Journal of Science, Technology, and Humanities : January - June 2004, Vol. 2, No. 1, pp. 59-72.

IMPROVING JOB COMMITMENT IN SEMICONDUCTOR INDUSTRY

Wichai Rawiphan

King Mongkut's Institute of Technology Ladkrabang, Chalongkrung Road, Ladkrabang, Bangkok 10520, Thailand.

Received July 2003; accepted January 2004.

ABSTRACT

The purposes of this study were to find out the level of job commitment of supervisors in semiconductor industries, the factors affecting on job commitment of supervisors, and introduce the job commitment development model for improving job commitment in semiconductor industry.

The findings were that the job commitment level of the supervisors' organization in every group classified by demographic factor was average. The best predictive variables among those 18 variables arranged in consecutive order were the supervision, compensation, position power, and autonomy. The findings also concluded that the best predictor variable was supervision where standardized coefficient (beta) was 0.938. The four remaining predictor variables arranged the important predictor variables in consecutive order were compensation, position power and autonomy with their standardized coefficients equal to 0.544, 0.497, and 0.151, respectively. The adjusted R square was 0.894 that was 89.4 percent of the variability in the data accounted for the regression model. The job Commitment Development Model (JCDM) was a useful tool for improving the job commitment level of supervisors. The JCDM had six steps comprising definition of opportunity, identification and analysis of cause, setting job commitment action, implementation, confirmation and standardization. The quality techniques and tools of Plan-Do-Check-Action (PDCA) cycle applied the model.

Keywords : Job commitment, supervisor, factor.

INTRODUCTION

Nowadays, the effective utilization of resources is the crucial factor in the success of every organization. Among all resources, human resource is an important factor affecting the effectiveness and competitiveness of the organization in the business world. In addition, human resource development is an essential strategy in our organizational development. With high quality

E-mail address: wichai.rawiphan@philips.com

human resources, rapid development in other aspects is possible. Therefore, the effort for any development without personal intention is difficult to accomplish.

Psychological studies revealed that job commitment produces more effective work. Such job commitment may yield higher production and profits (Bease, 1984). However, individual differences do exist in job commitment, for instance, salary expectations and psychological rewards such as being connected to other persons in the organization. Some may need to acquire social status. The different needs results in different levels of job commitment, which affects the performance and profits of the organization. Thus, it is essential for an organization director to pay attention to human resource management and effective manipulation, starting from the employee selection and placement, planning and developing together with maintaining well-qualified employees in the organization.

The job commitment of a person to the organization is shown in the confidence and acceptance of the good values of the organization (Tivunluk, 1999). A good example of this case is the semiconductor industry, which exists in a strong competitive market. The products are rapidly being developed to catch up with the new and continuous changing technologies as seen from specifications of latest models of electronic equipment such as computers and mobile phones. These are continuously developed to be smaller and more effective products to satisfy consumers' needs (Mark, 1999). The products were adopted in terms of production techniques, designs and quality, resulting in the development of the organization in job designs for the employees' work satisfaction which also raised the employees' commitment to the job and work efficiency. However, semiconductor industries are very dynamic causing high stress and reduced work efficiency among employees, especially the supervisors-mediating policies of the organization and the employees. Therefore, the supervisors without job commitment to the job do not want to remain in such organizations. They have less faith and acceptance of the goal and ethics of the organization. In addition, they make no effort in work dedication, which lowers their efficiency to the point of affecting the organization. Low job commitment also leads to absence, work tardiness or resignation, which results in higher expenses for the organization.

