



The Influence of a Non-Physical Work Environment, Transformational Leadership, and Work Motivation as Mediating Variables on the Performance of State Civil Apparatus in the Directorate General of Metal Industry, Machinery, Transportation and Electronics

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ARTICLE INFO

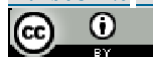
Keywords: Non-Physical Work Environment, Transformational Leadership, Work Motivation, ASN Performance

Received : 05, June

Revised : 10, July

Accepted: 15, August

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ABSTRACT

This study aims to analyze the effect of non-physical work environments, transformational leadership, and work motivation on the performance of ASN Ditjen ILMATE. The population is all ASN employees in the ASN Directorate General of ILMATE, totaling 230 employees with a sample of 147 employees. Data analysis using the SEM-PLS technique The results of the study found evidence that, partially, the non-physical work environment and transformational leadership had an effect on ASN work motivation. Non-physical work environments, transformational leadership, and work motivation partially affect ASN performance. Non- physical work environments affect ASN performance through work motivation. Transformational leadership affects ASN performance through work motivation.

INTRODUCTION

ASN is the most valuable and crucial resource an organization has because the prosperity of the organization is mainly influenced by its human component. DG ILMATE certainly requires quality ASN to achieve maximum performance in carrying out its main tasks and functions. One of the main aspects of human resource management is aspects related to the performance of individual ASNs. ASN performance evaluation is a periodic evaluation of the performance of ASN employees, which includes an evaluation of the employee work target (SKP) component and the work behavior component. The results of performance appraisal can be used as information for consideration in ASN growth, such as assignment, promotion, position placement, education and training, and recognition.

The results of the ASN performance assessment of DG ILMATE in the last 3 years (2019–2021) show a downward trend. This can be seen from the average results of ASN performance in 2019–2021, where it is indicated that there are several problems that have caused the decline in the performance achievements of ASN Ditjen ILMATE.

Table 1: ASN Performance in DG ILMATE (2019-2021)

No.	Elements	2019	2020	2021
A	Employee Work Objectives	96	90	92
B	Work Behavior			
1	Service Orientation	88	86	81
2	Integrity	81	78	80
3	Commitment	84	81	82
4	Discipline	79	77	75
5	Cooperation	81	83	80
6	Leadership	83	81	76
	Total	592	576	566
	Average	84,57	82,29	80,86
	Category	Good	Good	Good

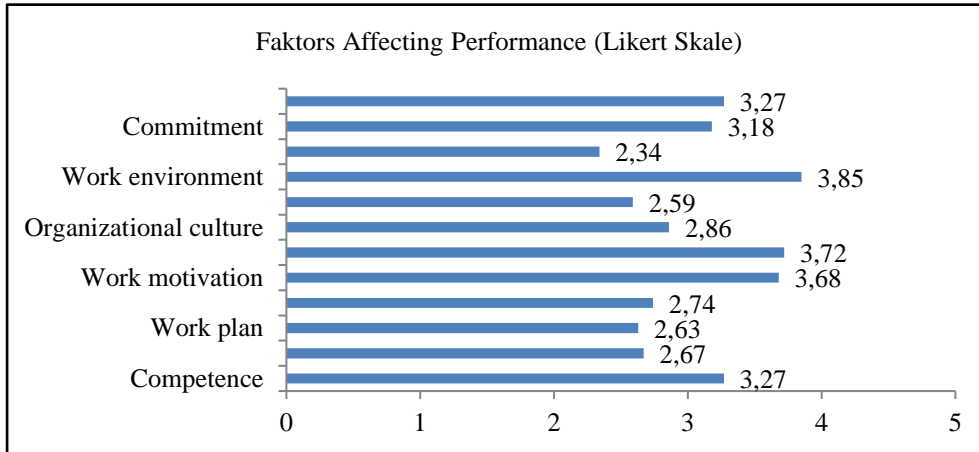
Source: DG ILMATE data, 2022.

The performance of ASN DG ILMATE in the last 3 years has continued to decline, especially work behavior in the elements of service orientation, discipline, and leadership. The decline in the value of the service orientation element occurred because there were several civil servants who could not complete their tasks on time and whose work results were not optimal. The value of the discipline element has decreased, indicating that there are discipline problems at ASN DG ILMATE, including ASN violating working hour regulations and company policies such as tardiness, leaving the work area at the appointed time, wasting work time for unproductive activities (browsing Facebook, playing games, excessive rest), and employees exceeding the allocated rest time. In addition, there has been a decline in effective leadership, likely caused by poor communication between leaders and their staff and the failure of leaders to address factual issues promptly.

The decline in ASN performance achievement at DG ILMATE is influenced by many factors. Theoretically, the factors that affect ASN performance consist of skills and proficiency, understanding, job structure, temperament, work motivation, guidance, corporate culture, job satisfaction,

work environment, loyalty, dedication, and work behavior (Kasmir, 2016). The results of the preliminary survey of the factors that influence the performance of ASN Ditjen ILMATE are as follows:

Figure 1: Results of the Pre-Survey Factors Affecting Performance



The results of ASN responses regarding 12 factors that affect the performance of ASN Ditjen ILMATE obtained the 3 highest average value ratings: work environment, leadership, and work motivation. Furthermore, the problem restrictions in this study use these three independent variables that affect the performance of ASN Ditjen ILMATE. Based on a review of previous research, inconsistent research results (*research gaps*) were obtained from all research variables as follows:

Table 1: Research Gap

The Effect of Work Environment on Performance		
No.	Researcher, Year	Results
1	Dwihasrianti and Wasiman (2020)	There is influence
2	Fatimah and Hadi (2021)	There is influence
3	Al Hazmi and Nugraha (2021)	There is influence
4	Sulistiyorini and Pogo (2018)	There is influence
5	Kristanti (2017)	There is influence
1	Astuti and Mulyadin (2022)	No effect
2	Nurhuda et al. (2019)	No effect
3	Riyadi (2019)	No effect
The Effect of Leadership on Performance		
No.	Researcher, Year	Results
1	Indadan Gunawan (2021)	There is influence
2	Kalambayi et al. (2021)	There is influence
3	Anggriani and Peridawaty (2022)	There is influence
4	Bano, Ahmad and Ullah (2022)	There is influence
5	Santika, Sujana, Novarini (2022)	There is influence
6	Siraj et al (2022)	There is influence
7	Yulisharsasi, Surjanti and Kistyanto (2022)	There is influence
8	Andriani, Kesumawati and Kristiawan (2018)	There is influence
9	Saragih et al. (2021)	There is influence

