which positions intrinsic and extrinsic motivation as drivers of deep psychological engagement. Memon et al. (2019) further supported this by showing that well-developed motivation enhances vigor, dedication, and absorption—the core components of engagement.

Table 20 shows the standard of fit indices for Structural Model 1 of employees' work engagement. The model's chi-square to degrees of freedom ratio ( $CMIN/DF = 9.85$ ) exceeded the recommended value of less than 3, indicating poor model fit. Absolute fit indices, including GFI (.833) and AGFI (.729), were below the acceptable threshold of .90, suggesting the model does not adequately reproduce the observed covariance structure. Incremental fit indices, TLI (.858) and CFI (.897), were also below the recommended .95, reflecting

marginal fit. The RMSEA (.162) exceeded the ideal maximum of .05, and the PCLOSE value (.000) indicated that the null hypothesis of close fit was rejected.

Table 20. Standard of Fit Indices in Structural Model 1 of Employees' Work Engagement

Standard Indices	Standard Value Per Criterion	Model Fit Value	Decision
CMIN/DF	<3	9.85	Poor Fit
GFI	>.90	.833	Poor Fit
AGFI	>.90	.729	Poor Fit
TLI	>.95	.858	Poor Fit
CFI	>.95	.897	Poor Fit
RMSEA	≤0.05	.162	Poor Fit
PCLOSE	>0.05	.000	Poor Fit

Legend: CMIN/DF – Chi-Square Minimum/Degrees of Freedom; CFI – Comparative Fit Index; RMSEA – Root Mean Square Error of Approximation; NFI – Normed Fit Index; TLI – Tucker-Lewis Index; GFI – Goodness of Fit Index; PCLOSE – p-value for Close Fit.

Overall, all indices suggest that Structural Model 1 exhibits poor fit, highlighting the need for model modifications or alternative specifications to represent better the relationships among job satisfaction, motivation capabilities, leadership skills, and employees' engagement. Hair et al. (2019) indicate that acceptable CFI values should exceed .90, and RMSEA values should be below .08. The poor fit mirrors Čulibrk et al.'s (2018) initial model, which also required refinement due to misaligned structural paths.

Hypothesized Model 2 represents the revised structural model that achieved the best fit for explaining millennial engineers' work engagement. In this model, job satisfaction, operationalized through Existence, Relatedness, and Growth, is posited to influence employees' engagement directly as well as indirectly through leadership behaviors. Superior transformational leadership, represented by Intellectual Simulation, Idealized Influence, Inspiration, Motivation, and Individual Consideration, influences leadership skills, which in turn affect engagement.

Motivation capabilities, including Intrinsic and Extrinsic Motivation, have direct and indirect effects on employees' engagement. Engagement itself is measured by the sub-constructs Vigor and Dedication, which together define the overall level of employees' engagement. Model 2 reflects a refined pathway compared with the initial hypothesized model, emphasizing significant predictors and reducing non-significant paths to achieve improved model fit indices.

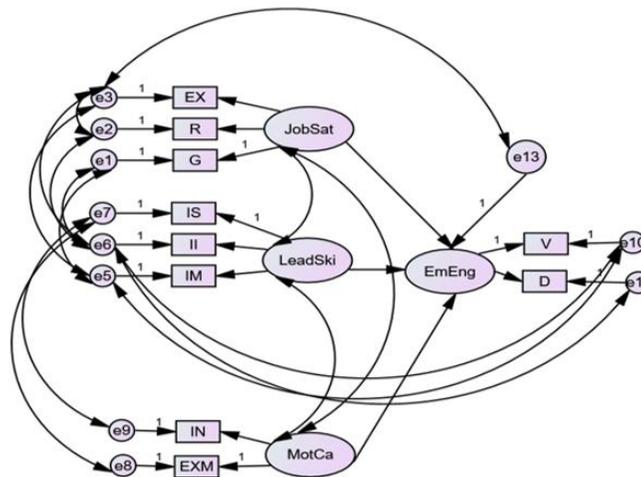


Figure 3. Hypothesized Model 2 of Millennial Engineers' Work Engagement (Best Fit)

Legend: E – Existence; R – Relatedness; G – Growth; JobSat – Job Satisfaction; IS – Intellectual Simulation; II – Idealized Influence; IM – Inspiration Motivation; IC – Individual Consideration; LeadSki – Leadership Skills; IN – Intrinsic; EXM – Extrinsic; MotCa – Motivational Capabilities; V – Vigor; D – Dedication; A – Absorption; EmEng – Employees' Engagement.