The objectives of this study were to investigate factors affecting on job commitment of supervisors that was viewed in terms of the extent to which supervisors identify with the job and wish to remain as members. It represents a strong positive attitude toward the job, accompanied by a behavioral intention to work hard on behalf of job and organization. The term of job commitment of supervisors was their overall commitment of feeling about their present job and its various factors. Four factors were selected for study. Firstly, demographic factor comprised the following five variables: sex, age, education, work in service, and status. Secondly, characteristic factor comprised the following five variables: skill variety, task identity, task significance, autonomy, and feedback. Thirdly, job satisfaction factor comprised the following five variables: co-worker, supervision, works itself, compensation, and promotion. Finally, work environment factor comprised the following three objectives: leader-member relationship, task-structure, and position-power. The following three objectives were the focus of this study, namely, (1) to examine the level of the job commitment of supervisors, (2) to determine the key factors affecting on job commitment of supervisors, and (3) to introduce the Job Commitment Development Model for improving job commitment of supervisors.

The knowledge gained from this study can assist executive in semiconductor industries to improve the job commitment of supervisors.

METHODS

Samples

The survey method was conducted to gather data from supervisors in two semiconductor companies: Philips Semiconductor (Thailand) Co., Ltd, and AMD (Thailand) Co., Ltd. Research samples were 78 supervisors from both companies.

Criteria for sample selection included: (1) Thai women and men, (2) supervisors who work in Western Semiconductor industries in Thailand in 1999, and (3) willing to participate in the study.

Procedure

Questionnaires were used in conducting this research and were developed and improved by gathering information from relevant documents and research. There were five parts in one questionnaire.

The first part concerned demographic factor comprising the following five variables: sex, age, education, year in service, and status. This part contained both multiple-choice questions and others that required an explanation and discussion. The second part had 15 questions and concerned job characteristic factor comprising the following five variables: skill variety, task identity, task significance, autonomy, and feedback. The third was aimed to calculate job satisfaction of a supervisor comprising the following five variables: coworker, supervision, works itself, promotion, and compensation. There were 45 questions altogether. The fourth part had 25 questions and was about the work environment factor comprising the following three variables: leader-member relationship, task-structure, and position-power. The fifth, and last, had an objective to figure out via 14 questions, how much a supervisor feels committed to his/her position and the organization.

Table 1. Number, variable, and reliability of questionnaire.

Part	Factor	Variable	Number of question	Reliability
1	Demographic	Sex, age, education, year in service, and status	5	-
2	Job characteristic	Skill variety	3	0.80
		Task identity	3	0.82
		Task significance	3	0.79
		Autonomy	3	0.78
		Feedback	3	0.73
		Total	**15**	**0.81**

Table 1. Number, variable, and reliability of questionnaire.

Part	Factor	Variable	Number of question	Reliability
3	Job satisfaction	Co-worker	9	0.93
		Supervision	9	0.95
		Works itself	9	0.84
		Promotion	9	0.88
		Compensation	9	0.86
		Total	**45**	**0.90**
4	Work environment	Leader-member relationship	8	0.94
		Task structure	12	0.75
		Position power	5	0.83
		Total	**25**	**0.81**
5	Job commitment		14	0.85
		Total	**104**	

The questionnaires were 100 percent returned without deficiency, they were all valid for use in analysis. The statistics used were mean and standard deviation for examining the level of the job commitment of supervisors. The multiple regression analysis was then applied for determining the key factors affecting job commitment of supervisors.

Measure

The measure for this study was job commitment of supervisors who work in Western Semiconductor industries in Thailand in 1999. The job commitment would be indicated by extra-role behaviors that are beneficial to the job. The extra-role aims toward enhancing the job, is willing to make personal sacrifices on behalf of the job, and is unwilling to leave the job.

RESULTS

Level of the job commitment of supervisors

Table 2 is a summary of percentage of supervisors answering the questionnaires, according to demographic factors.

Sex: The number of samples in male supervisors was 71 or 91.02 percent. The sample number in female supervisors was 7 or 8.98 percent.

Age: The ranges of the age were categorized into three groups, i.e., below 31 years old, 31 to 35 years old, and 36 years old and above. The number of the samples below in the 31-year-old group was 28 or 35.90 percent, the sample number in the 31 to 35 year old group was 22 or 28.20 percent, and the sample number in the 36 and above was 28 or 35.90 percent.

Table 2. Number and percentage of supervisors.