1	Arif and Saluy (2019)	No effect
2	Adeel, Malik and Parvez (2021)	No effect
3	Hermina and Yosepha (2019)	No effect
4	Juwainia et al (2021)	No effect
5	Nurhuda et al. (2019)	No effect
The Effect of Work Motivation on Performance		
No.	Researcher, Year	Results
1	Saragih et al. (2021)	There is influence
2	Riyanto Endri and Herlisha (2021)	There is influence
3	Nurhuda et al. (2019)	There is influence
4	Andriani, Kesumawati and Kristiawan (2018)	There is influence
5	Santika, Sujana, Novarini (2022)	There is influence
6	Anggriani and Peridawaty (2022)	There is influence
7	Kumari et al (2021)	There is influence
8	Mahardika, Hamid and Ruhana (2020)	There is influence
9	Dwihasrianti and Wasiman (2020)	There is influence
10	Aqil, Karabulut and Hatipoğlu (2020)	There is influence
11	Arif and Saluy (2019)	There is influence
12	Sulistyorini and Pogo (2018)	There is influence
1	Juwainia et al (2021)	No effect
2	Hermina and Yosepha (2019)	No effect

Based on the background of the problem, it is suspected that the decline in ASN performance at the Directorate General of ILMATE in 2019–2021 is due to factors such as work environment conditions, leadership, and work motivation. Furthermore, the existence of a *research gap* makes it interesting to examine these variables with the formulation of the title "The Effect of Nonphysical Work Environment, Transformational Leadership, and Work Motivation as Mediating Variables on the Performance of State Civil Apparatus of the Directorate General of Industry, Metal, Machinery, Transportation Equipment, and Electronics".

THEORETICAL REVIEW

Performance

ASN performance in government organizations is very important because it will be valuable to understand the efficiency of organizational performance so that organizational goals (vision and mission) can be achieved. The term work performance or performance is a translation of words from English *performance*, which is often interpreted as appearance, or performance. According to Hasibuan (2019: 94), work achievement is the result of work that can be achieved by an individual in carrying out predetermined responsibilities by relying on ability, expertise, dedication, and duration.

The definition of performance is the result of effort in the standard and amount performed by a staff member in carrying out his responsibilities in accordance with the mandate given. "*Performance is described as the*

documentation of results generated on a designated job role or task over a specific period of time." Performance is the documentation of results achieved from a specific job role or task over a specific period of time (Gustianingsih, 2017: 8).

Armstrong and Baron, quoted by Wibowo (2017:7), argue that performance includes more than just the results of one's work; it also includes the way in which the work is done. Performance is related to the execution of work and the results that can be achieved, meaning that ASN performance includes the results of the work and the process they follow. Work results refer to the tasks that ASN has completed and are usually evaluated both in terms of quantity and quality. Work processes include how ASNs complete their tasks, including compliance with procedures and legalities, and whether their attitudes and behaviors are in line with organizational norms and ethical standards.

According to Chumaidah and Haryati (2019: 61), performance is related to the extent to which individual actions carry out tasks and strive to achieve predetermined goals. The level of employee performance depends on two elements: talent and employee drive. Civil servant talent, such as level of education, expertise, and experience

Mangkunegara (2017: 67) states that the concept of performance is the result of effort and quantity achieved by an ASN in fulfilling its responsibilities in accordance with the obligations imposed. This definition shows that performance contains two aspects, namely: (1) quantity of work and (2) quality of work. ASN's being able to achieve a number of work targets is not a good achievement if the quality of the work produced is not in accordance with predetermined standards.

Researchers can conclude from the description of the definition of performance that performance is the real action shown by civil servants as a result of work in accordance with their role in the organizational structure. ASN performance includes the level of achievement of results for the implementation of its work (work performance) and work behavior or process. Work performance is a measure of how much work ASN achieves based on job standards, such as standards for quality and quantity of results and time to complete work. Work behavior is the attitude, behavior, and actions of employees during work, such as discipline, responsibility, honesty, cooperation, motivation, and work morale. As a result of work achievement and work behavior displayed by employees at work, performance contains many aspects or elements (dimensions) that are assessed. This is related to the job description itself and the goals the organization wants to achieve.

Usually, the targets that are the subject of performance appraisal for civil servants are skills and capabilities in work that are assessed using certain standards objectively and routinely. Wibowo (2017:337) conveys performance standards for people related to responsibilities and sets them within the parameters of quantity, quality, productivity, on-time delivery, and cost efficiency. According to Rivai and Sagala (2014: 309), employee performance includes two elements, namely the performance and behavior of employees in accordance with their duties and responsibilities in the company. Work

performance is generally calculated from the extent of work performance that can be achieved by employees based on predetermined task measures, such as measures of quality and quantity of results and time to complete tasks. Work behavior is the attitude, behavior, and actions of employees during work, such as discipline, responsibility, honesty, a cooperative attitude, motivation, and work morale.

The achievement of good employee performance can be identified from various points of view. Mangkunegara (2017: 75) proposes performance measures, specifically excellence, volume, task execution, and job accountability. As stated by Paijan (2018: 233), there are various aspects of performance, namely:

1. Work excellence is the degree to which a process or result achieved in an endeavor is close to perfect, encompassing precision, accuracy, proficiency, and neatness.
2. The volume of work, which includes productivity, also needs to be considered, not only routine productivity but also the ability to complete additional work quickly.
3. Trustworthiness, particularly the ability to carry out work and uphold the good name of the company, Reliability in following instructions, taking initiative, being careful, and showing diligence.

Mindset is the psychological readiness to react to something unfavorable or favorable. It includes dispositions towards the organization, colleagues, and tasks, as well as cooperation.

Nonphysical Work Environment

The work environment is one of the elements that affect employee productivity and morale. If the work atmosphere is unsatisfactory, employees will quickly lose interest and feel uncomfortable while working. The extent of the work atmosphere can include elements from inside and outside the organization that affect employee performance. Siagian (2014: 56) suggests that the work atmosphere is a space for employees to carry out their daily tasks. If the work atmosphere is pleasant, meaning supportive, it will improve employee performance. Conversely, if the work atmosphere is not conducive, employee performance will be below standard (Sastra et al., 2020: 3).

Nitisemito (2012: 182) explains that the work atmosphere includes all the factors that surround employees and can affect their efficacy in fulfilling their assigned tasks. Both connotations offer an understanding that the work environment includes all entities that exist around employees, both tangible and intangible, which can affect individual employees in carrying out their job obligations.

