

## Exploring the impact of social relationships on work productivity of employees: A structural equation modeling approach



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### ABSTRACT

Improving work productivity is crucial for a company's ability to build strong trust, particularly with its customers. This study aims to explore how social relationships impact employee work productivity by acting as a mediator between supervision and motivation. The research utilizes a quantitative method, specifically a structural equation modeling (SEM) based on SmartPLS, and was carried out at PDAM Tirta Silau Piasa in Asahan Regency, involving 185 employees. Data was collected through surveys using a Likert scale. Findings reveal that social relationships play an important role in linking supervision and motivation to the work productivity of employees at PDAM Tirta Silau Piasa Asahan Regency. The study suggests that supervision should maintain a focus on professionalism to ensure objective outcomes. Additionally, enhancing employee motivation should include not just the employees but also offering rewards such as vacation packages for families and scholarships for children's education to keep motivation levels high.

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### 1. Introduction

In the face of global competitiveness, the main concentration of organizations is on Human Resources. The organization's ability to develop is nothing more than the organization's Human Resources' ability to develop (Bhatti et al., 2021). Human resources carry out organizational tasks within a structured and coordinated framework (Adil and Hamid, 2020). Human resources are indispensable and the organization's primary asset, with the thought that the available resources can only be managed with human resources to manage immovable assets and financial assets (Rivaldo, 2021). Therefore, human resource development is not a burden but an opportunity for organizational growth (Bibi et al., 2022). A company is a formal association system of two or more people working together to achieve a goal (Hirschi and Spurk, 2021).

Companies building a competitive advantage are determined by employee productivity factors (Leitão et al., 2021). Productivity can be defined as the ratio between the results achieved and labor involvement

per unit of time. Furthermore, employee productivity is improved through good social relations within the company. Currently, very few research results make social relations an intervening variable in supporting work productivity (Kristanti et al., 2022). Work productivity is the key to the company's success in competing with its competitors. Leaders can monitor the extent of their subordinates' productivity level through work behavior. Employees will show good behavior daily when carrying out their duties and responsibilities (Lubis et al., 2023).

Productivity is more than science, technology, and management (Syaifuddin et al., 2023). Furthermore, productivity is also a philosophy and mental attitude that is always motivated to develop to get a better quality of life in the future (Song and Gao, 2020). Productivity is also described as the level of efficiency used to produce goods and services (Chandra and Ginting, 2022). Productivity shows how to use resources well in producing commodities (Demartini and Beretta, 2020). Every organization, whether it is a company or not, will always strive so that members or workers involved in organizational activities can provide success in the form of high work productivity to meet the goals set (Debus et al., 2020).

One of the critical factors in increasing employee productivity is building solid social relationships within the company. Social relationships can be defined as how individuals react to themselves; they

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also involve environmental adaptations, such as eating alone, dressing alone, obeying rules, and so on (Swanson et al., 2020). Social relationships begin at home and develop in broader social settings, such as school and peers. Children's difficulties in social relations with peers are usually caused by powerful parenting (Zhaoyang et al., 2021). Life situations in the family are in the form of wrong parenting. Generally, the parents can still correct it, but social situations with peers and the surrounding environment are challenging. It is because of these factors that are always lived in daily life that can affect an employee's social life pattern (Tekin et al., 2023). The results of previous research show that social relationships directly have a significant effect on employee work productivity (Ramli et al., 2023). However, good social relations are not always considered capable of increasing work productivity (Tajvidi and Karami, 2021). Good social relations between employees and their leaders often make employees behave negatively and harm the company (Paruzel et al., 2021).