Variable		n	Percentage
Sex	Male	71	91.02
	Female	7	8.92
Total		**78**	**100.00**
Age	Young (<31)	28	35.90
	Middle-age (31-35)	22	28.20
	High (>35)	28	35.90
Total		**78**	**100.00**
Education	Below bachelor degree	13	16.67
	Bachelor degree	60	76.92
	Higher than bachelor degree	5	6.41
Total		**78**	**100.00**
Year in service	Below 6 years	7	8.98
	6 to 10 years	39	50.00
	11 to 15 years	21	26.92
	More than 15 years	11	14.10
Total		**78**	**100.00**
Status	Single	34	43.59
	Married	44	56.41
Total		**78**	**100.00**

Education: The ranges of education were categorized into three groups, i.e., below bachelor degree, bachelor degree, and higher. The sample number in the below bachelor degree group was 13 or 16.67 percent, the sample number in bachelor degree group was 60 or 76.92 percent, and the sample number in the higher than bachelor degree group was 5 or 6.41 percent.

Year in service: The ranges of year in service were categorized into four groups, i.e., below 6 years, 6 to 10 years, 11 to 15 years and more than 15 years. The sample number in below the 6-year group was 7 or 8.98 percent, the sample number in the 6-10 year group was 39 or 50 percent, the sample number in the 11-15 year group was 21 or 26.92 percent, and the sample number in the more than 15-year group was 11 or 14.10 percent.

Status: The sample number in single supervisors was 34 or 43.59 percent, and the sample number in married supervisors was 44 or 56.41 percent.

In this section, the study on job commitment level of the supervisors classifying by demographic factors, which were sex, age, education, year in service, and status is shown in Table 3.

From Table 3, the determination of the job commitment level of the supervisors was derived from the analysis of mean and standard deviation. The results showed that the job commitment level of supervisors was average regardless of the following factors: sex, age, education, year in service, and status.

Table 3. Mean, standard deviation, and level of job commitment (JC) by classification of demographic factors.

Variable		Mean	S.D.	JC level*
Sex	Male	3.893	0.277	Average
	Female	3.820	0.232	Average
Age	Young (<31)	3.861	0.280	Average
	Middle-age (31-35)	3.876	0.266	Average
	High (>35)	3.919	0.277	Average
Education	Below bachelor degree	3.872	0.302	Average
	Bachelor degree	3.910	0.268	Average
	Higher than bachelor degree	3.644	0.138	Average
Year in service	Below 6 years	3.843	0.218	Average
	6 to 10 years	3.863	0.295	Average
	11 to 15 years	3.920	0.258	Average
	More than 15 years	3.937	0.267	Average
Status	Single	3.887	0.273	Average
	Married	3.886	0.276	Average
	Total	**3.887**	**0.273**	**Average**

** Job commitment level: The degree of retention and intention of supervisors are good in their job which job commitment levels were lowest (1.00-1.49), moderately low (1.50-2.49), average (3.50-4.49), above average (4.50-5.49), moderately high (5.50-6.49), and highest (6.50-7.00) (Jorajit, 1989).*

Factors affecting the job commitment of supervisors

The discussion in this section starts with the application of the regression analysis to the data collection and then presents an alternative model. The main purpose of this research was on forecast, the multiple regressions and stepwise multiple regression models were our alternative models because it produced more realistic forecast of the job commitment of supervisors.

The analysis of variance for the full regression model testing $H_0: \beta_i=0$ was summarized in Table 4. Since the significance of regression was = 0.000, we rejected H_0 and concluded that at least one of $\beta_i \neq 0$ that mean at least one variable affecting the job commitment of supervisors.

Table 4. Analysis of variance for the full regression model.

Source	SS	df	MS	F	Sig
Model	5.241	18	0.291	35.891	0
Error	0.479	59	0.008		
Total	**5.719**	**77**			

The estimated equation presented in Table 5 was used to forecast the job commitment level of supervisors. The predictor variables included, apart from the full multiple regression, were sex, age, education, year in service, status, skill variety, task identity, task significance, autonomy, feedback, co-worker, supervision, work itself, promotion, compensation, leader-member relationship, task structure, and position power. The data analysis is shown in Table 5.