According to Sedarmayanti (2017: 2), work context refers to the overall tools and resources at hand, the surrounding setting where individuals carry out tasks, how to work, and work arrangements for both individuals. This definition contains three meanings, namely: (1) the work environment is a work facility and infrastructure; (2) the work environment is related to the method or mechanism of employee work; and (3) the work environment includes the division or organization of the task load that employees must do.

The work environment consists of tangible and intangible elements. According to Sumantri and Firmansyah (2021: 35), the intangible work environment refers to all the circumstances that arise in relation to work interactions, including interactions with superiors, coworkers, and subordinates. This intangible environment is an important aspect of the work environment that should not be ignored. Hasibuan (2019: 193) emphasizes that the intangible work environment is a pleasant or unpleasant situation where employees perceive their responsibilities. According to Fitriani (2018: 122), the intangible work environment includes all conditions that arise in connection with the work association. In an intangible work environment, the goal is to foster good relationships among coworkers and resolve any conflicts that may arise. The purpose of studying the intangible work environment is to foster a positive employee mindset that can increase employee productivity.

Fatimah and Hadi (2021: 35) explain the intangible work environment as all conditions that arise in connection with work engagement, both with superiors, staff, and coworkers. As stated by Nitisemito (2012: 139), the intangible work environment reflects situations that encourage collaboration between managers and employees, as well as colleagues in the organization. The situation formed by the company regarding the intangible work environment consists of a sense of camaraderie, interaction between superiors and subordinates, and personal responsibility.

Based on the explanation given, it can be concluded that intangible work settings are work settings that are not concrete but can be felt. The embodiment of this work environment includes interactions between coworkers, superiors, and subordinates, thus creating a positive and pleasant work atmosphere. The intangible state of the work setting will have the capacity to increase employee motivation in the workplace, resulting in better performance.

Leaders' efforts to build a pleasant working atmosphere for staff members are a challenge because many elements affect it. As stated by Nitisemito (2012: 185), factors that affect the work environment can be divided into two categories: innate factors and external factors. Intrinsic factors include atmosphere, a hygienic work environment, sufficient lighting, sufficient air circulation, and background music during work, while extrinsic factors include security guarantees, noise levels, and freedom from external disturbances.

In relation to the elements that influence the non-physical work environment, Sedarmayanti (2017: 26) argues that the intangible workplace includes any aspects that arise in connection with engagement among coworkers or engagement with staff members. According to Wursanto (2009) in Fitriani (2018: 122), there are various factors that are significant in influencing the attitudes and behavior of workers in the non-physical work environment, namely: (1) continuous monitoring with a strict supervision system, (2) a work atmosphere that offers encouragement and strong morale, (3) an attractive reward system, (4) good and compassionate treatment, not seen as a robot or machine, the opportunity to advance in one's career as much as possible based on individual abilities, (5) a sense of security between members, both inside and outside the organization, (6) harmonious relationships characterized by

informality, a strong sense of family, and (7) members receive fair and impartial treatment.

Transformational Leadership

Leadership plays an important role in various organizations, including governing bodies. The prosperity of the organization, both as a whole and in certain fractions, is highly dependent on the caliber of leadership that exists in the organization concerned and the leadership approach applied. One of the leadership styles in the industrial era of 4.0, specifically in government agencies, is transformational leadership. According to Saladin (2015: 49), the term transformative comes from the word *to transform*, which means to change or modify something into a different form. A transformative leader must have the ability to effectively transform all organizational assets to achieve more significant goals in line with predetermined goals. The assets in question consist of personnel, infrastructure, finances, and external elements of the organization.

According to Maryanto (2015:1), transformative leadership is illustrated as an all-engaging and unified leadership skill that is essential for individuals, groups, and organizations to produce distinctive change at every stage of operations. The essence of transformative leadership will be realized in the process of uplifting, nurturing, and empowering supporters.

Nugroho (2019:5) states that a leader with a transformative leadership style is one who focuses on the aspects and growth needs of each of his followers. Transformative leaders change followers' perceptions of problems by helping them understand familiar problems from a new perspective, and they have the ability to encourage and motivate followers to put in extra effort to achieve collective goals. According to Sinaga et al. (2021: 3), transformational leadership is a type of leadership in which leaders use personal appeal and intellectual stimulation to create change and generate enthusiasm in their organizations.

Burns, in Akbar and Imaniyati (2019: 3), argues that transformative leadership is a type of leadership in which leaders and subordinates strive for higher moral and motivational standards. The criteria used to evaluate this leadership style is to observe the level of trust, compliance, appreciation, loyalty, and recognition from followers. These criteria are used because followers of transformative leaders will be motivated to consistently strive for excellence to achieve organizational goals.

Transformational leadership is proven and can serve as a remedy for different types of problems related to difficulties in the current era, where many individuals research and demand what is suitable for a particular human condition. Therefore, contemporary transformational leadership does not solely depend on the need for self-esteem but can also increase the recognition of the existence of leaders who assume responsibility for doing their best, in line with research on management and leadership advancement that focuses on individuals, productivity, and interrelated aspects of organizational progress. The research on leadership management and advancement focuses on the individual, productivity, and interrelated aspects of organizational advancement.

Robbins and Coulter (2010: 263) suggest several indicators of transformational leadership style: attractiveness, motivation, intellectual stimulation, and personal attention. According to Bass and Avolio in Paijan et al. (2018: 3), there are four dimensions of transformational leadership, namely:

1. *Idealized Influence* (charisma). Connected to leadership behaviors that demonstrate followers' willingness to go beyond anticipated levels of effort. Followers especially hold their leaders in high esteem, respect them, and share their trust.
2. *Inspirational motivation*. Leaders have the authority to spark subordinates' excitement for the collective task and can articulate phrases that can motivate subordinates' confidence in their competence to complete tasks and achieve group goals.
3. *Intellectual stimulation*. Efforts to offer help to followers to become more innovative and imaginative, where the leader inspires followers to question assumptions, propose new concepts and techniques, and present conventional approaches from new angles
4. *Individual consideration*. Leaders place great importance on each individual's desire for achievement and development, serving as mentors, consultants, instructors, trusted friends, and guides.

Work Motivation

Basically, employees engage in tasks because of an urge, either from their own internal drive or from an external source, to fulfill their needs. This stimulus is referred to as motivation. Rangga and Jumhur (2020:4) argue that motivation is a collection of mindsets and principles that influence individuals to achieve certain goals based on their personal aspirations. These mindsets and principles serve as a driving force to inspire individuals to act in pursuit of their goals. Stimulation includes two elements, namely: work behavior orientation (work to achieve goals) and behavior intensity (strength at work).

