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Productivity Improvement at a High-Tech State-Owned Industry—An Indonesian Case Study of Employee Motivation

Adik A. Soedarsono, Susan L. Murray, and Yildirim Omurtag

Abstract—The purpose of this case study was to identify the level of employee motivation at an Indonesian high-tech state-owned company. Comparisons were drawn between labor and management as well as Indonesian and Western industrial environments. The overall results provide insight into employee motivation and the potential for productivity improvement that should prove beneficial to management at state-owned and privately owned companies in Indonesia and the Pacific Rim. The study can also help Westerners appreciate culture differences and productivity challenges in this developing country.

Index Terms—Aircraft industry productivity, Indonesia, motivation, state-owned.

I. INTRODUCTION

INDONESIA is a developing country with a population of 196 million people and a land area of 1.8 million km². Traditionally, Indonesia has been a predominantly agrarian nation, but it has begun to develop its industrial sector significantly since the late 1970's. Gaining independence in 1945, Indonesia is like many young nations in that most industries were started with government funds. Such state-owned industries are significantly different from privately owned companies. They tend to have more long-term goals, they are less profit driven, they have greater technology transfer requirements, and they obtain more government support (both financial and regulatory).

In 1980 manufactured goods were only about 2% of Indonesia's total exports. This is far behind other ASEAN (The Association of Southeast Asian Nations) countries. Beginning in 1988, new government regulations were issued to improve the performance of the various state-owned enterprises. The government felt that attaining competitive capabilities in technological industries was a requirement to enter the global marketplace [10]. Success in total performance productivity was seen as the key.

Most Indonesian state-owned industries operate in government-protected markets. The performance of these industries, which now comprise about 25% of Indonesia's economy, is relatively low. This is particularly alarming since many of these state-owned companies are labeled as strategic

industries by the government. An Indonesian periodical, *Swa Sembada*, wrote that the return of asset (ROA) of state-owned industries under the Agency of Strategic Industry Management (BPIS) was only 1.77% [27]. In 1994, the strategic industries were ranked (based on 1993 total profit before tax) by the Indonesian periodical *Warta Ekonomi* between eleventh and one hundred eighty-second of 184 state-owned industries in Indonesia [26]. Overall, this study showed that strategic industries have relatively low performance compared to other state-owned industries.

Employees at state-owned industries also tend to have common characteristics that distinguish them from employees at privately owned companies. In general these employees are paid less and are less likely to be laid off. Thus they tend to be comparatively less motivated and more resistant to change. The working morale is often relatively low due to the feeling that their standard of living will not improve, regardless of improvements in productivity.

Grant and Cibin [11] compared the performance of 23 of the world's largest oil companies. They found that state-owned companies achieved substantially lower levels of labor productivity than privately owned oil companies. However, due to the domestic market power wielded by the state-owned companies, differences in profitability between the two groups was small. Employees of state-owned companies may be less willing to accept change, because they may expect that change will make their lives more difficult without any direct benefit to them [22]. Further, managers at these companies are also less likely to be concerned with low productivity levels due to the low labor costs; which typically represent only 5%–10% of total manufacturing cost. Traditionally, such managers place more emphasis on meeting the production output goals.

Hofstede [14] describes the Indonesian culture as having a large power distance index, a weak uncertainty avoidance index, a collectivist nature, and a masculine–feminine mixed culture. In societies with large power distance indexes, such as Indonesia, people in less powerful positions tend to accept inequality in power more readily. They consider inequity normal. This cultural outlook often influences work relationships between management and labor. Indonesian workers might seem more submissive and detached than Western workers. Hofstede's analysis of the culture's weak uncertainty avoidance index leads to a description of the Indonesian people as tending to be contemplative, passive, unemotional, accepting of personal risk, and relatively tolerant.

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In this culture, the dominant people within political and work organizations tend to be male. Males are expected to be assertive, ambitious, and competitive, to strive for material success, and to respect whatever is big, strong, and fast. Females are expected to serve and attend to domestic tasks such as raising children. They have limited job opportunities outside the home.

