The relationships between technical operator turnover rate and selected working condition factors in Taiwan's printing industry

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University of Northern Iowa

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The relationships between technical operator turnover rate and selected working condition factors in Taiwan's printing industry

Lee, Ling-Hsiao, D.I.T.
University of Northern Iowa, 1992

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THE RELATIONSHIPS BETWEEN
TECHNICAL OPERATOR TURNOVER RATE AND
SELECTED WORKING CONDITION FACTORS
IN TAIWAN'S PRINTING INDUSTRY

A Dissertation
Submitted In Partial Fulfillment
of the Requirements for the Degree
Doctor of Industrial Technology

Approved:

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August 1992
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ABSTRACT

The purpose of this study was to determine how technical operator turnover rate related to selected working condition factors in Taiwan's printing industry. These factors, as defined in this study, included wages, employee benefits, alternative work schedules, training programs, and gainsharing. If the results of this study showed that technical operator turnover rate was related to these selected factors, then the findings of this study would be helpful to a manager making decisions on turnover management.

The data for this study were collected by using three sets of questionnaires: (a) one designed for personnel directors, (b) one targeted at financial directors, and (c) one aimed at technical operators. These questionnaires were developed by the author and were validated by graphic arts professionals both in the United States and in Taiwan. The population of this study was the medium-size lithographic printing companies in Taiwan, having between 20 and 60 employees. These companies were members of the Taiwan Printing Industry Association between January 1991 and June 1992. The statistical analyses were accomplished by employing the multiple regression analysis at the 0.05 level of significance to determine how technical operator turnover rate related to these selected factors as defined in this study.

The results of this study indicated that there were significant correlations between technical operator turnover rate and the defined working condition factors. The turnover rate could be predicted by using any two specific variables, based on the information gathered from either the management or the operators. The companies with higher wages had better benefits, training programs, gainsharing, and alternative work schedules. At the same time, the technical operators' perceptions of these companies' practice in wages, employee benefits, alternative work schedules, training...
programs, and gainsharing were also higher. The turnover rates for these companies were lower.

Recommendations for management interested in employee turnover management were (a) be aware of the importance of working conditions, (b) should note the strong correlations between the actual amount of each selected working condition factor as defined in this study and the technical operators' perceptions of each factor, (c) the needs for re-evaluating the employees' working conditions when employee turnover rate begins to increase. Recommendations for further study were (a) extending the selected working condition factors and include the external economic climate, internal size of operation, line of business, personal factors, and psychological motivation factors; (b) enlarging the population needed for further study which may include small, medium, and large size lithographic printing companies and the non-member lithographic printing companies, adding the company size and membership as independent variables; (c) stretching the time frame of future study to 3 years for the purpose of verifying the long-term effects of working conditions on employee turnover rate; (d) repeating this study in different countries and compare these results with the results of this study for the purpose of finding out the effects of different cultures and environments; and (e) conducting this same study at a later date and compare the results of these two studies to see what changes might have occurred through time.
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CHAPTER I
INTRODUCTION

Background of the Problem

Employee turnover has always been costly. There have been at least two reasons. First, when replacements were needed, there was a cost of hiring the new employees; then, there was the cost of initial training of the employees. Furthermore, there was a time-lag before the new replacements became fully situated, and this also added an extra cost to the employer. Thus, the higher the rate of turnover, the higher was the cost; and the higher the degree of uniqueness of skill, the greater was the cost. This has been so because the higher the rate of turnover and the higher the degree of uniqueness of skill, the longer the period required for the new replacement to become fully accustomed to the new situation, and to become fully functional. Exceptions, however, did exist. For example, when the new replacement had been trained elsewhere for the same kind of job, the problem became minimal. Therefore, when a highly skillful employee left the job, the loss to the employer became even more serious (Alfus, 1990; Mobley, 1982; Wilkinson, 1988).

The effect of high turnover rate has been important not only in economic terms, but also from the standpoint of psychology. A high degree of turnover in a given company could lead to instability in the minds of those who were still remaining on the job.

But why did people leave their job to go somewhere else? Demographers as well as population geographers in studying the mobility or migration of people from one geographic area to another, have identified two sets of factors. There have been pulling factors that attracted people to migrate to a specific region; and there have been pushing factors that caused people to leave their home base. These two sets of factors
may also apply to the employment situation such as employees being attracted to leave one company and join another (or even leaving the industry to find employment in the related industries). Then, there have been situations in which the employees felt like being pushed by internal factors that prompted them to seek employment elsewhere.