Data in Table 5 indicated that the reason for autonomy, supervision, compensation, and position power is obvious and its effect is statistically significant above 95 percent and the remaining variables are not statistically significant on job commitment. The multiple correlation coefficient (R) of regression model was 0.957. The standard error of the estimate was 0.009 and the adjusted R square was 0.891 that was 9.1 percent of the variability in the data was accounted for the regression model. The model might be more effective with the deletion of the variables, which were not statistically significant by applying the stepwise multiple regression method. The full regression models were as follows.

Full Regression Model

Job commitment = 0.534 - 0.054* (Sex) - 0.005* (Age) - 0.016* (Education)
+ 0.007* (Year in service) - 0.005* (Status) + 0.016* (Skill variety)
+ 0.017* (Task identity) - 0.002* (Task significance)
+ 0.062* (Autonomy) - 0.09* (Feedback) + 0.014* (Co-worker)
+ 0.826* (Supervision) - 0.056* (Work itself) - 0.030* (Promotion)
+ 0.579* (Compensation) - 0.002* (Leader-member relationship)
- 0.004* (Task structure) + 0.104* (Position power)

Standard Full Regression Model

Z Job commitment = - 0.057* (Z Sex) - 0.089** (Z Age)-0.028* (Z Education)
+ 0.103* (Z Year in service) + 0.010* (Z Status)
+ 0.069* (Z Skill variety) + 0.068* (Z Task identity)
- 0.009* (Z Task significance) + 0.190* (Z Autonomy)
- 0.033* (Z Feedback) + 0.018* (Z Co-worker)
+ 0.900* (Z Supervision) - 0.071* (Z Work itself)
- 0.040* (Z Promotion) + 0.567* (Z Compensation)
- 0.035* (Z Leader-member relationship)
- 0.032* (Z Task structure) + 0.500* (Z Position power)

Table 5. Coefficient of variables.

Variable	b	Std. error	Beta	t	Sig. level
Constant	.534	.264		2.023	.048
Sex	-.054	.043	-.057	-1.262	.212
Age	-.005	.004	-.089	-1.261	.212
Education	-.016	.027	-.028	-.597	.553
Year in service	.007	.004	.103	1.563	.123
Status	.005	.033	.010	.161	.872
Skill variety	.016	.010	.069	1.622	.110
Task identity	.017	.011	.068	1.534	.130
Task significance	-.002	.011	-.009	-.214	.831
Autonomy	.062	.015	.190	4.024	.000
Feedback	-.009	.012	-.033	-.761	.450
Co-worker	.014	.034	.018	.399	.691
Supervision	.826	.043	.900	19.4050	.000
Work itself	-.056	.036	-.071	-1.554	.125
Promotion	-.030	.037	-.040	-.816	.418
Compensation	.579	.043	.567	13.505	.000
Leader-member relationship	-.002	.003	-.035	-.785	.436
Task structure	-.004	.005	-.032	-.749	.457
Position power	.104	.009	.500	10.945	.000

R = .953 R square = .916 Adjusted R square = .891 S. Est = .009

The analysis of variance for the reduced regression model testing H_0: $\beta_i = 0$ is summarized in Table 6. Since the significance of regression was = 0.000, we rejected H_0 and concluded that at least one of $\beta_i \neq 0$ that mean at least one variable affecting the job commitment of supervisors.

Table 6. Analysis of variance for the reduced regression model.

Source	SS	df	MS	F	Sig
Model	5.146	4	1.287	163.841	.000
Error	.573	73	.008		
Total	**5.719**	**77**			

The reduced equation presented in Table 7 was used to forecast the job commitment level of supervisors. The predictor variables included, apart from the reduced multiple regression, were supervision, compensation, position power, and autonomy. The data analysis is shown in Table 7.

Table 7. Coefficients of best variables.