Furthermore, work supervision is an essential element in increasing employee productivity. Work supervision is currently seen as an effort by management to maintain the work productivity of its employees. Work supervision is currently seen as an effort by management to maintain staff productivity (Suriagiri et al., 2022). Supervision is reviewing work results and, if necessary, corrective action to ensure those results are by the plan (Martin et al., 2021). All actions taken to ensure and guarantee that work or tasks are completed by the plan that has been planned, the regulations or policies put in place, and the orders or instructions issued to implement the plan are referred to as supervision (Lee and Kusumah, 2020). Supervision is needed to ensure what has been achieved, assess whether the implementation is running smoothly, and make appropriate adjustments to produce good performance (Saputri et al., 2020). The results of research conducted (Bani-Melhem et al., 2021; Herliana et al., 2023) stated that work supervision directly has a significant effect on work productivity. In contrast, Lim et al. (2021) and Ronen and Donia (2020) highlighted that work supervision affects employees' concerns, which in turn influences the demand for greater work creativity from each employee.

Furthermore, motivation is necessary for company leaders to consider increasing their employees' work productivity. Furthermore, motivation is a desire within a person that causes that person to take action, and of course, this will affect a person's performance (Riyanto et al., 2021). If a person's work motivation is good, then that person's performance will also be good, and vice versa (Hemakumara, 2020). Work motivation is considered to have a positive relationship between motivation and work productivity (Andreas, 2022). This means that employees with high motivation tend to perform well. Otherwise, employees whose performance is low may be due to low motivation

(Putra and Mujiati, 2022). Previous research indicates that work motivation significantly influences work productivity (Nurmayanti and Narlan, 2020; Arafat and Putra, 2021). However, high work motivation does not necessarily lead to increased productivity among employees (Pham and Nguyen, 2020). This is undoubtedly a fundamental question: What kind of motivation most effectively increases employee productivity

PDAM Tirta Silau Piasa Asahan Regency is one of the offices engaged in drinking water supply services in Asahan and surrounding areas. Based on researchers' observations, so far, the work productivity of employees at PDAM Tirta Silau Piasa Asahan Regency has yet to be maximized to improve services to the community. This finding can be corroborated by Table 1.

**Table 1:** Number of community grievances in 2022

Month	Amount complaint
January	31
February	45
March	36
April	52
May	47
June	42
July	38
August	67
September	43
October	74
November	63
December	58

Table 1 shows that the number of community complaints about the services provided by PDAM Tirta Silau Piasa employees in Asahan Regency could be more optimal. Complaints have been submitted, such as insufficient water quantity, payment bills that do not match the measuring instrument, and slow response to new customers who want to install water supply. If this continues, it will adversely impact the image of PDAM Tirta Silau Piasa Asahan Regency as a company owned by the Indonesian government that provides excellent service, especially to the community in Asahan Regency. Furthermore, this research is fundamental, considering that its results can be used as material for management evaluation, especially in increasing employee productivity. Finally, this research also has a high novelty value. Few studies have identified social relations as a mediating variable in improving work supervision and motivation and increasing work productivity.

## 2. Literature review

### 2.1. Work productivity

High productivity can improve the quality of a company's products or services (Børing and Grøgaard, 2023). Companies can produce better products or provide more satisfactory client services if production or service processes are more efficient (Leitão et al., 2021). Companies can provide faster services to clients if their workers work productively

(Olayisade and Awolusi, 2021). To support employee productivity, companies can invest in training and development programs, machinery investment, and research (Oseremen et al., 2022). This condition is necessary to improve employee productivity continuously and emphasize operational costs' cost efficiency (Chahal et al., 2021). The company will also continue to build an excellent reputation with consumers and the owners of the Company (Syaifuddin et al., 2023).

## 2.2. Social relationships

Social relationships are needed in companies to reduce the risk of work conflicts. Companies that emphasize the importance of maintaining social relationships will be able to carry out positive work coordination (Carlsen et al., 2021). This will trigger high work solidarity among employees (Van Orden et al., 2021). One form of social relations can be seen from the concern of employees to remind each other not to make work mistakes (Aziz et al., 2021). So, in the end, social relations can create a solid team to achieve company targets (Colenberg et al., 2021). The results of previous research show that social relations have a significant effect on employee work productivity (Chen and Wei, 2020; Zhang et al., 2021; Ahmad et al., 2021). The results of research conducted by CCCC state that social relations directly affect employee work productivity.