The pulling factors that caused employees to leave their present jobs could be the availability of similar job opportunities which were more attractive elsewhere. When such opportunities were readily available, laborers became more mobile, which enhance the turnover rate (Mobley, 1977; Staw, 1980). The well trained employees in the highly skillful jobs were not immune. When this happened, the employers naturally suffered serious losses caused by the high turnover rate (Alfus, 1990; Hinrichs, 1980; Roseman, 1981). On the other hand, there have been pushing factors within the company. Factors in this category might be a less-than-desirable working environment, both physical and human, lower wages, poor benefits, etc.

The above discussion revealed that employee turnover had a strong negative impact on a company and, therefore, it should be carefully analyzed and managed. Furthermore, the problem of employee turnover has not been getting any better; in fact, it has become worse. This has been true not only inter-industrially, but also internationally. The interviews which this author conducted in Taiwan with five professionals in Taiwan’s printing industry in August 1991 confirmed this (M. Hsu, C. T. Tang, M. T. Wang, S. C. Wei, S. C. Wu, personal communication, August 1991). According to those interviews, labor turnover, especially the technical operators, has been a serious problem in the printing industry in Taiwan, and in their opinion, requires serious managerial attention.

According to the statistics published by Taiwan’s Bureau of Industrial Development (1988), the turnover rate of this job category was 14% in 1986. This was
four times higher than that of the national average of manufacturing labor turnover rate of 3.5% in the same year (Council of Labor Affairs, Executive Yuan, R.O.C., 1988). Why did this particular trade have such an unusually high rate of turnover? What forces were at work to cause such a high turnover rate? Identifying these forces or factors certainly was the first step toward helping managers make appropriate and rational decisions to reduce the turnover rate.

Common sense implied that some of the factors were internal and others were external; some were controllable within the managerial skills and others were not. Factors such as external economic climate, internal size of operation, line of business, as well as personal factors, were beyond the control of the managers. It, therefore, behooved the managers to discern and deal only with those factors that were within their reach to improve. Unfortunately, literature on these questions of Taiwan's printing industry to help managers has been non-existent.

Because of his past working experience in the printing industry in Taiwan, this author has been particularly interested in finding ways to help reduce the turnover rate of the technical operators in the printing industry in Taiwan. It has been his conviction that through careful research, the results of this study should be very helpful to managers in Taiwan in making appropriate decisions to deal with the problem of employee turnover in this particular industry.

Statement of the Problem

The problem of this study was to explore the relationships between technical operator turnover rate and selected working condition factors in Taiwan's printing industry.
Statement of Purpose

The purpose of this study was to determine how technical operator turnover rate related to selected working condition factors in Taiwan's printing industry. As defined in this study, these factors included wages, employee benefits, alternative work schedules, training programs, and gainsharings. The findings of this study would be helpful to a manager making decisions on turnover management.

Statement of Need

The need for this study was based on the following factors:

1. Employee turnover has had a strong negative impact on a company, therefore, it should be carefully analyzed and managed.

2. The turnover rate of technical operators in the printing industry was four times higher than that of the national average of manufacturing labor in Taiwan.

3. Interviews with experts provided information that labor turnover, especially for the technical operators, has been a serious problem in the printing industry in Taiwan, which, in their opinion, needs to be investigated.

4. To date, no research was conducted to determine the relationships between technical operator turnover rate and selected working condition factors in Taiwan's printing industry.

This study should be helpful to a manager making decisions on turnover management. Some factors which were possibly related to turnover rate but were difficult to change or improve by managers. These were external economic climate, internal size of operation, line of business, and personal factors. They were not the subject of this study. Selected working condition factors that could be improved by managers included wages, employee benefits, alternative work schedules, training programs, and gainsharings. They were examined in this study.
Wages were a monetary compensation for the work performed by employees. The average wages of employees in a company can influence the turnover rate (Armknecht & Early, 1972; Blau, 1973; Fry, 1973; Price, 1977). The statistics from the Directorate-General of Budget, Accounting, and Statistics of the Executive Yuan of the Republic of China, as well as those from the Council for Economic Planning and Development of the Executive Yuan of the Republic of China (1986, 1987, 1988, 1989) showed that during the period between 1985 and 1988, 29.4% of the voluntary job leavers left their jobs because of low pay. Therefore, wages can be an important factor related to turnover.