Wibowo (2017: 110) suggests that motivation is the result of a compilation of internal and external influences that encourage an employee to choose appropriate actions and show certain behaviors. According to Hasibuan (2019: 143), work motivation is the supply of driving energy that arouses a person's desire to work, thus encouraging them to collaborate, work efficiently, and achieve satisfaction.

Sutrisno (2017: 146) suggests that motivation is a catalyst that stimulates individuals to engage in certain efforts, so motivation is often considered the force that drives a person's behavior. Every effort made by individuals must have a driving force. In relation to performance, Mangkunegara (2017: 103) emphasizes that the drive for achievement is defined as a catalyst within a person to carry out or perform an action or task to the best of their ability to achieve work proficiency with commendable designations.

Based on several explanations mentioned earlier, researchers can conclude that work motivation is an encouragement that comes from within a worker to carry out and complete a task properly according to the needs and desires of the work performed. Work motivation is related to providing

encouragement that can increase morale and work motivation to the highest level so that an employee is able to collaborate and perform tasks efficiently to achieve organizational goals and personal goals, thereby meeting their own needs.

Motivation theory is now used by organizational leaders to assist organizations in motivating their employees. In government organizations, the tendency of motivation theory is closer to McClelland's motivation theory (needs theory). According to Asyari and Khasmir (2018: 265), in McClelland's motivation theory, there are three specific requirements: (a) achievement requirements: longing to improve previous performance; (b) dominance requirements: the need to have greater power and have a greater impact on others; and (c) requirements for association: longing to be admired, cultivate, and maintain friendships with others.

Niswan and Yesika (2022: 8) explain that McClelland's need theory is one of the theories that explains the motivation procedure by describing what and how desires are and how they should be approached. McClelland's needs theory or *achievement theory of motivation* revolves around three important angles: *achievement*, *power*, and *affiliation*. His theory is known as the Three Needs Theory. This theory of motivation reveals that the desire for achievement, power, and association significantly influences individual behavior, which is valuable to understand from a supervisory point of view. Ridho (2020: 6) clarifies McClelland's three desires hypothesis as follows:

1. *Need for achievement*

The will to succeed will encourage a person to excel in situations where the goals to be achieved are clear and possible to achieve and tend to trigger creativity in an employee. According to McClelland in Ridho (2020: 7), the desire for success has two signs, namely: (a) competence refers to the ability to acquire various talents that are inherent or acquired through training to perform an action; and (b) innovation refers to the ability of individuals to generate fresh ideas and produce new work in the form of something original.

2. *Need for power*

The demand for authority is the desire to have control over, influence, and command other individuals. An employee who has a strong need for authority will usually have a conscientious nature, strive to influence other individuals, enjoy being placed in competitive circumstances, and focus on social standing. McClelland in Ridho (2020: 8) asserts that the desire for authority has two significant signals, namely: (a) self-fulfillment is the opportunity for individuals to improve their skills so that it manifests as an actual ability to achieve authority; (b) authority is the capacity of individuals to get things the way they want.

3. *Need for affiliation*

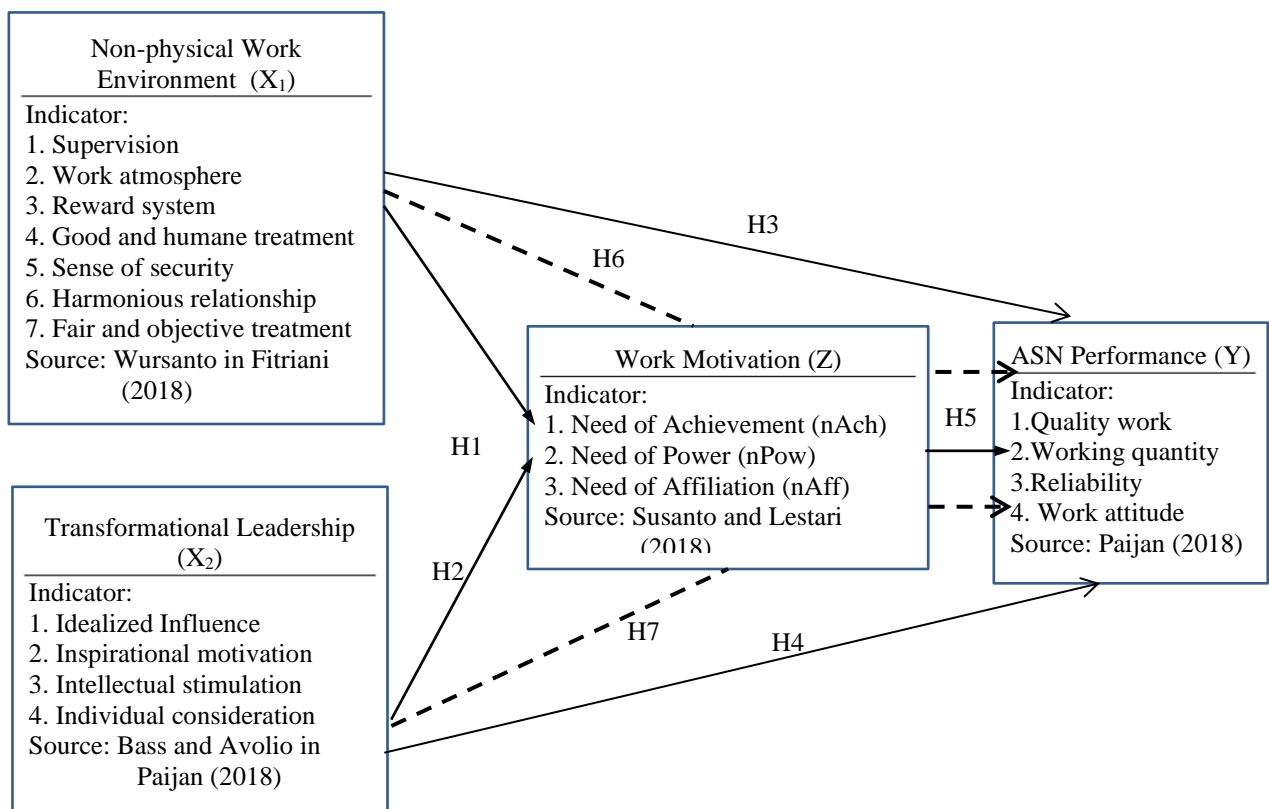
This need is characterized by the tendency of strongly motivated workers to form friendships, support cooperative situations, and desire relationships that require a substantial degree of mutual understanding. The need for social relationships will vary depending on the circumstances; for example, when a

work team is being formed, the need for social relationships will increase. Individuals show a desire to have intimate, cooperative, and friendly relationships with other entities. Individuals with a high need for social relationships usually achieve success in their professional endeavors.