H1: Social relationships have a significant effect on employee work productivity.

## 2.3. Work supervision

Each employee will be responsible for ensuring the company's smooth operation (Susmadiana et al., 2021). One way to improve work discipline is to improve work supervision (Saputri et al., 2020). In this situation, the roles of employees and managers will differ regarding work objectives (Lee and Kusumah, 2020). The most likely outcome is the development of a negative attitude towards employees towards the task load assigned by their superiors (Susmadiana et al., 2021). Therefore, before starting work, management must build social relationships with employees (He et al., 2021). The ability to build a sound work supervision system is necessary so that the company's reputation will be more trusted by the public. Strengthening work supervision must also be balanced with the ability of supervisors to build harmonious communication or relationships with other employees. Supervisors are required to be able to collaborate with their subordinates to present high-quality and quantity work. Research results show that job development has a significant impact on work productivity (Nazah et al., 2021; Herliana et al., 2023; Isola et al., 2023).

H2: Work supervision has a significant effect on social relations.

H3: Work supervision has a significant effect on employee work productivity.

H4: Work supervision has a significant effect on work productivity through social relations.

## 2.4. Motivation

Companies need maximum work motivation from all employees to achieve reasonable work results more quickly (Hou et al., 2022). Employees must be motivated to prevent mistakes from occurring (Nazah et al., 2021). To unleash their potential, employees must convey their work enthusiasm to other colleagues (Anisya et al., 2021). Leaders often praise staff to ensure they perform well (Shafi et al., 2020). This form recognizes the importance of employees to management (Shafi et al., 2020). A common mistake is that leaders must appreciate or congratulate employees for their hard work. According to research findings conducted by Maryani et al. (2021) and Ali and Anwar (2021), work motivation has a direct and quite significant influence on employee work productivity.

H5: Motivation has a significant effect on social relations.

H6: Motivation has a significant effect on employee work productivity.

H7: Motivation has a significant effect on work productivity through social relations.

## 3. Research methods

Researchers chose a quantitative approach to determining the most appropriate model for increasing employee work productivity. Data analysis using the SmartPLS-based structural equation modeling (SEM). Then, the research data is primary data obtained through the distribution of questionnaires. The population in this study are permanent employees at PDAM Tirta Silau Piasa, Asahan Regency, totaling 185 people. This sampling procedure is based on employees with more than ten years of service, of which all 185 have had more than ten years.

### 3.1. Data analysis

The core data of this research comes from distributing questionnaires that have passed validity and reliability tests. Furthermore, this research used Partial Least Squares (PLS) modeling to test the conceptual model. We use PLS path modeling because it is widely used in management and related fields. This research will predict the dependent variable. Consequently, PLS path modeling is considered an appropriate study technique. Experts view PLS as the most comprehensive and all-encompassing variance-based SEM method. SmartPLS 3 was used to analyze the data further to verify the suggested relationships (Hidayanto et al., 2020).

### 3.2. Measurement

In this study, work productivity is assessed using the following indicators: (1) Work enthusiasm, (2) Work methods, (3) Work results. Additionally, social relations are measured through these indicators: (1) Conversation, (2) Mutual understanding, (3) Cooperation, (4) Openness, (5) Fourn, (6) Providing support or motivation, (7) Positive feelings, (8) Similarities with other people. Work supervision is evaluated based on these criteria: (1) Effective time management, (2) Completion of duties and responsibilities within deadlines, (3) Independent work, (4) Ability to work under time pressure. Finally, motivation is gauged using these indicators: (1) Effort to work better and avoid repetition, (2) Striving to be the best, and (3) Efforts to improve quality.

## 4. Research results

### 4.1. Testing of outer models

Measurement model analysis uses two tests: construct reliability and validity and discriminant validity.