Low level of employee benefits might also have contributed to high turnover rate. Lucrative fringe benefits can increase productivity and satisfaction, improve performance, attract employees, and give them incentives to stay on (Beam & McFadden, 1988; Mobley, 1982; Rosenbloom & Hallman, 1991). For example, employee benefit payments in the United States have risen from 17% to 36.2% of wages during the period between 1955 and 1987 (Rosenbloom & Hallman, 1991).

Alternative work schedules or flexible working hours have also been an important benefit for employees, and also can serve to help retain employees (Mobley, 1982; Pierce, Newstrom, Dunham, & Barber, 1989; Ronen, 1984). A flexible work schedule has had a positive impact on employee job satisfaction (Pierce et al., 1989; Ronen, 1984). The statistics from the Directorate-General of Budget, Accounting, and Statistics of the Executive Yuan of the Republic of China, as well as those from the Council for Economic Planning and Development of the Executive Yuan of the Republic of China (1986, 1987, 1988, 1989) showed that during 1985 and 1988, 6.5% of the voluntary job leavers left their jobs because of inflexible working schedules.
Therefore, alternative work schedules can also be an important factor related to turnover.

Training programs have been a means for developing human resources because it increases the employee's skills, knowledge, and performance which also reduced turnover. Training programs helped to motivate employees, increase productivity, improve product quality, and they even had a positive impact on employees' attitudes toward work (Connor, 1983; Goldstein & Associates, 1989; Nilson, 1990).

Gainsharings have been a reward system, which were generally based on the company's profits and an individual's contributions to those profits. In other words, a gainsharing plan encouraged employees to increase their effort and improve their performance for a monetary reward. It also can be a factor in attracting and retaining employees. A gainsharing plan has been an effective strategy which has helped to motivate employee involvement, increase employee contributions, increase productivity and satisfaction, improve performance, and reduce costs (Graham-Moore & Ross, 1990; O'Dell, 1981).

The aforementioned working conditions can be related to turnover, and can be modified by managers or the organization. Once these relationships were determined, the findings can contribute to managerial decision-making on labor turnover management in Taiwan's printing industry.

Research Question

The research question was: What are the relationships between the technical operator turnover rate and selected working condition factors, namely wages, employee benefits, alternative work schedules, training programs, and gainsharings?
Limitations

This study was conducted with the following limitations:

1. The selected working condition factors were wages, employee benefits, alternative work schedules, training programs, and gainsharings. The external economic climate, internal size of operation, line of business, personal factors, and psychological motivation factors were not within the scope of this study.

2. The population of this study consisted of about 100 medium size (between 20 and 60 employees) lithographic printing companies which were members of the Taiwan Printing Industry Association between January 1991 and June 1992.

Assumptions

The following assumptions were made in pursuit of this study:

1. Persons who answered the questionnaires gave honest answers.

2. The graphic arts professionals were capable of judging the validity of the questionnaires, and their opinions were reflected the validity of the questionnaires.

3. The qualities of technical operators were equally distributed among companies. Consequently, the samples sufficiently represented the population.

4. The necessary translation preserved the validity of the documents in this study.

Statement of Procedure

Research Design

The type of research was correlational research. The dependent variable was technical operator turnover rate. The independent variables were wages, employee benefits, alternative work schedules, training programs, and gainsharings. The data were collected from medium size lithographic printing companies in Taiwan by questionnaires; and multiple regression analysis was employed to analyze the data.
Research instrument. The purpose of this study was to determine how the turnover rate of technical operators related to wages, employee benefits, alternative work schedules, training programs, and gainsharings. The data to be collected and used in this study were related to turnover rate, wages, employee benefits, alternative work schedules, training programs, and gainsharings in each company.

An appropriate way to collect data for this study was a questionnaire survey technique. White (1987) indicated that "The most frequently used method of collecting descriptive information is surveys" (p. 79). Balian (1982) further stated, "Mail questionnaires have advantages of respondent privacy and convenience. They are also relatively low in cost to implement" (p. 110).