II. LITERATURE REVIEW

Employee motivation has a direct relationship to productivity improvement [1], [4], [15], [21], [25]. Success is built on well-trained motivated managers, engineers, and workers who can integrate technology, people, and management in a global environment [1]. Sink [21] stated that motivating employees is a necessary condition for improving performance in most organizations. A motive can be considered to be an inner drive, impulse, or intention that causes a person to do something or act in a certain way. Sink defined motivation as “a force to perform.” It influences behavioral choices, directions, goals, and perceived rewards. As such any analysis of motivation should concentrate on needs and drives that arouse or energize a person’s activities. Sink suggested some techniques for improving motivation that include the reinforcement theory (including incentive systems and gain sharing), behavior modification, enrichment techniques, and participatory techniques.

Sink [21] described the principle of reinforcement theory as behaviors that can be modified by reinforcing desired behaviors and ignoring undesired behaviors. The technique of behavior modification attempts to motivate through identification of functional or desired behaviors and reinforcement of those behaviors. The behavior occurs because it is rewarded and encouraged. Sink recommends improving the clarity and visibility of the necessary goal and action congruity between the individual and the organization.

Kemayel and Querderni [18] evaluated the impact of numerous factors in programmer productivity in Tunisia’s software industries. Results showed that of Herzberg motivational factors, five were statistically significant: 1) technical supervision; 2) working conditions; 3) achievements; 4) responsibilities; and 5) recognition. Kemayel and Querderni [18] concluded that the results differ from the Fitz–Enz study of American subjects a decade earlier. They suggested that this difference is due to differences in sociocultural backgrounds and traditions in the two countries. Further differences may have resulted from the fact that Tunisia’s software industry is largely in the public sector with low levels of competition and a moderate concern for efficiency. Most of the programmers in Tunisia work for state institutions and had extensive job security.

Foo [9] investigated the differences in perceived approaches to productivity improvement between domestic-owned and Western-owned companies in Singapore. The study explored possible East (Singaporean, indigenous)–West (foreign, multi-national) differences in structural configuration. The study results showed there were some differences in the mean scores and in the order of importance of the variables. All scores except one were higher for the foreign samples, although

some differences were statistically insignificant. It appears that organizations may tend to place greater focus on productivity improvements when operating outside their own national cultures. Foo concluded that Eastern cultures structural approaches to productivity tend to be inclined toward a softer, more humanistic and adaptive posture. Western management was more mechanistic and strategy-directed. Thus Eastern organizational processes were likely to be less mechanistic than their Western counterparts.

Additional researchers have investigated extensively productivity improvement approaches [6], [8], [12], [20], [23], [25]. However, none of the research focused specifically on strategic state-owned industries in a developing country. Additionally, Sink [21] stated that different productivity improvement approaches will be effective for different organizations. Consequently, further study is required to adapt these improvement techniques to Indonesian industries, especially state-owned industries.

III. CASE STUDY

The purpose of this case study was to identify the level of employee motivation at a high-tech state-owned company. Written questionnaire responses from both management and labor were compared directly to determine their relative level of motivation. Comparisons were also drawn between the Indonesian and Western industrial environments. The overall results provide insight into employee motivation and the potential for productivity improvement that should prove beneficial to management at state-owned and privately owned companies in Indonesia and the Pacific Rim. Additionally, the study can help Westerners appreciate culture differences and productivity challenges in this developing country. The authors do not propose to test a hypothesis regarding the effectiveness of productivity improvement approaches in the manufacturing environment. However, an underlying assumption of this study is that motivation improvements can help any organization to improve productivity, if applied appropriately.

This study was limited to workers at one of Indonesia’s ten strategic state-owned industries. Subjects completing the survey included group leaders, either at the management or the production floor level. The survey instrument’s questions regarded general motivation issues in the workplace. Particular questions were taken from existing research to allow for direct comparison with studies performed in other countries. The survey was translated into the Indonesian language.