2.1 Hypothesis Development

Sugiyono (2019) explains that the conjecture functions as a temporary response to the formulation of research problems where the problem has been presented in the form of an inquiry. Hypothesis development is a model that explains the relationship between one variable and another. Based on the literature review, a research framework and hypothesis development can be made as follows:

Figure 2: Research Framework



Based on the above framework, the hypothesis formulation in this study is as follows:

- H1: Non-physical work environments affect ASN work motivation.
- H2: Transformational leadership affects ASN work motivation.
- H3: Non-physical work environment affects ASN performance.
- H4: Transformational leadership affects ASN performance.
- H5: Work motivation affects ASN performance.
- H6: Non-physical work environment through work motivation affects ASN performance.

H7: Transformational leadership through work motivation affects ASN performance.

METHODOLOGY

Research Design

This study uses quantitative and descriptive research methods. The descriptive method is a type of research conducted to ensure the existence of independent variables, either on one or several variables (individual variables), without making comparisons and looking for associations between these factors and other variables (Sugiyono, 2018). The descriptive approach is used to describe the conditions of the non-physical work environment variables, transformational leadership, work motivation, and ASN performance of DG ILMATE.

Quantitative research methods can be defined as research methods based on positivist views that are used to investigate certain populations or events, collect data using research tools, and examine data that emphasize numerical or statistical values with the aim of validating previously established hypotheses (Sugiyono, 2018). Quantitative methods are used to analyze the influence of the non-physical work environment, transformational leadership, and work motivation as mediating variables on the performance of ASN Ditjen ILMATE.

Operational Definition and Measurement of Variables

Sugiyono (2018) states that the operational definition refers to the essence, characteristics, or magnitude of an object or activity that has many variations identified by the researcher for the purpose of examination and further stabilizing the results. The operational definitions and indicators of each variable are as follows:

Table 2: Operational Definitions and Indicators

Variables	Dimensions	Indicator	No. Order
Nonphysical Environment (X ₁): all the circumstances that occur related to work relationships	1. Surveillance	a. Continuous supervision	1
		b. Strict supervision	2
	2. Working atmosphere and relationships	a. Fun work atmosphere	3
		b. A good and harmonious working relationship	4
	3. Reward system	a. Pay according to workload.	5
		b. Rewards according to ASN needs	6
	4. Good and fair treatment	a. Tasks according to the job description	7
		b. Objective treatment from leaders	8
	5. A sense of security	a. Career path opportunities	9
		b. Job security guarantee	10
Transformational Leadership (X ₂) is leadership that must be able to turn an idea into reality and turn concepts into concrete actions.	1. <i>Idealized Influence</i>	a. ASN Respected	1
		b. Trusted ASN	2
		c. Be a role model.	3
	2. <i>Inspirational Motivation</i>	a. Become a motivator	4
		b. Setting group goals	5
	3. <i>Intellectual Stimulation</i>	a. Come up with creative ideas	6
		b. Problem solver	7
	4. <i>Individualized Concideration</i>	a. Career development attention	8
		b. Creating a work environment	9
		c. Good relationship with ASN	10
Work Motivation (Z) is a person's desire that causes a person to act to achieve a goal.	1. <i>Need for achievement</i>	a. Accept high-risk	1
		b. Achieving success	2
		c. Giving feedback	3
		d. Responsible	4
	2. <i>Need for affiliation</i>	a. Good cooperation	5
		b. Cooperative attitude	6
	3. <i>Need for power</i>	a. Behavior as desired by superiors	7
		b. Controlling other ASNs	8
		c. Reaching higher positions	9
d. Having a leader's character		10	
ASN performance (Y ₂) is the quantity or quality of something produced or services provided by someone who does the job.	1. Quality of work	a. Accuracy of work results	1
		b. Thoroughness of work	2
		c. Work process skills	3
	2. Work quantity	a. Amount of work	4
		b. On-target work results	5
		c. Work error	6
	3. Reliability	a. Initiative	7
		b. Diligent	8
	4. Attitude	a. Responsive	9
		b. Responsibility	10

To obtain research data, measurements were made of research instruments by making questionnaires of each research variable. In order to

measure respondents' opinions or answers, a Likert scale is used, which is a scale used to measure the attitudes, opinions, and perceptions of a person or group of people about social phenomena (Sugiyono, 2018). Furthermore, for the purposes of quantitative (statistical) analysis, the variable instrument answers are given a weighted score according to the following table:

Table 3 Likert Scale and Respondent Answer Scores

No.	Answer	Score
1.	Disagree / not good	1
2.	Disagree / not good	2
3.	Undecided / good enough	3
4.	Agree/good	4
5.	Strongly Agree / very good	5

Source: Sugiyono (2018)

Population and Sample

Sugiyono (2017) emphasizes that population is a broad domain consisting of entities or individuals that have certain attributes and qualities determined by the investigator to be examined, and then conclusions are made. The population of this study consisted of the entire workforce of the Directorate General of ILMATE--as many as 230 people.

The sample is part of the quantity and quality possessed by the population (Sugiyono (2017)). To obtain a representative sample, the sample size is determined using the Slovin equation in the following way:

$$n = \frac{N}{1 + Ne^2} = \frac{230}{1 + 230 \times (0,05)^2} = 146.03 \text{ rounded up to } 147 \text{ respondents}$$

Description:

n = sample size

N= population size

e = *error tolerance limit*

The number of samples was taken using *stratified random sampling*, which is a sampling technique that takes into account a level (strata) in the population element.

Data Collection Technique

The data collection techniques used are:

1. Literature study, which is collecting secondary data by collecting relevant data from books, journals, articles, and other sources that can support research at DG ILMATE,
2. Documentation, which is collecting secondary data by requesting documents owned by DG ILMATE, The required documents include information on the number of employees, organizational structure, and other supporting information needed related to the research theme.
3. Questionnaires, namely collecting primary data, are done by giving a list of questions or statements in writing to participants (147 employees of DG ILMATE).