Variable	b	Std. error	Beta	T	Sig. level
Constant	.340	.157		2.175	.033
Supervision	.861	.037	.938	23.258	.000
Compensation	.556	.039	.544	14.225	.000
Position power	.103	.008	.497	12.246	.000
Autonomy	.049	.012	.151	4.011	.000
R = .949 R square = .900 Adjusted R square = .894 S. Est = .089					

Data in Table 7 indicated that the coefficients of the best predictor variables. It can be concluded that the best predictor variable was supervision where standardized coefficient (beta) was 0.938. The four remaining predictor variables arranged the important predictor variables in consecutive order were compensation, position power and autonomy with their standardized coefficients equal to 0.544, 0.497 and 0.151, respectively. The multiple correlation coefficient (R) of regression model was 0.949. The standard error of the estimate was 0.089 and the adjusted R square was 0.894 that was 89.4 percent of the variability in the data was accounted for the regression model. The regression model of the job commitment of supervisors in term of the best predictor variables is as follows.

Reduced Regression Model

Job commitment = 0.340 + 0.861* (Supervision) + 0.556* (Compensation) + 0.103* (Position power) + 0.049* (Autonomy)

Standard Reduced Regression Model

Z Job commitment = 0.938* (Z Supervision) + 0.544* (Z Compensation) + 0.497* (Z Position power) + .151* (Z Autonomy)

Job Commitment Development Model (JCDM)

The concept of building the JCDM was discussed with an emphasis on the job commitment requirements. The modeling discussions were introduced and applied the quality management concept for structuring the JDCM. Thus, the researcher used a quality management guide and brainstorming tool for gathering data and developed the mode. The best way to improve the job commitment of supervisors is by using the PDCA cycle and the model guide with the six steps approach, as follows.