A. Selected State-Owned Manufacturing Company

With the comparative advantage of cheap labor, Indonesia attempted in 1976 to begin an aeronautics industry based on foreign technology. The Archipelago Aircraft Industry (IPTN) was established as a state-owned company to assemble aircraft and helicopters. In 1979, IPTN designed and produced a 35-passenger aircraft (CN-235) in conjunction with Construcci Aeronauticas of Spain (CASA). The plane was rolled out in 1984. By 1986, IPTN had delivered 194 of these aircrafts, almost entirely to domestic buyers [16]. In November 1994, IPTN rolled out its first independently designed aircraft, a 50-

TABLE I
EMPLOYEE RESPONSES TO AWARD PROGRAM IN THE COMPANY

	Ineffective	Quite Ineffective	Adequate	Quite Effective	Effective	N/A
Management	6%	46%	36%	1%	4%	7%
Nonmanagement	18%	42%	25%	2%	0%	13%

passenger commuter aircraft (N250). Currently, IPTN employs more than 15 000 people at its main production plant in Bandung, Indonesia. The company has been valued at more than U.S. \$3 billion [10].

As one of the ten strategic industries, IPTN was ranked 57th by *Warta Ekonomi* in 1994. In 1993 IPTN's profit margin, ROA, and total asset turnover were 2.85%, 0.46%, and 15.99%, respectively [2], [3]. In the same year IPTN generated a total sales of \$181 million. This represents \$11 711 in product sales per employee during a one-year period. By comparison, in the same year Boeing and McDonnell Douglas generated sales of approximately \$206 813 and \$206 910 per employee, respectively [5]. IPTN is the first and only company in the area of aircraft manufacturing in Indonesia. It is challenged by limited manufacturing experience, restricted financial resources, and minimal technological capabilities.

IPTN has made several attempts at improving productivity, including: extensive educational programs; hiring consultants; and restructuring management. The educational programs included both management and workers. They ranged from formal to informal and have included in-house training, off-site programs, and even sending employees out of the country for extensive education. Despite these attempts, the results are still far from satisfactory and the company struggles with low productivity.

B. Research Methodology

In this study, a multiple-choice questionnaire was used to evaluate motivation, performance-measurement systems, and productivity-improvement activities. The motivation-assessment portion consisted of 18 questions concerning opportunities for technical achievement, professional development, career advancement, employee concerns regarding company policies, quality of work life, and company atmosphere. These questions were adapted from Kemayel's questionnaire [18] which was based on Herzberg motivational factors and modified to fit the manufacturing environment. The survey instrument measured the motivation level of the subjects and sought to determine if there are any motivation-related problems in the company.

The sampling population used for this study was taken from IPTN. The research focused on a critical area for productivity improvement efforts: the manufacturing operations. As of January 1995, there were 15 673 employees at IPTN, 5609 of whom were in manufacturing units [17]. Workers and managers from these units were selected as subjects of this survey. Indonesian culture may explain the small number of female participants in the survey, i.e., 0% of managers and 4% of nonmanagers. The survey questionnaires were distributed

at IPTN in February 1995. Of 378 questionnaires distributed, 298 questionnaires were returned (a 79% response rate). The participants from various work units completed the survey in a meeting room which provided an opportunity for a brief introduction and question-and-answer session for participants. This promoted more consistency in question interpretation by the various participants, ensuring more credible responses. A Chi-square test was used to test for significant differences in the survey responses of two subject groups: management and nonmanagement.

IV. RESULTS

Factors that have been previously shown to be significant with respect to employee motivation for productivity improvement were examined at IPTN. Implied in Kemayel's study of Tunisian worker's productivity was that motivation affects productivity and that higher survey scores mean higher employee motivation, which would be expected to improve performance, although this was not directly measured in either his study or this case study [18].

A. Recognition

The majority of responses to the award program were negative for both subject groups, as shown in Table I. At a significance level of 5%, the difference between managers and nonmanagers is statistically insignificant. Several survey participants indicated the need for better award or incentive programs in an open-ended question included in the survey. Responses showed the company lacks consistent recognition programs for awarding employee achievement, performance, and productivity. The limited number of awards that are presented at IPTN are not perceived as being awarded in a systematic fashion by the employees.

Kemayel [18] addressed the importance of proper recognition of both quality and output for technical workers. Additionally, Cougar and Zawaki maintain that feedback is one of five important factors related to job performance [7]. Sink points out the importance of this factor as a technique for improving motivation and performance as a function of ability and motivation [21]. Thus a better recognition program at IPTN might improve both the motivation level of employees and the performance level.