3.1 Data Analysis Technique

In analyzing the data using *structural equation modeling* (SEM) with *partial least squares* (PLS), PLS is a cause-and-effect prediction tool used for theory development. PLS can also be used to show the presence or absence of correlation between hidden variables and to examine constructions built with reflective and formative indicators (Haryono, 2017). The steps of data analysis in this study are described as follows:

1. The instrument quality test, also known as the measurement model evaluation (*outer model*), includes construct validity and reliability tests. Construct validity consists of *convergent validity* and *discriminant validity*, while the reliability test uses *Cronbach's alpha* and *composite reliability* methods.
2. Test the structural model (*inner model*), which is seen from several indicators including the *path coefficient*, coefficient of determination (R^2), *goodness of fit index* (GoF), and *predictive relevance* (Q2).
3. Hypothesis testing, namely by looking at the probability value and t-statistic. The criteria for accepting the hypothesis are *t-statistic* > t-table and *p-value* < 0.05.

RESULTS

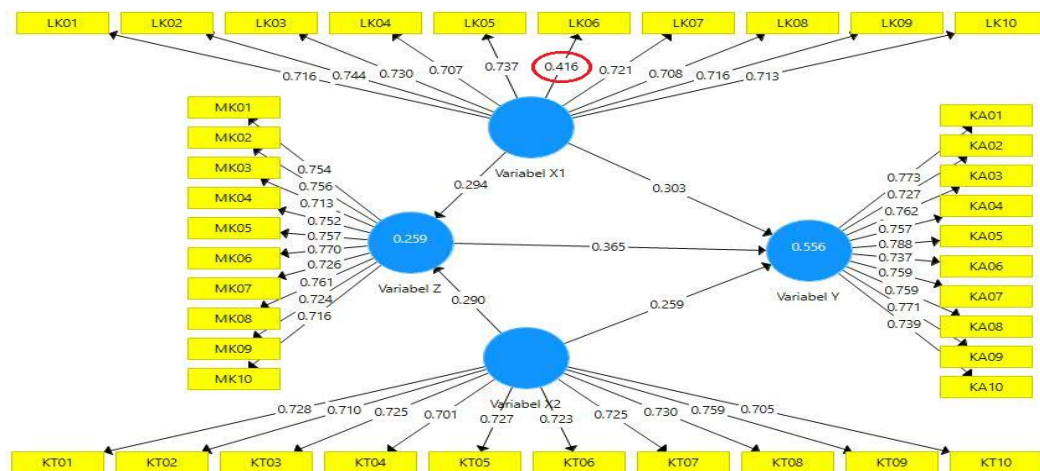
Instrument Quality Test (*Outer Model*)

The instrument quality test or measurement model (*outer model*) is evaluated by looking at validity and reliability.

1. Validity Test

The validity test consists of discriminant validity and convergent validity. Variables are said to be valid if the discriminant validity test results produce an *average variance extracted* (AVE) value > 0.5, while the convergent validity test is said to be valid if the *loading factor value* is > 0.7. The results of the discriminant validity test obtained show that all variables have an AVE value > 0.5 except for the non-physical work environment AVE value of 0.486 < 0.5. To get invalid statement items, it is necessary to test convergent validity.

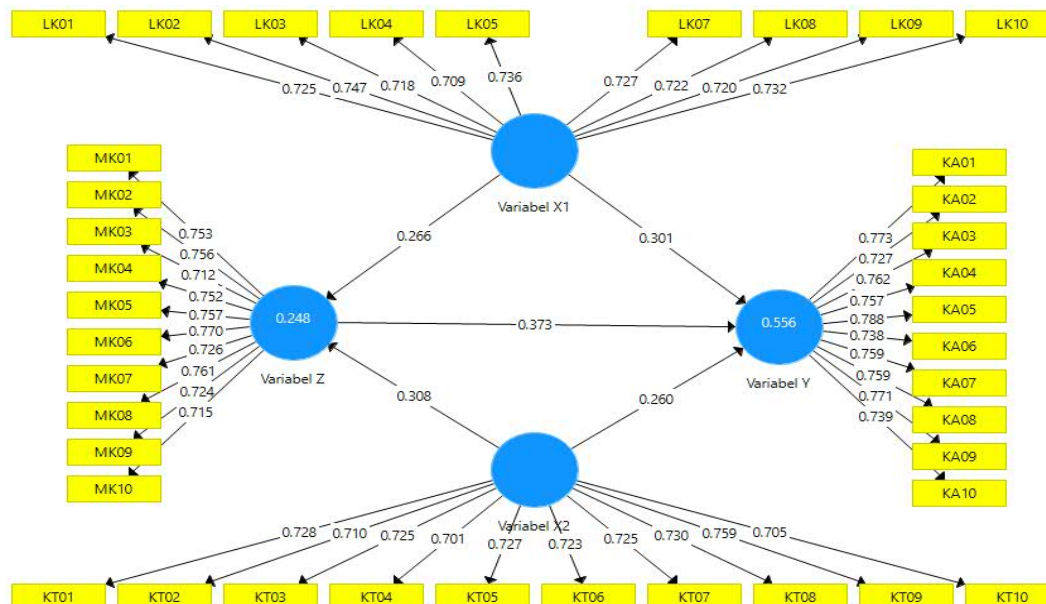
Figure 3: Results of Stage 1 Convergent Validity Testing



Source: Research results, 2023.

Stage 2 validity testing needs to be done so that the variables are truly valid. The results of the discriminant validity test obtained by all variables have an AVE value > 0.5 (valid), which means that the discriminant validity test is acceptable. Furthermore, the convergent validity test obtained by all variables has a loading factor value > 0.7 (valid), which means that the convergent validity test is acceptable.

Figure 4: Results of Stage 2 Convergent Validity Testing



Source: Research results, 2023.

2. Reliability Test

To test the reliability of the construct, the Cronbach alpha coefficient and composite reliability are used. A variable can be said to have construct

reliability if it has a composite reliability value > 0.7 and a Cronbach alpha coefficient value > 0.7 , which indicates a good level of reliability for the variable.

Table 4: Research Variable Reliability Test

Variables	Cronbach's Alpha	Composite Reliability	Description
Nonphysical Work Environment (X1)	0.879	0.884	Reliable
Transformational Leadership (X2)	0.899	0.903	Reliable
Work Motivation (Z)	0.910	0.912	Reliable
Performance (Y)	0.917	0.919	Reliable

Source: Research results, 2023.

The validity test results obtained, the *Cronbach's alpha* coefficient value, and the *composite reliability value* are all ≥ 0.7 , meaning that all research variables can be relied on (reliable) for research.