Data were obtained from the printing companies by using three sets of questionnaires (see Appendix C): One designed for personnel directors, one targeted at financial directors, and one aimed at technical operators. The questionnaire to personnel directors included questions such as the number of technical operators for each quarter in 1991, the number of technical operators who left on their own during 1991, and the weeks technical operators chose the alternative work schedules in 1991. The questionnaire to financial directors included questions such as the monthly wages, employee benefit costs, training costs, and gainsharing payments for technical operators. A five-point Likert scale was used to measure technical operators' perception of companies' practice in wages, employee benefits, alternative work schedules, training programs, and gainsharings in the questionnaire. The alternative responses to each statement were "strongly agree," "agree," "not sure," "disagree," and "strongly disagree."

Since the questionnaires were newly designed, a pilot test was needed. The purpose of the pilot test was to determine if the questions were easily understood in
order to gain a proper response. Each questionnaire was pilot tested in both English and Chinese on two small groups (five each) of graphic arts professionals (one in the United States and the other one in Taiwan). Members of the pilot test groups were asked to offer suggestions for improving the questionnaires.

Description of the population and sample. The population of this study consisted of medium size (between 20 and 60 employees) lithographic printing companies which were members of the Taiwan Printing Industry Association between January 1991 and June 1992. The number of companies was approximately 100. The final sample for this study consisted of all the companies that agreed to participate in this study and returned the questionnaires.

Data collection. Before collecting the data, a letter (see Appendix B) was sent to the top management of all the members of population. The purpose of this letter was to request participation in this study and to request the names of the personnel director, the financial director, and all of the technical operators who had worked for that company between January 1, 1991 and December 31, 1991.

The questionnaires were then sent to the personnel director, financial director, and randomly selected technical operators of each company. Therefore, there was a need for another cover letter (see Appendix C) to go with the questionnaires. Both letters were printed on the letterhead of Taiwan Printing Industry Association with the chairman's stamped signature.

Data analysis. The statistical analysis of the data was accomplished by analyzing the relationships between the dependent variable and the set of independent variables. The multiple regression analysis was employed to analyze the data. Hamburg (1983) stated, "Multiple regression analysis represents a logical extension of two-variable regression analysis. Instead of a single independent variable, two or more
independent variables are used to estimate the values of a dependent variable" (p. 407).
The research question of this study was investigated by multiple regression analysis. A
correlation matrix was developed to show the simple correlation coefficients among all
the variables. The multiple regression analysis was conducted at the 0.05 significant
level to evaluate the individual coefficients in order to retain those that were
significant. The stepwise method was employed to build the multiple regression
equation. This method has three advantages, "(1) only significant regression
coefficients are included in the equation, (2) the steps involved in building the equation
are clearly seen, and (3) the step-by-step changes in the standard error of estimate and
the coefficient of determination are shown" (Mason & Lind, 1990, p. 583).

For this study, two multiple regression analyses were conducted; the first one
was based on the data from management and the second one was based on the data
from technical operators. Both analyses used the same dependent variable, namely
technical operator turnover rate.

Research Schedule

<table>
<thead>
<tr>
<th>Activities</th>
<th>Time Necessary</th>
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<tr>
<td>Stage 1: Preparation.</td>
<td></td>
</tr>
<tr>
<td>1. Pilot tested questionnaires (determined if the questions were easily understood in order to gain a proper response).</td>
<td>1 month</td>
</tr>
<tr>
<td>2. Revised and printed questionnaires.</td>
<td>2 weeks</td>
</tr>
<tr>
<td>3. Prepared the population roster based on records of the Taiwan Printing Industry Association.</td>
<td>1 week</td>
</tr>
<tr>
<td>4. Mailed the request letter to the top management of all the members of population.</td>
<td>1 week</td>
</tr>
<tr>
<td>5. Received lists of employees from the members of population.</td>
<td>2 weeks</td>
</tr>
</tbody>
</table>
Activities | Time Necessary
---|---
6. Assigned each responded company a number (e.g., 1, 2, 3,). | 1 day
7. Assigned each director and operator a number (e.g., 1-1, 1-2, 1-3). | 1 day

Stage 2: Data collection.
1. Sent out questionnaires. | 1 week
2. Followed up by telephone. | 2 weeks
3. Received questionnaires. | 2 weeks

Stage 3: Data description.
1. Organized data. | 2 weeks
2. Calculated turnover rate and mean scores of technical operators' perceptions of each independent variable of each company. | 1 week

Stage 4: Data analysis.
Analyzed the relationships between the dependent variable and the set of independent variables; multiple regression was employed to analyze the data. | 1 month

Stage 5: Research report preparation.
Wrote research report. | 2 months

Stage 6: Abstract preparation.
Prepared a research abstract and sent it to respondent companies. | 2 weeks

Definition of Terms
The following terms were defined to clarify their usage in the context of the study:
1. Employee turnover: An individual employee who left on his own (Mobley, 1982; Price, 1977).
2. Turnover rate: The separation rate was employed as measurement of turnover rate in this study. The separation rate is the number of members who left divided by the average number of members during the same time interval times 100% (Mobley, 1982; Price, 1977). The turnover rate in this study was the number of technical operators who left on their own during 1991 in a company divided by the average number of technical operators in the same company during 1991 times 100%. Calculation was based on the answers from personnel directors.