The recognition results for the Indonesian workers at IPTN may be somewhat surprising. Based on the large power distance index value for this country, one might expect the workers to have a lesser need for recognition from upper management. However, these results imply that the workers have needs similar to those in the United States and Tunisia. This

TABLE II
COMPANY ENVIRONMENT AND INFLUENCE ON PRODUCTIVITY

	Ineffective	Quite Ineffective	Adequate	Quite Effective	Effective	N/A
Management	19%	19%	37%	22%	1%	2%
Nonmanagement	16%	21%	45%	13%	2%	3%

TABLE III
OPPORTUNITIES FOR CAREER ADVANCEMENT IN THE COMPANY

	Very Poor	Poor	Adequate	Good	Excellent	N/A
Management	3%	21%	42%	30%	1%	3%
Nonmanagement	15%	42%	26%	10%	3%	4%

TABLE IV
SALARY WITH RESPECT TO EMPLOYEE'S EFFORTS

	Very Low	Quite Low	Just Right	Quite High	Very High	N/A
Management	1%	31%	56%	0%	0%	12%
Nonmanagement	3%	48%	44%	0%	0%	5%

TABLE V
SALARY WITH RESPECT TO EMPLOYEE'S SKILLS

	Very Low	Quite Low	Just Right	Quite High	Very High	N/A
Management	3%	32%	51%	3%	1%	10%
Nonmanagement	5%	54%	35%	1%	0%	5%

might suggest that recognition and incentive programs that have worked effectively in the West could also be beneficial in Indonesia.

B. Command Structure

The command structure, which includes such things as company policies and administrative structure, was also studied. A number of questions were asked in this area, including an overview question concerning the effects of the company environment and corporate influence on productivity. As shown in Table II, only 23% of management and 16% of nonmanagement respondents reported an effective influence. At a significance level of 5%, this difference is statistically insignificant.

Being the only aircraft manufacturer in the country, combined with being a state-owned company, has not provided IPTN any motivation to be efficient in its command structure. The company is relatively young and still developing its own corporate culture. Additionally, the bureaucracy of Indonesia's government is often excessive and not responsive, which directly impacts IPTN's manufacturing operations.

Frederick and Worden [10] report the following.

A critical review of IPTN by two foreign economists argued that the endeavor was a premature leap into advanced technology and could only hope to be profitable by mandating continued domestic purchases of its

aircraft. The government justified the U.S. \$3 billion investment on broader criteria than financial profitability, including the potential stimulus to domestic suppliers of aircraft parts and the training of highly skilled workers.

C. Rewards

Based on statistical analysis (at 5% level of significance), there are differences in responses to the questions concerning opportunities for promotion, salary levels, prestige within the company, and working condition between the two groups. Most management respondents reported that opportunities for promotion, salary levels with respect to both effort and skill, and prestige within the company is average or better (see Tables III–VII). On the other hand, the majority of nonmanagement responders reported the opposite, poor or lower. Despite the apparent dissatisfaction among IPTN workers, there is relatively little turnover among nonmanagement personnel. The average time worked at IPTN for this group is 13.1 years in a company that is 19 years old. The average age of the employees surveyed was 36.1 years. Their limited exposure to other work environments combined with some cultural issues may help explain this finding.

D. Working Relationships

Responses to questions on relationships among employees show IPTN employees as tightly integrated. This may be ex-

TABLE VI
PERCEIVED PRESTIGE AND AUTHORITY INSIDE THE COMPANY

	Very Low	Quite Low	Neutral	Quite High	Very High	N/A
Management	1%	5%	76%	17%	1%	0%
Nonmanagement	5%	18%	68%	6%	1%	2%

TABLE VII
PERCEIVED PRESTIGE AND AUTHORITY OUTSIDE THE COMPANY

	Very Low	Quite Low	Neutral	Quite High	Very High	N/A
Management	5%	6%	57%	19%	3%	10%
Nonmanagement	8%	11%	60%	13%	1%	7%

TABLE VIII
COMPETITIVENESS OF RELATIONSHIP WITH PEERS

	Very Non-Competitive	Non-competitive	Neutral	Competitive	Very Competitive	N/A
Management	8%	5%	77%	10%	0%	0%
Nonmanagement	3%	10%	72%	12%	2%	1%