### 4.2. Construct reliability and validity

Composite reliability is a component used to evaluate the dependence of indicators on a variable. A variable with a composite reliability value greater than or equal to 0.6 can be said to meet composite reliability. Table 2 shows the results of construct validity and reliability testing. Table 2 indicates that the composite reliability for all research variables exceeds 0.6, demonstrating that each variable satisfies the criteria for composite reliability and thus possesses a high level of reliability. Additionally, the Average Variance Extracted (AVE) for each indicator, which should be greater than 0.5 for a model to be considered viable, serves as a method for assessing discriminant validity, alongside examining the cross-loading values. Table 3 presents the results of the AVE.

Based on Table 3, the AVE values of facilities, organizational culture, service quality, social relations, and work productivity are >0.5. So, each variable has solid discriminant validity. Unlike Cronbach Alpha, this metric does not presuppose measurement equivalence or that each indicator is given equal weight. Assuming that the parameter estimates are valid, Composite dependability is a closer approach, but Cronbach Alpha tends to decrease the dependability of the tie estimates.

### 4.3. Discriminant validity

The cross-loading value is used in the discriminant validity test. If the cross-loading value of an indicator on a particular variable is higher than other variables, then the indicator is said to have discriminant validity. The cross-loading value for each indication is shown in Table 4.

The data in Table 4 shows that, when compared to the cross-loading value on other variables, each indication on the research variable has the most significant cross-loading value on the variable it forms. The indicators utilized in this study already have good discriminant validity when assembling their respective variables.

### 4.4. Inner model

#### 4.4.1. R square

Based on data processing that has been carried out using the SmartPLS 3.0 program, the R-square value is shown in Table 5. Based on Table 5, it is known that the R Square Adjusted value for the social relations variable is 0.668 or 66.8%. In comparison, the remaining 33.2% is influenced by other variables that are not the variables of this study. Then, on the work productivity variable, the value of R Square Adjusted is 0.755 or 75.5%, while the remaining 24.5% is influenced by other variables that are not this study's variables.

#### 4.4.2. Predictive relevance (Q2)

The Q2 value is analogous to the coefficient of determination (R-square), serving a similar purpose. A substantial Q2 value (greater than 0) indicates that the model has predictive relevance. Conversely, a Q2 value less than 0 suggests that the model has limited predictive relevance. In other words, higher Q2 values imply a better fit of the model to the data. The evaluation of the Q2 value can be conducted as follows:

$$Q_2 = 1 - (1 - R_1^2)(1 - R_2^2) \dots (1 - R_n^2)$$

$$Q_2 = 1 - (1 - 0.668)(1 - 0.755)$$

$$Q_2 = 1 - (0.332)(0.245)$$

$$Q_2 = 1 - 0.081$$

$$Q_2 = 0.919$$

Based on these results, the value of Q2 is 0.919. So, all the variables in this study, work supervision, motivation, social relations, and work productivity, contributed to the original data in the existing structural model of 91.9%. Then, the remaining 8.1% needs to be developed apart from research variables.

**Table 2:** Composite reliability

	Cronbach's alpha	Rho A	Composite reliability	Average variance extracted (AVE)
Motivation (X2)	0.921	0.927	0.980	0.909
Social relations (Y1)	0.940	0.941	0.953	0.770
Work supervision (X1)	0.975	0.975	0.980	0.909
Work productivity (Y2)	0.948	0.983	0.966	0.798

**Table 3: Average variance extracted (AVE)**

	Cronbach's alpha	Rho A	Composite reliability	Average variance extracted (AVE)
Motivation (X2)	0.828	0.831	0.851	0.867
Social relations (Y1)	0.869	0.866	0.875	0.868
Work supervision (X1)	0.890	0.821	0.814	0.705
Work productivity (Y2)	0.873	0.873	0.886	0.824