3. Wages: Wages are payments made to employees for their work (Dasgupta, 1976; International Labour Office, Geneva, 1968). Management: The measurement of wages was the mean wages for technical operators in a company. Data were collected from financial directors. Technical operators: The measurement of wages was the mean score using an instrument measuring technical operators' perceptions of the appropriateness of wages.

4. Employee benefits: Employee benefits are all benefits and non-wage payments, that are provided in part or in whole by employers to employees, including the employer's share of payments, insurance, payments for time not worked, cost of services to employees, and miscellaneous benefits (Beam & McFadden, 1988; Rosenbloom & Hallman, 1991). Management: The measurement of employee benefits was the mean costs of benefits per technical operator in a company. Data were collected from financial directors. Technical operators: The measurement of employee benefits was the mean score using an instrument measuring technical operators' perceptions of the appropriateness of employee benefits.

5. Alternative work schedules: Alternative work schedules are those work schedules which provide employees certain autonomy in deciding work schedules (Pierce et al., 1989; Ronen, 1984). Management: The measurement of alternative
work schedules was the mean number of weeks that each technical operator chose the alternative work schedules. Data were collected from personnel directors. Technical operators: The measurement of alternative work schedules was the mean score using an instrument measuring technical operators' perceptions of degree of beneficial of alternative work schedules.

6. Training programs: Training is a learning process and a major approach to provide employees new knowledge and skill in order to manage changes/improvements (Goldstein & Associates, 1989; Nilson, 1990). Management: The measurement of training programs was the mean training costs per technical operator in a company. Data were collected from financial directors. Technical operators: The measurement of training programs was the mean score using an instrument measuring technical operators' perceptions of the effectiveness and helpfulness of training programs.

7. Gainsharings: Gainsharings are a reward system which encourages employees to improve productivity. All employees who contribute to the improvement of the company share the gains that reflect increases in productivity (Graham-Moore & Ross, 1990; O'Dell, 1981). Management: The measurement of gainsharings was the mean gainsharing payments per technical operator in a company. Data were collected from financial directors. Technical operators: The measurement of gainsharings was the mean score using an instrument measuring technical operators' perceptions of the satisfaction of gainsharings.

8. Technical operators: Full-time operators with specific skills. For the scope of this study, they were limited to scanner operators, camera operators, strippers, and offset-press operators, and did not include trainees. Council of Labor Affairs, Executive Yuan, R.O.C. (1990) defined the scanner operator as one who "operates electronic color scanners to produce yellow, magenta, cyan, and black positive or
negative films, make enlargements or reductions based on requirements for use in producing printing plates" (p. 403); a camera operator is one who "sets up and operates camera to photograph originals and produce films used in the preparation of lithographic printing plates" (p. 401). A stripper "positions negative and positive film on layout sheets to assemble film flats used in production of photolithographic printing plates" (p. 403). The offset-press operator "makes ready, adjusts, and operates offset printing press to print single and multicolor copy which meet the requirements" (p. 398).

9. Lithographic printing company: The Directorate-General of Budget, Accounting, and Statistics, Executive Yuan, R.O.C. (1987) defined printing as "including establishments primarily engaged in printing books, maps, pamphlets, documents and forms on the surfaces of paper, metallic, plastic, rubber, resin or other materials" (p. 178). A lithographic printing company is a printing company which is "primarily engaged in printing by the lithographic process" (The Directorate-General of Budget, Accounting, and Statistics, Executive Yuan, R.O.C., 1987, p. 178).

10. Medium size lithographic printing company: A lithographic printing company which employs more than 20 but less than 60 employees.

11. Taiwan Printing Industry Association: The official association for Taiwan's printing industry. The requirements for membership are printing companies that have (a) valid business licenses, (b) valid manufacturing plant registration certificates, and (c) complete tax return documents.