TABLE IX
FRIENDLINESS OF RELATIONSHIP WITH PEERS

	Very Unfriendly	Unfriendly	Neutral	Friendly	Very Friendly	N/A
Management	3%	4%	32%	55%	6%	0%
Nonmanagement	1%	5%	37%	49%	5%	3%

TABLE X
ONE SHOULD HAVE DISTANCE FROM SUBORDINATES

	Strongly Disagree	Disagree	No opinion	Agree	Strongly Agree	N/A
Management	19%	12%	45%	22%	1%	1%
Nonmanagement	18%	12%	29%	14%	4%	23%

TABLE XI
FRIENDLINESS OF RELATIONSHIP WITH SUPERIORS

	Very Unfriendly	Unfriendly	Neutral	Friendly	Very Friendly	N/A
Management	0%	4%	68%	27%	1%	0%
Nonmanagement	2%	9%	61%	26%	1%	1%

plained by the collectivist culture of Indonesia. In collectivist cultures, individuals belong to one or more close "in-groups" (extended family, clans, or organizations) from which they cannot detach themselves [14]. This is in agreement with the survey findings on peer relationships, showing that only 13% of respondents were considered competitive and 7% of respondents were unfriendly (see Tables VIII and IX).

Approximately 20% of Indonesian respondents agree that they should have distance from their subordinates (see Table X). Less than 11% of respondents reported being unfriendly to their superiors (see Table XI). At 5% level, the statistical difference between management

and nonmanagement regarding the relationship factor is insignificant. Indonesia's large power distance index combined with the collectivist society might explain the difference between these findings and the working relationships in the West.

E. Prestige

Responses to questions regarding prestige both inside and outside the company were mainly neutral from both groups. High prestige inside the company was reported by only 18% of management and 7% of nonmanagement respondents (see Table VI). For both groups, prestige outside the company was

TABLE XII
PRODUCTIVITY WILL IMPROVE IF WAGES ARE LINKS TO PERFORMANCE

	Mgt.	Non Mgt.	X2 value
Yes	83%	81%	2.110*
No	12%	9%	
Don't know	5%	10%	

*The differences in responses between management and nonmanagement are insignificant at a significance level of 5%.

TABLE XIII
MOTIVATIONAL FACTORS' RELATIVE IMPORTANCE

Factors	Management <i>average or better</i>	Non Mgt.	X2 value
Technical Supervision	91%	81%	2.110*
Working Conditions	90%	9%	
Tech. Achievement	88%	10%	
Added Responsibility	95%		

*The differences in responses between management and nonmanagement are insignificant at a significance level of 5%.

reported as less than 22% (see Table VII). At a significance level of 5%, there is no statistical difference between the groups or between low and high levels. This implies that the majority of IPTN employees feel no particular pride in their position or responsibility to the company.

Responses to survey questions on prestige combined with those on additional work responsibilities can be related to the results of the Kemayel [18] study. On the Kemayel survey in Tunisia, 83% of those sampled consider their socioprofessional status to be below their expectations. Kemayel explains that people more oriented toward socioprofessional concerns such as prestige, power, and social status tend to feel that responsibility is important. This explanation is in agreement with IPTN findings. Most respondents indicated having both additional responsibilities beyond their job descriptions and considering their socioprofessional status to be neutral or below their expectation.

F. Productivity Measurement

Survey results showed that less than 47% of management and 32% of nonmanagement respondents were involved in productivity measurement. Sink [21] pointed out that low percentages in measurement involvement is a sign of lack of interest in productivity improvement. When asked about the involvement of employees in productivity improvement activities, survey participants reported that production workers play the most intensive role, followed by productivity committees, middle managers, and upper managers. This ranking is opposite of Foo's [9] results on a study of Singaporean companies. These companies reported that upper management plays a significant role in productivity improvement activities, while workers play a lesser role. Foo studied private firms where the CEO was very concerned with the health of the

company. This is in contrast to the state-owned IPTN, where upper management is primarily concerned with output.