Structural Model Test (Inner Model)

Inner model evaluation is analyzed by looking at the significance of the relationship between constructs as indicated by the coefficient of determination (R^2), *goodness of fit index* (GoF), *predictive relevance* (Q2), *path coefficient* and *indirect effects*, and *effect size* (f^2).

1. Coefficient of Determination (R^2)

The coefficient of determination measures the level of variation in changes in exogenous variables affecting endogenous variables. Small R^2 value = 0.19; moderate R^2 = 0.33; large R^2 = 0.67 (Tenenhaus, 2004; Haryono, 2017).

Table 5: R Square and Adjusted R Square Values

Variables	R Square	Adjusted R Square
Performance (Y)	0,556	0,547
Work Motivation (Z)	0,248	0,237

Source: Research results, 2023.

The value of R squared (R^2) performance = 0.556 means that the non-physical work environment and transformational leadership have a large (strong) influence on performance. The value of R squared (R^2) work motivation = 0.248 means that the non-physical work environment and transformational leadership have a small (weak) influence on performance.

2. Goodness of Fit Index (GoF) and Predictive Relevance (Q2)

GoF and Q2 are carried out to measure the fit or not of the research model. GoF and Q2 values are calculated using the following formula:

a. $GoF = (AVE \times R^2) = (0.574 \times 0.556) = 0.565$

b. $Q2 = 1 - (1 - R^2) = 1 - (1 - 0.556) = 0.556$

The GoF value of $0.565 > 0.36$ and the Q value of $0.556 > 0$ mean that the *measurement model (inner model)* has met the requirements, so it can be continued to analyze the *path coefficient*, *indirect effects*, and *effect size*.

3. Path Coefficient

The path coefficient directly describes the strength of the relationship between constructs or variables. The path coefficient criteria are acceptable if the $t\text{-count} > t\text{-table value}$ or $p\text{ value} < 0.05$.

Table 6: Path Coefficient Results

Relationship	Path Coefficient	T Statistics	P values	Results
Environment > Motivation	0.266	3.102	0.002	Significant
Leadership > Motivation	0.308	3.353	0.001	Significant
Environment > Performance	0.301	3.842	0.000	Significant
Leadership > Performance	0.260	3.173	0.002	Significant
Motivation > Performance	0.373	4.737	0.000	Significant

Source: Research results, 2023.

4. Indirect Effects

The path coefficient directly describes the strength of the relationship between constructs or variables. The path coefficient criteria are acceptable if the $t\text{-count} > t\text{-table value}$ or $p\text{ value} < 0.05$.

Table 7: Results of Indirect Effects

Relationship	Indirect Effects	T Statistics	P values	Results
Environment, > Motivation, > Performance	0.099	2.489	0.013	Significant
Leadership, Motivation, and Performance	0.115	2.672	0.008	Significant

Source: Research results, 2023.

5. Effect Size (f^2)

In evaluating whether this omitted exogenous construct has an important impact on the endogenous construct (dependent variable), it can be seen from the results of the effect size (f^2). The effect size value (f^2) = 0.02 is in the small influence category, f^2 = 0.15 is in the medium influence category, and f^2 = 0.35 is in the large influence category.

Table 8: Effect Size Results (f^2)

	R Square	Results
Environment > Performance	0,140	Small Influence
Leadership > Performance	0,103	Small Influence
Environment > Motivation	0,086	Small Influence
Leadership > Motivation	0,084	Small Influence
Motivation > Performance	0,223	Moderate Influence

Source: Research results, 2023.

4.1 Hypothesis Test

The results of hypothesis testing using the *bootstrapping* method with *smartPLS* are as follows:

Table 9: Hypothesis Testing Results

Relationship	Part Coeficient	T Statistics	P values	Results
Direct Influence				
Environment > Motivation	0.266	3.102	0.002	H1 accepted
Leadership > Motivation	0.308	3.353	0.001	H2 accepted
Environment > Performance	0.301	3.842	0.000	H3 accepted
Leadership > Performance	0.260	3.173	0.002	H4 accepted
Motivation > Performance	0.373	4.737	0.000	H5 accepted
Indirect Effect				
Environment-> Performance	0.099	2.489	0.013	H6 accepted
Leadership > Performance	0.115	2.672	0.008	H7 accepted

Source: Research results, 2023.

DISCUSSION

1. The Effect of a Nonphysical Work Environment on Work Motivation

The results of testing hypothesis 1 obtained the value of *part coeficient* $X_1 = 0.266$ with a t-count of 3.102 and a *P value* of 0.002, meaning that there is a positive and significant influence of the non-physical work environment on work motivation of 0.266, so that hypothesis 1 is accepted (H_a is accepted). The findings of this study corroborate the research of Sentosa and Riana (2018), which shows that the intangible workplace atmosphere has a favorable and noteworthy impact on the internal drive of personnel at the Badung Mangusada Regional Revenue Office. The proof of hypothesis 1 is that efforts to increase the work motivation of the ASN Directorate General of ILMATE can be done by improving the quality of the non-physical work environment, namely by maintaining the condition of the non-physical work environment variable statement that gets the highest score and improving the statement item that gets the lowest score. In this case, the leadership of the Directorate General of ILMATE should pay more attention and improve the pleasant working atmosphere of each work unit because this statement item received the lowest score.

2. The Effect of Transformational Leadership on Work Motivation

The results of testing hypothesis 2 obtained the value of *part coeficient* $X_2 = 0.308$ with a t-count of 3.353 and a *P value* of 0.001, meaning that there is a positive and significant effect of transformational leadership on work motivation of 0.308, so that hypothesis 2 is accepted (H_a is accepted). The results of the study support the research of Charisma Ayu, Merisa Faradita (2019), and Prayudi Ahmad (2020) that transformational leadership style has a positive and significant effect on employee work motivation. The proof of hypothesis 2 means that efforts to increase the work motivation of the ASN Directorate General of ILMATE can be done by improving the quality of

transformational leadership, namely by maintaining the condition of the transformational leadership variable statement that gets the highest score and improving the statement item that gets the lowest score. In this case, the leadership of the Directorate General of ILMATE pays more attention to and improves the conditions of employees who do not respect the leadership.

3. The Effect of a Nonphysical Work Environment on Performance

The results of testing hypothesis 3 obtained the value of *part coefficient* $X_1 = 0.301$ with a t-count of 3.842 and a *P value* of 0.000, meaning that there is a positive and significant effect of the non-physical work environment on ASN performance of 0.301, so that hypothesis 3 is accepted (H_a is accepted). These results support the research of Dwiharianti and Wasiman (2020), Al Hazmi and Nugraha (2021), Sulistyorini and Pogo (2018), and Kristanti (2017). The proof of hypothesis 3 means that efforts to improve the performance of the ASN Directorate General of ILMATE can be done by improving the quality of the non-physical work environment by maintaining the condition of the non-physical work environment variable statement that gets the highest score and improving the statement item that gets the lowest score. In this case, the leadership of the Directorate General of ILMATE should pay more attention and improve the pleasant working atmosphere of each work unit because this statement item received the lowest score.