Structural Model 2 illustrates the finalized, best-fitting model of millennial engineers' work engagement after modifications to the initial hypothesized model. In this model, job satisfaction—represented by Existence, Relatedness, and Growth—directly and indirectly contributes to employees' engagement. Leadership skills, influenced by transformational leadership dimensions (Intellectual Simulation, Idealized Influence, Inspiration, Motivation, and Individual Consideration), serve as mediators in the engagement process. Motivation capabilities, including both Intrinsic and Extrinsic Motivation, are shown as strong predictors of engagement. Employees' engagement is operationalized through the sub-constructs Vigor and Dedication, which collectively represent the overall level of engagement. This structural model emphasizes significant predictive relationships, excludes non-significant paths from the initial model, and demonstrates improved model fit, providing a more parsimonious and theoretically meaningful explanation of engagement among millennial engineers.

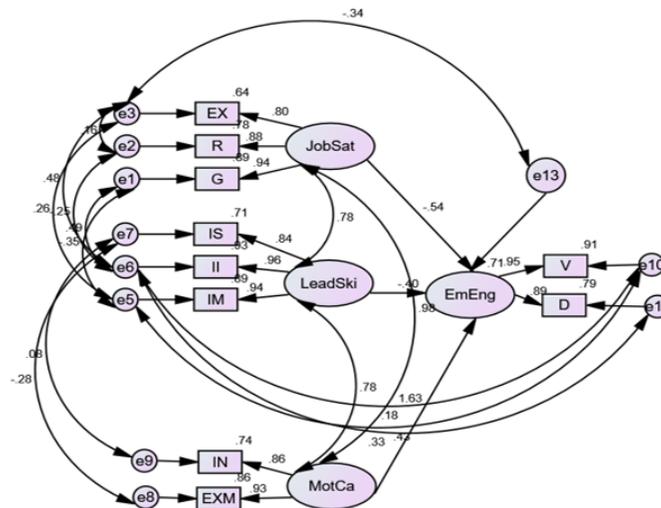


Figure 4. Structural Model 2 of Millennial Engineers' Work Engagement (Best Fit)

Legend: E – Existence; R – Relatedness; G – Growth; JobSat – Job Satisfaction; IS – Intellectual Simulation; II – Idealized Influence; IM – Inspiration Motivation; IC – Individual Consideration; LeadSki – Leadership Skills; IN – Intrinsic; EXM – Extrinsic; MotCa – Motivational Capabilities; V – Vigor; D – Dedication; A – Absorption; EmEng – Employees' Engagement.

Table 21 presents the regression weights of Structural Model 2 of millennial engineers' work engagement, highlighting the direct effects of job satisfaction (JobSat), leadership skills (LeadSki), and motivation capabilities (MotCa) on employees' engagement (EmEng), as well as the loadings of sub-constructs on their respective latent variables. The model reveals that motivation capabilities significantly predict employees' engagement ( $B = 1.514, p = .015$ ), suggesting that when engineers perceive higher intrinsic and extrinsic motivation in their work, their engagement increases. Similarly, leadership skills, as measured through the dimensions of transformational leadership (Inspiration, Motivation, Idealized Influence, Intellectual Simulation, and Individual Consideration), also significantly contribute to engagement ( $B = -0.401, p < .001$ ). Although the direct effect of job satisfaction on engagement is not statistically significant ( $B = -0.487, p = .404$ ), its sub-constructs—Relatedness ( $R = .881, p < .001$ ) and Existence ( $EX = .801, p < .001$ )—demonstrate strong loadings, indicating that job satisfaction indirectly supports engagement through other pathways in the model. Growth (G) serves as the reference sub-construct for job satisfaction, providing a baseline for interpreting the strength of other indicators.