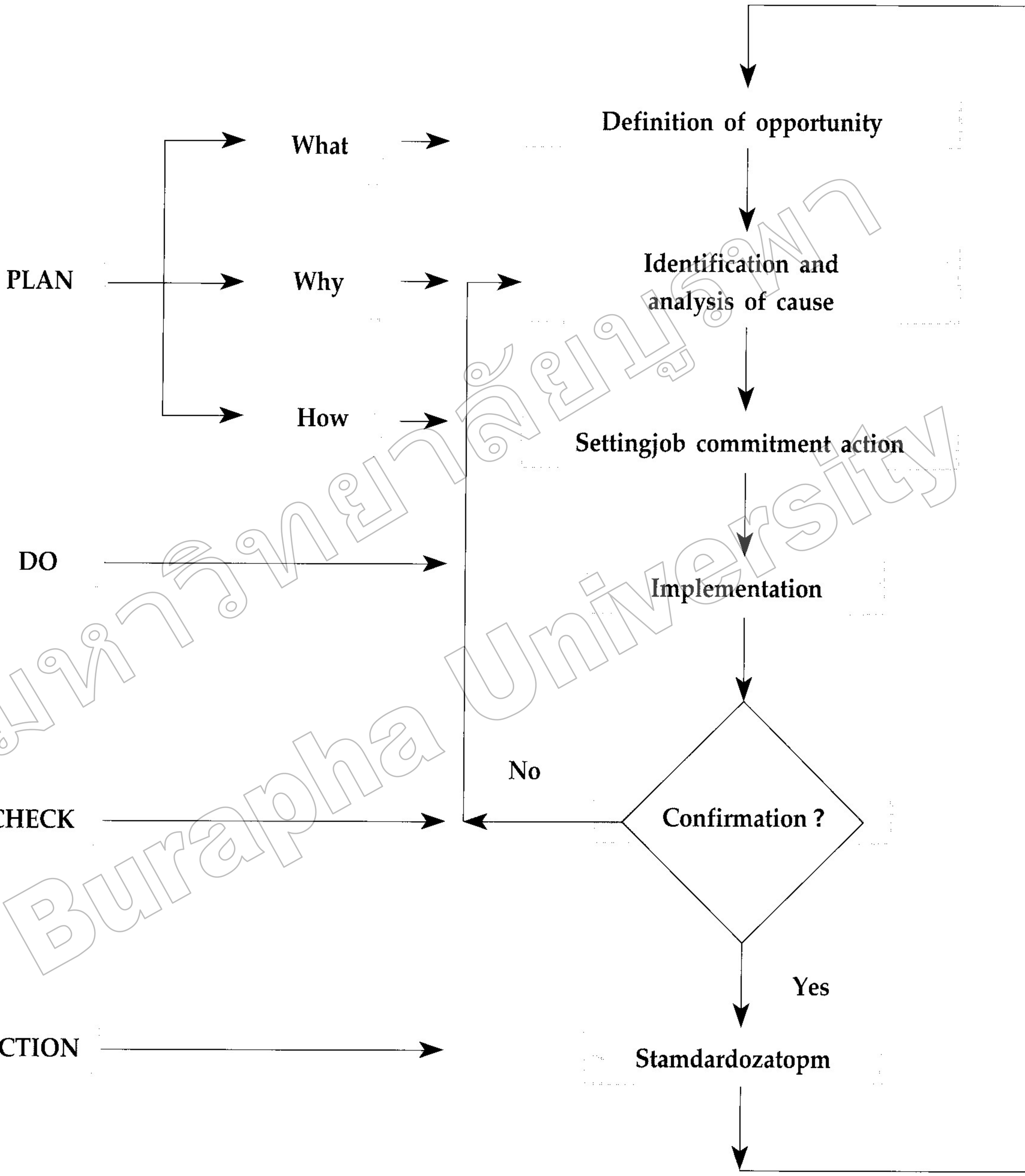

Figure 1. Job Commitment Development Model.

1. Definition of opportunity: Frequently a cause or solution is stated as "problem or opportunity". It should be understood to avoid skipping most of opportunity. The opportunity can be described by the observed facts and by the comparable facts related to what, where, when, and magnitude.

2. Identification and analysis of cause: Use the Pareto principle to highlight major contribution and select the opportunity for improving job commitment. The analysis of cause could determine the most likely cause.

3. Setting job commitment action: To decide on the most appropriate action to improve the job commitment of supervisors.

4. Implementation: If the solution is a success, then the appropriate action should be incorporated into the job commitment development program.

5. Confirmation: Confirm that procedure and actions are being adhered to and that the new level of job commitment is being maintained. Aim for future improvement.

6. Standardization: Modify the necessary systems including policies, practices and procedure, to prevent recurrence of job commitment cause. Documentation is preferable in this step.

DISCUSSION

In general, the finding indicated that the job commitment level of the supervisors' organization in every group classified by demographic factor was average and the predictor variables affecting the job commitment of supervisors in semiconductor industries were supervision, compensation, position power, and autonomy. A variety of program exists for improving the job commitment of supervisors such as quality of work life (QWL), supervisor's involvement, autonomous work group (AWG), and compensation. The quality of work life refers to the level of commitment of individuals experience with respect to their lives at work. To enhance the supervisors' OWL, companies have to instill in supervisors the feelings of security, equity, pride, family democracy, ownership, autonomy, responsibility, and flexibility. It is believed that involving supervisors in decision-making will result in improved job commitment and attitudes. These effects are, however, contingent on whether there is sufficient time to involve supervisors in decision making and whether supervisors have the ability and interest to be participative. Three approaches to supervisors' involvement should be implemented: parallel suggestion involvement system, job involvement system, and high involvement work system. Autonomous work group or self-managing team means to give employee groups a high degree of decision making responsibility and behavior control for completing their work. For AWG or self-managing team to be effective, several conditions are necessary. Companies should provide the training for team members on human relation skill, such as problem solving, conflict resolution, cooperation, and participation.