Most employees (more than 81% of the respondents) agreed with the statement that "productivity will improve if wages are linked to their performance and the company's profit." At a significance level of 5%, there was no statistical difference between management and nonmanagement respondents (see Table XII). Although an incentive program is in use at IPTN, some employees felt that the program is not uniformly applied or clearly understood by all employees. Negative incentives, such as reducing wages or limiting raises for lower performance, have never been applied at IPTN. Management tends to be reluctant to punish employees for poor performance. Limit information about financial performance is collected. IPTN reports the yearly company financial status to the Ministry of Treasury as the "owner" of the company.

Most employees, more than 83% of the respondents, said they would work harder if they were involved in making decisions that affect their jobs. The majority, more than 80% of the respondents, believed all employees are responsible for increasing the productivity of their organization (see Table XIII). The philosophy of empowerment, giving employees more opportunities to be involved in the decision-making process and additional responsibility, has received increasing attention in the United States. It tends to boost employee motivation, which should result in higher productivity [19], [28]. However, the work practice at IPTN is still far from empowerment. As a state-owned company, most decisions are made by top management; employees are seldom involved.

G. Overall Morale

The survey included a question concerning the overall morale of the IPTN employees. A scale of one to five was

given with one defined as very low and five as very high. Over 60% of the workers reported morale as three, defined as average. The average score for management and nonmanagement were 2.95 and 2.97, respectively. These scores are interesting, since the results for some important factors, such as the employee's salary level with respect to their skill and effort, were rated as low.

V. CONCLUSION

The survey indicates that there are differing views between management and nonmanagement subjects at IPTN. These differences include perceived opportunities for career advancement (promotion), satisfaction with their employer, feelings of prestige, satisfaction with salary, and attitudes on completing the job. These differences suggest that there is a meaningful distinction in the motivation of the two subject groups. This distinction may be perceived as common and acceptable situations in a developing country due to cultural factors such as a large power distance index.

Most questions on motivation were answered positively. Although responses for recognition and command structure factors (for both subject groups) and opportunity for promotion and salary factors for nonmanagement subjects were in the negative range. These findings indicate that there is a need to improve these factors, especially for the nonmanagement employees. Improvements should increase employee motivation, which should lead to a higher productivity level. Possible improvements at IPTN include modifying existing award programs, profit-sharing programs, job enrichment, or employee-recognition programs.

The nonmanagement subjects indicated a lower rate of involvement in performance measurement subjects. The situation shows a sign of lack of interest for measuring productivity by nonmanagement employees. Performance measurement is a part of a productivity cycle in total quality management (TQM) and as such any improvement of this activity should eventually lead to improved productivity.

The common use of government funds to begin high-technology state-owned industries presents many motivational challenges. State-owned companies usually have some differences from a comparative privately owned company, especially for nonmanagement workers, such as lower payment and lower productivity. Grant and Cibin [11] reported for the oil industry, "Privately-owned companies were generally far more orientated toward cost efficiency and were more responsive to changes in external markets than state-owned companies."

During the late 1980's, the Indonesian government took several measures to prepare for possible eventual privatization of state-owned companies, including a thorough independent assessment of the profitability of each enterprise and a review of management compensation in relation to performance criteria. However, a 1989 government policy suggested that at least some state-owned industries would be protected from possible privatization including several munitions plants, the state aircraft firm Archipelago Aircraft Industry (IPTN), and Krakatau Steel [10].

Based on the IPTN survey, it appears that improving the financial reward system in a state-owned industry would make it possible to distinguish creative and highly motivated workers from the others and motivate workers to work more productively. The laws and regulations for the state-owned industries also need to be adjusted, especially to accommodate high-tech manufacturing firms. The improved policies would lead to a command structure that allows workers to work more productively. Finally, the opportunities for making decision (empowerment) and career advancement for nonmanagement workers also need to be improved.

Beside technical and management approaches, cultural aspects (of the nation and of the company) also need to be considered. Efforts are needed to introduce and support new corporate cultures that would improve motivation and productivity in such traditionally agrarian countries. However, before this can be done, more research is needed on engineering management in Southeast Asian countries. Improvement techniques that have been effective in Western countries may need to be adapted before being applied in Indonesia or other developing countries.

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