Table 21. Regression Weights of Structural Model 2 of Millennial Engineers' Work Engagement

	Path	B	S.E.	C.R.	Beta	Label	Interpretation
EmEng	<--- JobSat	-.487	.584	-.834	-.538	.404	Not Significant
EmEng	<--- MotCa	1.514	.621	2.440	1.630	.015	Significant
EmEng	<--- LeadSki	-.401	.095	-4.216	-.403	***	Significant
G	<--- JobSat	1.000			.942		Reference Sub-construct
R	<--- JobSat	.807	.029	27.514	.881	***	Significant
EX	<--- JobSat	.907	.043	21.243	.801	***	Significant
IM	<--- LeadSki	1.407	.057	24.552	.941	***	Significant
II	<--- LeadSki	1.364	.054	25.403	.962	***	Significant
IS	<--- LeadSki	1.000			.842		Reference Sub-construct
EXM	<--- MotCa	1.000			.927		Reference Sub-construct
IN	<--- MotCa	.872	.035	24.813	.860	***	Significant
V	<--- EmEng	1.000			.953		Reference Sub-construct
D	<--- EmEng	.948	.039	24.267	.890	***	Significant

For the leadership skills latent variable, all sub-constructs show high and significant loadings: Inspiration Motivation ( $IM = .941, p < .001$ ), Idealized Influence ( $II = .962, p < .001$ ), and Intellectual Simulation ( $IS = .842$ , reference). This suggests that these dimensions reliably capture transformational leadership, and these leadership behaviors significantly shape engineers' perceptions of their supervisors' effectiveness. Motivation capabilities are represented by Intrinsic Motivation ( $IN = .860, p < .001$ ) and Extrinsic Motivation ( $EXM = 1.000$ , reference), emphasizing that both internal and external motivators are integral in fostering engagement. Employees' engagement itself is measured through Vigor ( $V = 1.000$ , reference) and Dedication ( $D = .890, p < .001$ ), indicating that highly engaged engineers display energy, persistence, and commitment to their work. Furthermore, the results show Motivation Capabilities as the most powerful predictor of engagement ( $\beta = 1.630, p = .015$ ). This strongly corroborates Ryan and Deci's (2002, as cited in Davis, 2023) Self-Determination Theory, which asserts that autonomy, competence, and intrinsic drive produce sustained engagement. Chua and Ayoko (2019) also found that motivation mediates leadership effects, reinforcing the central role of motivation observed in this model.



Leadership Skills retained a significant negative relationship with engagement ( $\beta = -.403, p < .001$ ). Although surprising, this finding aligns with Garcia-Sierra et al. (2015), who explained that leadership does not universally increase engagement and may even hinder it when employees feel excessive pressure or misalignment with leadership style. Millennials, in particular, prefer autonomy and shared decision-making (Williams, 2016), which may explain why traditional transformational behaviors do not always enhance engagement.

Job Satisfaction again produced no significant effect on engagement ( $\beta = -.538, p = .404$ ). This outcome is consistent with Čulibrk et al. (2018), who emphasized that satisfaction affects engagement through indirect pathways involving job involvement and emotional commitment. The strong factor loadings for Relatedness ( $\beta = .881$ ) and Existence ( $\beta = .801$ ) show that satisfaction is conceptually strong but functionally indirect.

The engagement indicators Vigor ( $\beta = .953$ ) and Dedication ( $\beta = .890$ ) demonstrated excellent loadings, supporting findings by Memon et al. (2019), Akkaya and Esen (2025), and DeCesare (2024), all of whom confirmed that these components strongly predict employee retention and high performance.