This study would also recommend that human resource managers should be familiar with these predictor variables affecting the job commitment as mentioned above. They should develop the supervision and position power for supervisors by training and making them understand on four roles: coach, advisor, and performance appraisal. As such, supervisors should be taught how to help subordinates develop and implement their career plans in one on one counseling sessions and should be instructed on how to integrate counseling into their performance appraisal and selection activities. For position power, human resources should specify an authorization and specify clearly the power granted to supervisors so that they can manage equally and fairly, eliminating any "gray areas". The other variable affecting job commitment that fosters increased felling of personal responsibility for work outcomes

is autonomy of supervisors. When the job provides substantial autonomy of the persons performing it, the work outcome will be reviewed according to their own effects, initiatives and decisions, rather than on, say, their adequacy of instructions from the boss or on a manual of job procedures. As autonomy increases, individuals tend to accept more personal responsibility for successes and failure that occur on the job and are more willing to accept personal accountability for the outcomes of their work. Because of the importance that compensation holds for their lifestyle and self-esteem, individuals are very concerned that they be paid a fair and competitive wage. Organizations are concerned with pay, not only because of its importance as a cost of doing business but also because it motivates important decision of employees about taking a job, and working on the job. For the designing compensation plans, it is important that an organization chooses an approach that is in alignment with its organization philosophy and that supports its organizational goals. For the basic change in organization today and the new global challenges and opportunities, there is a growing search for new direct compensation approaches in the hope that they will be better - focused on employees in order to achieve organization goals. Such new approaches to pay include broad banding, pay for knowledge, and team pays plans. The traditional approach to pay still also provides the best answer because this approach rests on the use of a job evaluation plan and the review of market salary data. So the researcher recommends human resource management should apply both compensation approaches for improving pay structure.

There are several opportunities for enhancement of this study through additional research. One of the more significant efforts would be to change to different population. The research on this particular subject should be carried out with the executive population, since the results of this research were limited to the population of the studied supervisors only. Therefore, a new research should be focused on the higher levels of management.

A second opportunity for further research would be to compare the population of supervisors between the government and private sectors. Results of the research would bring about guidelines for co-management between government offices and private organizations.

Finally, the further study on factors affecting supervision of the company executives should be made on a sample of the supervision of managers. The result would indicate the real causes of supervision, which should prove useful for the development of factors preventing future supervisions.

REFERENCES

Bearse, L.N. 1984. *A Development of Measure of Job. Organizational and professional Commitment, and an Evaluation of Their Relationships with Performance.* Dissertation Information Service, 8428078.

Bovas, A. and Johannes, L. 1983. *Statistical Methods for Forcasting.* John Wiley & Sons, New York.

Chanin, T. 1999. *Factor of Job Satisfaction and Organizational Commitment of Finance and Securities Company Employees, Industrial Psychology.* M.P.A. Thesis, Kasetsart University, Bangkok, Thailand.

Diorio, M. 1999. Opportunities abond in advanced packaging. *Advanced Packaging* October: 14.

Montgomery, D.C. 1991. *Design and Analysis of Experiment.* John Wiley & Sons, New York.

Fiedler, F.E. 1967. *A Theory of Leadership Effectiveness.* McGraw-Hill, New York.

Fiedler, F.E., Chemers, M. M., and Mahar, L. 1977. *Improving Leadership Effectiveness: The Leader Match Concept*. John Wiley & Sons, New York.

Jones, G.R. 2000. *Organizational Theory*. Prentice Hall, Upper Saddle River, New Jersey.

Hackman, J.R. and Oldman, G.R. 1980. *Work Redesign*. Addison-Wesley, Massachusetts.

Imai, M. 1991. *Kaizen (Ky'zen) The Key to Japan's Competitive Success*. McGraw-Hill, New York.

Daft, R.L. 2001. *Essentials of Organization Theory and Design*. South-Western College Publishing, Cincinnati, Ohio.

Streers, R.M. and Porter, L.W. 1983. *Motivation and Work Behavior*. McGraw-Hill, New York.

Jorajit, S. 1989. *Factors Affecting Position Retention of Department Heads in Regional Universities Education*. Ph.D. Dissertation, Srinakharinwirot University, Bangkok, Thailand.