**Table 4: Loading factor value of each indicator**

	Motivation (X2)	Social relations (Y1)	Work supervision (X1)	Work productivity (Y2)
PK1	0.702	0.340	0.732	0.420
PK2	0.826	0.411	0.798	0.497
PK3	0.815	0.385	0.777	0.474
PK4	0.744	0.421	0.752	0.524
PK5	0.827	0.419	0.822	0.511
PK6	0.734	0.484	0.728	0.495
MT1	0.488	0.859	0.587	0.914
MT2	0.523	0.919	0.675	0.996
MT3	0.552	0.936	0.652	0.810
MT4	0.551	0.953	0.687	0.830
MT5	0.550	0.930	0.664	0.985
MT6	0.531	0.935	0.655	0.825
HS1	0.966	0.494	0.867	0.490
HS2	0.893	0.424	0.757	0.493
HS3	0.750	0.365	0.753	0.461
HS4	0.782	0.347	0.734	0.489
HS5	0.837	0.321	0.743	0.486
HS6	0.779	0.427	0.865	0.503
HS7	0.739	0.931	0.715	0.825
PD1	0.895	0.465	0.772	0.537
PD2	0.864	0.430	0.654	0.515
PD3	0.836	0.323	0.514	0.522
PD4	0.899	0.379	0.616	0.543
PD5	0.886	0.468	0.616	0.475
PD6	0.887	0.475	0.706	0.552
PD7	0.841	0.943	0.655	0.824
PD8	0.833	0.947	0.674	0.819

#### 4.5. Hypothesis test

The results of hypothesis testing in this study can be shown in [Table 6](#).

#### 4.6. The influence of work supervision on social relations

Data analysis shows that work supervision directly has a significant effect on social relations. The results of this research align with previous research, which emphasizes that work supervision can improve social relations between other employees ([Lim et al., 2021](#); [López-Cabarcos et al., 2022](#)). Furthermore, [Iosim et al. \(2022\)](#) emphasized that work supervision can also increase the desire to continue understanding the company's work system. Work supervision with good coordination can also minimize work conflicts ([Charoensukmongkol, 2022](#)). The implications of the findings in this research indicate that work supervision at PDAM Tirta Silau Piasa, Asahan Regency, needs to be carried out more professionally. There has been much emphasis on leadership from protecting certain employees who are related to them. Leaders have not been strict with employees who behave badly and lack empathy for employees who are highly disciplined.

#### 4.7. The effect of work supervision on work productivity

This research demonstrates that work supervision directly and significantly impacts

employee work productivity. The findings align with [Fischer et al. \(2021\)](#) and [Hannang and Qamaruddin \(2020\)](#), who noted that correctly structured work supervision can significantly enhance work quality. Conversely, [Kaur and Randhawa \(2021\)](#) caution that work supervision based on subjective assessments of employees can lead to internal conflicts, potentially diminishing an employee's workplace comfort. This study's results reveal that at PDAM Tirta Silau Piasa in Asahan Regency, work supervision is deemed effective in enhancing the quality of employees' work. Although not always executed with professional rigor, the general practice of supervision still manages to instill a comprehensive sense of responsibility among employees.

#### 4.8. The influence of work supervision on work productivity through social relations

The results of the data analysis show that social relationships have a significant role in mediating work supervision and improving work productivity. The findings of this study corroborate those of [Hoque et al. \(2020\)](#), [Nwosu et al. \(2021\)](#), and [Suriagiri et al. \(2022\)](#), which indicated that social relationships can render work supervision more objective. This, in turn, helps employees feel less fearful and less like they are under constant surveillance. Then [Hussain et al. \(2020\)](#) and [Chen et al. \(2021\)](#) also stated that the leader's ability to manage the supervision system will reduce employee work errors. Furthermore, research results ([Wiyono et al., 2022](#)) clearly showed that

work supervision is to avoid finding fault with other employees. However, this work supervision aims to maximize the ability of each employee to accelerate the work plan that has been set (Erdogan et al., 2022). The implications of the findings in this research show that employees need to be more comfortable with the supervision system. However, employees consider that working professionally is the primary goal of working in companies owned by the Indonesian government. Employees assume that

this position will have a time limit. Whoever the leader is chosen will, of course, be able to assess which employees are considered company assets in improving their reputation in the eyes of the public.