Table 22. Standard of Fit Indices in Structural Model 2 of Employees' Work Engagement (Best Fit)

Standard Indices	Standard Value Per Criterion	Model Fit Value	Decision
CMIN/DF	<3	3.08	Acceptable Fit
GFI	>.90	.970	Good Fit
AGFI	>.90	.905	Good Fit
TLI	>.95	.975	Good Fit
CFI	>.95	.991	Good Fit
RMSEA	≤0.05	.079	Acceptable Fit
PCLOSE	>0.05	.025	Acceptable Fit

Legend: CMIN/DF – Chi-Square Minimum/Degrees of Freedom; CFI – Comparative Fit Index; RMSEA – Root Mean Square Error of Approximation; NFI – Normed Fit Index; TLI – Tucker-Lewis Index; GFI – Goodness of Fit Index; PCLOSE – p-value for Close Fit.

Table 22 presents the fit indices for Structural Model 2 of millennial engineers' work engagement, which was identified as the best-fitting model. The chi-square minimum divided by degrees of freedom (CMIN/DF) is 3.08, which slightly exceeds the ideal criterion of <3. But it is still within the range considered an acceptable fit. These values exceed standards recommended by Hair et al. (2019). The improved fit mirrors Čulibrk et al.'s (2018) refined SEM model, which also achieved significantly better fit after removing unnecessary paths.

The Goodness of Fit Index (GFI = .970), Adjusted GFI (AGFI = .905), Tucker-Lewis Index (TLI = .975), and Comparative Fit Index (CFI = .991) all exceed the recommended thresholds, indicating an excellent overall fit. The Root Mean Square Error of Approximation (RMSEA = .079) and PCLOSE (.025) indicate an acceptable fit, suggesting that while the model fits the data well overall, there is some room for improvement in capturing the close fit of the population covariance matrix. Model 2 supports contemporary theories of engagement, demonstrating that motivation is the primary driver, leadership exerts an indirect and complex influence, and job satisfaction supports engagement through contextual but not direct pathways. Kohnen et al. (2024) similarly found that work environment, well-being, and leadership influence engagement through mediated structures. Thus, Model 2 represents the most theoretically consistent and empirically supported explanation of millennial engineers' engagement. Collectively, these indices support that Structural Model 2 provides a robust representation of the relationships among job satisfaction, leadership skills, motivation capabilities, and employees' engagement, making it suitable for interpretation and discussion of the predictors of work engagement among millennial engineers.

## Conclusions

Based on the findings of the study, the following conclusions are hereby drawn:

Millennial engineers in the Department of Public Works and Highways (DPWH) generally exhibit a high level of job satisfaction, particularly in terms of relatedness, which reflects strong interpersonal relationships, collaboration, and communication in the workplace. Although existence needs were met to a satisfactory extent, this dimension showed slightly lower ratings, suggesting that foundational job conditions—while adequate—may require continued attention to strengthen overall employee well-being. Regarding leadership, millennial engineers perceive their superiors as demonstrating high levels of transformational leadership, especially through inspirational motivation and intellectual stimulation. However, individualized consideration, while still rated positively, showed more variability, implying that leadership practices tailored to personal development may not be consistently experienced across all employees.

Superiors' motivation capabilities were also evaluated favorably, with intrinsic motivation slightly higher than extrinsic motivation. These results show that employees feel more motivated when their autonomy, competence, and opportunities for achievement are supported, while extrinsic rewards remain an important, though somewhat less impactful, motivational factor. Millennial engineers likewise exhibit strong work engagement, with dedication emerging as the highest dimension. Correlation analysis revealed that job satisfaction, transformational leadership, and motivation capabilities all have significant positive relationships with work engagement. Among these factors, motivation capabilities emerged as the strongest correlate, highlighting the central role of both intrinsic and extrinsic motivational experiences in shaping engagement.