4. Effect of Transformational Leadership on Performance

The results of testing hypothesis 4 obtained the value of *part coefficient* $X_2 = 0.260$ with a t-count of 3.173 and a *P value* of 0.002, meaning that there is a positive and significant effect of transformational leadership on ASN performance of 0.260, so that hypothesis 4 is accepted (H_a is accepted). These results are in accordance with the research of Indadan Gunawan (2021), Kalambayi et al. (2021), Anggriani and Peridawaty (2022), Bano, Ahmad, and Ullah (2022), and Santika, Sujana, and Novarini (2022). The proof of hypothesis 4 means that efforts to improve the performance of the ASN Directorate General of ILMATE can be done by improving the quality of the transformational leadership style, namely by maintaining the condition of the transformational leadership variable statement that gets the highest score and improving the statement item that gets the lowest score. In this case, the leadership of the Directorate General of ILMATE pays more attention to and improves the pleasant working atmosphere of each work unit because this statement item gets the lowest score.

5. Effect of Work Motivation on Performance

The results of testing hypothesis 5 obtained a *part coefficient* value of $Z = 0.373$ with a t-count of 4.737 and a *P value* of 0.000, meaning that there is a positive and significant effect of work motivation on ASN performance of 0.373, so that hypothesis 5 is accepted (H_a is accepted). This result is in accordance with the research of Saragih et al. (2021), Riyanto Endri and Herlisha (2021), Nurhuda et al. (2019), Santika, Sujana, and Novarini (2022), and Anggriani and Peridawaty (2022). The proof of hypothesis 5 means that efforts to improve ASN performance at DG ILMATE can be done by increasing ASN work motivation, namely by maintaining the condition of the work motivation

variable statement that gets the highest score and improving the statement item that gets the lowest score. In this case, the leadership of DG ILMATE pays more attention and motivation to ASNs with challenging and high-risk jobs.

6. The Effect of a Nonphysical Work Environment on Performance through Work Motivation

The results of testing hypothesis 6 obtained the value of *part-coefficient* indirect effect $X_1 = 0.099$ with t-count 2.489 and *P value* 0.013, meaning that there is a positive and significant indirect effect of the non-physical work environment on ASN performance through work motivation of 0.099, so that hypothesis 6 is accepted (H_a is accepted). The results of this study support the research of Sundari and Okfitasari (2017), Fudzah (2020), and Andriyani (2020) that work environment conditions have a beneficial and important impact on employee productivity, with motivation as a mediating factor. The proof of hypothesis 6 means that efforts to improve the performance of the ASN Directorate General of ILMATE can be done by improving the quality of the non-physical work environment and ASN work motivation.

7. The Effect of Transformational Leadership on Performance Through Work Motivation

The results of testing hypothesis 7 obtained a *part coefficient* value of indirect effect X_2 of 0.115 with a t-count of 2.672 and a *P value* of 0.008, meaning that there is a positive and significant indirect effect of transformational leadership on ASN performance through work motivation of 0.115, so that hypothesis 7 is accepted (H_a is accepted). The results of this study support the research of Anggriani and Peridawaty (2022), Pariesti (2022), and Prayudi (2020) that work motivation is able to mediate the effect of transformational leadership on employee performance. The proof of hypothesis 7 means that efforts to improve the performance of the ASN Directorate General of ILMATE can be done by improving the quality of transformational leadership and ASN work motivation.

Some suggestions for improving the performance of ASN DG ILMATE are as follows:

1. The results showed that the pleasant working atmosphere of each work unit got the lowest score on the non-physical work environment variable, so it was suggested to all leaders of the Directorate General of Metal, Machinery, Transportation Equipment, and Electronics Industry to be able to hold informal activities such as *outbound* events, facilitating sports activities between DGs, and others that can build togetherness so that the work atmosphere can be properly created.
2. The results showed that employees respect for leadership got the lowest score on the transformational leadership variable, so it is recommended to all leaders at the Directorate General of Metal, Machinery, Transportation Equipment, and Electronics Industry to appreciate and empathize with their subordinates more about their work problems. Thus, subordinates will also have more respect for their leaders.

3. The results showed that ASN likes challenging and risky work and received the lowest score on the ASN work motivation variable, so it is recommended to all leaders of the Directorate General of Metal, Machinery, Transportation Equipment, and Electronics Industry to arouse the enthusiasm of ASN for carrying out challenging and risky work tasks by providing adequate work facilities for high-risk work.

CONCLUSIONS AND RECOMMENDATIONS

Based on the description of the research results and discussion, it can be concluded as follows:

1. The non-physical work environment affects the work motivation of ASN Ditjen ILMATE.
2. Transformational leadership affects the work motivation of the ASN Directorate General of ILMATE.
3. The non-physical work environment affects the performance of ASN Ditjen ILMATE.
4. Transformational leadership affects the performance of the ASN Directorate General of ILMATE.
5. Work motivation affects the performance of the ASN Directorate General of ILMATE.
6. The non-physical work environment affects the performance of ASN Ditjen ILMATE through work motivation as a mediating variable.
7. Transformational leadership affects the performance of ASN Ditjen ILMATE through work motivation as a mediating variable.

Some suggestions for improving the performance of ASN DG ILMATE are as follows:

1. The results showed that the pleasant working atmosphere of each work unit got the lowest score on the non-physical work environment variable, so it was suggested to all leaders of the Directorate General of Metal, Machinery, Transportation Equipment, and Electronics Industry to be able to hold informal activities such as *outbound* events, facilitating sports activities between DGs, and others that can build togetherness so that the work atmosphere can be properly created.
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3. The results showed that ASN likes challenging and risky work and received the lowest score on the ASN work motivation variable, so it is recommended to all leaders of the Directorate General of Metal, Machinery, Transportation Equipment, and Electronics Industry to arouse the enthusiasm of ASN for carrying out challenging and risky work tasks by providing adequate work facilities for high-risk work.

FURTHER STUDY

Further researchers can add factors that can potentially affect employee performance, such as: work ability, work discipline, work ethics, job satisfaction, job stress, work communication, career development, compensation, organizational culture and others.

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