**Table 5:** Coefficient of determination (R-square)

	R square	R square adjusted
Social relations (Y1)	0.672	0.668
Work productivity (Y2)	0.735	0.755

**Table 6:** Hypothesis test

	Original Sample (O)	Sample means (M)	Standard deviation (STDEV)	T statistics ( O/STDEV )	P values	Information
Motivation (X2) -> Social relations (Y1)	0.670	0.674	0.088	4.811	0.001	Significant
Motivation (X2) -> Work productivity (Y2)	0.216	0.223	0.054	1.135	0.325	Not significant
Social Relations (Y1) -> Work productivity (Y2)	0.765	0.762	0.052	2.884	0.002	Significant
Work supervision (X1) -> Social relations (Y1)	0.615	0.627	0.235	2.810	0.000	Significant
Work supervision (X1) -> Work productivity (Y2)	0.210	0.218	0.151	2.461	0.001	Significant
Motivation (X2) -> Social relations (Y1) -> Work productivity (Y2)	0.593	0.594	0.094	4.173	0.004	Significant
Work supervision (X1) -> Social relations (Y1) -> Work productivity (Y2)	0.546	0.554	0.216	2.857	0.000	Significant

#### 4.9. The influence of motivation on social relations

The results of the data analysis prove that motivation directly has a significant effect on social relationships. The results of this research are in line with research results (Paais and Pattiruhu, 2020; Chen et al., 2021), which stated that motivation plays a vital role in improving harmonious social relations between other employees. However, research rejects the results of this study, which are different from those of research conducted by Febrianti et al. (2020), which stated that work motivation is not significant in employee work productivity. The implications of the findings in this research show that employees have perfect work motivation, where employees can build effective communication to speed up their work results. Employees continue to work with high innovation to report work problems in the field, especially consumer complaints about the quality and quantity of clean water.

#### 4.10. The influence of motivation on work productivity

Based on the test results, supervision is not significant for employee work productivity at PDAM Tirta Silau Piasa, Asahan Regency. This research does not support the results of research conducted by Hemakumara (2020) and Anisya et al. (2021), which stated that motivation significantly affects work productivity. Furthermore, this research supports the results of research (Putra and Mujiati, 2022; Bashir et al., 2020; Engidaw, 2021), which stated that motivation is not always able to increase employee morale. The implications of the findings in this research show that employees have sound awareness in carrying out their duties and responsibilities. Work motivation will be stronger

when the leader gives an unfavorable assessment of the employee's work results. Employees believe that the quality and quantity of work will look good when each existing leader provides an objective assessment, not an assessment only based on subjective ones.

#### 4.11. The influence of motivation on work productivity through social relations

The data analysis results show that social relations have a significant role in mediating motivation for social relations. The results of this research are in line with the results of research conducted (Paais and Pattiruhu, 2020; Engidaw, 2021; Pham and Nguyen, 2020), which stated that work motivation can increase work productivity with the help of social relations. The implication of the existing findings is that the management of PDAM Tirta Silau Piasa, Asahan Regency, has provided a reward and punishment system that works well for each employee's work results. Then, the personnel management section was considered successful in managing employees to work with a complete sense of responsibility. This is also proven by the closeness between employees and one another and servant leadership. So that employees feel comfortable at work.

## 5. Conclusion

Social relations are vital in increasing employee work productivity at PDAM Tirta Silau Piasa, Asahan Regency. Both directly and indirectly, social relations are considered a medium for monitoring and motivating work to increase effectiveness. However, the limitation is that this research was only carried out in one company owned by the Indonesian government. It is known that dozens of Indonesian

government-owned companies still need in-depth studies, especially regarding employee work productivity. The researcher's recommendation for future researchers is to examine the work productivity in subsidiaries owned by the Indonesian government. So that in the end, the Indonesian government has a suitable model for formulating the proper policy steps to provide maximum services to the Indonesian people.

## Compliance with ethical standards

## Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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