The regression model further demonstrated that existence, relatedness, intellectual stimulation, intrinsic motivation, and overall motivation capability significantly predict work engagement. Relatedness and intrinsic motivation positively influence engagement, whereas existence and intellectual stimulation negatively predict it. These findings emphasize that supportive interpersonal relationships and motivational resources enhance engagement, while certain leadership behaviors and foundational job conditions may reduce it depending on context. Finally, among the structural models tested, Model 2 emerged as the best-fitting model for explaining millennial engineers' work engagement in DPWH. This model is hereby identified as Jess's Model of Millennial Engineers' Work Engagement in the Department of Public Works and Highways, offering a theoretically grounded and statistically validated framework for understanding how workplace factors support the engagement of millennial engineers.

The following set of strategic recommendations is tailored to enhance the work engagement of millennial engineers within the Department of Public Works and Highway (DPWH) Region X, built upon the insights gleaned from the preceding section; this section offers actionable suggestions aimed at addressing the multifaceted challenges identified in the retention of millennial talent:

Millennial Engineers are encouraged to proactively seek opportunities that enhance autonomy, skill development, and meaningful engagement with complex engineering tasks. By taking advantage of developmental programs, technical trainings, and collaborative initiatives, engineers can strengthen their intrinsic motivation and further enhance their professional growth. They may also continue cultivating collegial relationships and mentoring networks, as strong interpersonal connections have been shown to contribute to both satisfaction and engagement.

District Engineers in the Department of Public Works and Highways (DPWH) may intensify autonomy-supportive management practices and ensure that engineers are entrusted with decision-making responsibilities appropriate to their expertise. District Engineers may enhance individualized consideration by improving supervisory responsiveness, providing timely feedback, and offering personalized guidance to their staff. Strengthening these leadership behaviors may help address areas where employees perceive variability in support and individualized attention. Administrative Officers in DPWH Regional Office X may undertake a comprehensive review of existing welfare and benefit packages, particularly healthcare provisions, to ensure consistency and clarity across all employees. Standardizing these benefits may help reduce variability in satisfaction and eliminate perceptions of inequity. Additionally, the administrative office may emphasize transparency in promotion policies, reward distribution, and career progression pathways to reinforce extrinsic motivation and sustain employee morale.

Human resources professionals and practitioners are encouraged to implement leadership development programs that focus on motivation-enhancing strategies such as autonomy support, competence-building, and purposeful communication. HR may further provide structured coaching programs aimed at strengthening individualized consideration among supervisors. By equipping leaders with the necessary competencies to recognize and respond to employee needs, organizations can foster environments that are more conducive to sustained engagement.

The academic community may integrate topics on leadership, motivation, team dynamics, and workplace engagement. These competencies may better prepare future engineers for the demands of professional practice. Moreover, universities may collaborate with agencies such as DPWH to undertake longitudinal or intervention-based studies that examine the long-term effects of organizational practices on engagement and performance.

Department of Labor and Employment (DOLE) is suggested to promote standardized policies that ensure equitable welfare, benefits, and continuous professional development opportunities for public-sector engineers. DOLE may provide frameworks or guidelines that encourage agencies to institutionalize development plans, training interventions, and welfare programs that align with national labor standards and support a motivated engineering workforce.

Future researchers are encouraged to explore the negative coefficients observed for Existence and Intellectual Stimulation in the regression model to understand potential contextual conditions or mediating variables that influence these outcomes. Longitudinal, mixed-methods, or comparative studies are similarly suggested to strengthen causal interpretations and deepen understanding of engagement dynamics across engineering contexts. Investigations that analyze subgroup variations—such as differences across regions, project types, or employment classifications—would further refine the structural model and contribute to a more nuanced understanding of millennial engineers' workplace experiences.

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### **Affiliations and Corresponding Information**

#### **Jesus B. Rangcasajo**

Liceo de Cagayan University – Philippines

 [jrangcasajo@liceo.edu.ph](mailto:jrangcasajo@liceo.edu.ph) / [jessrangcasajo5394@gmail.com](mailto:jessrangcasajo5394@gmail.com)

#### **Nenita Itaas – Prado**

Liceo de Cagayan University – Philippines