Synopsis of Succeeding Chapters

This dissertation consists of five chapters. Chapter two contains a review of related literature. Chapter three deals with methodology. Chapter four reports
research findings. The final chapter contains the summary, conclusions, and recommendations.
CHAPTER II
REVIEW OF RELATED LITERATURE

Employee Turnover

Since the beginning of this century there has been a growing awareness of the problem of employee turnover, therefore there has been a steadily increasing flow of research on this particular topic (Steers & Mowday, 1981). During the second half of the century, numerous review articles on turnover have appeared.

In the same period of time, some models in regard to turnover have been developed. Four examples were (a) March and Simon (1958) presented their employee participation model dealing with the employee's decision to participate in or leave the organization, (b) Price (1977) presented his model of the determinants and intervening variables related to turnover, (c) Mobley (1977) presented his turnover decision process indicating the logical thinking process for the employees' decisions to remain or quit a job, and (d) Wanous (1978) presented his matching model to show how the matching of an employee and an organization influenced the employee's tenure in the organization.

After 1970, there was additional research which stimulated several reviews, such as a study by Goodman, Salipante, and Paransky (1973) on the characteristics of the hard-core unemployed. More extensive reviews were published by Porter and Steers (1973); Locke (1976); Forrest, Cummings, and Johnson (1977); Price (1977); Mobley, Griffeth, Hand, and Meglino (1979); Muchinsky and Tuttle (1979); Hinrichs (1980); Mobley (1982); Clegg (1983); Steel and Ovalle (1984); Cotton and Tuttle (1986); and Teel and Kukalis (1988).
The Process of Employee Turnover

Since the late 1950s, many researchers have developed processes and models of how employees made their decisions to remain at or leave an organization. Four of those models furnished a clear picture about the major factors that cause employee turnover and the logical thinking process for employees making decisions to remain at or leave an organization. March and Simon's employee participation model was presented first in this chapter because it was the earliest model regarding employee turnover and the foundation for the later developed models.

March and Simon's employee participation model. In 1958, March and Simon presented their model that identified the major factors affecting employees' decision whether to participate in or leave an organization. This earliest model regarding turnover clearly showed the major factors that could influence employee turnover, and it was also the foundation for later developed models.

March and Simon believed that the desired to move and the perceived ease of movement were two major factors that caused employee turnover. They stated that "the zero point on the inducement-contribution utility scale, on the other hand, is the point at which the individual is indifferent to leaving an organization" (March & Simon, 1958, p. 86). They further said, "The inducements-contributions balance, it was pointed out, is a function of two major components: the perceived desirability of leaving the organization, and the perceived ease of movement from the organization" (March & Simon, 1958, p. 93).

This model indicated that job satisfaction was the primary factor that influenced the desirability of movement. Thus, the higher the degree of job satisfaction, the lower the desirability to move. March and Simon also discussed three major factors that influenced job satisfaction. These were (a) the "conformity of the job characteristics to
the self-characterization held by the individual," (b) the "predictability of instrumental relationships on the job," and (c) the "compatibility of work requirements with the requirements of other roles." The higher the degree of the above three factors, the higher the degree of job satisfaction, because these factors reduced the conflicts between the job and the employee's self-image (March & Simon, 1958).

![Diagram of factors affecting perceived desirability of movement]

**Figure 1.** Major factors affecting perceived desirability of movement.


Another factor which influenced the desirability of movement was the size of organization, because "the larger the organization, the greater the perceived possibility
of intraorganizational transfer" (March & Simon, 1958, p. 99). This decreased the desirability of leaving the organization because an employee could make interdepartment transfers instead leaving the organization.

![Diagram](image)

Figure 2. Major factors affecting perceived ease of movement.


On the other hand, the perceived ease of movement for an employee depended on the employee's perception of the availability of other working opportunities. March and Simon (1958) mentioned that "the greater the number of perceived extraorganizational alternatives, the greater the perceived ease of movement" (p. 100).
Then, the number of extraorganizational alternatives perceived depended on the degree of business activity, the amount of organizations visible, and the perceived availability of exterior option, which have been the function of sex, age, social status, and the length of service of the employee. According to March and Simon (1958), the relationships between extraorganizational alternatives and those variables were:

The lower the level of business activity, the less the number of extraorganizational alternatives. . . . Male workers will perceive movement to be easier than will female workers. . . . The older the worker, the less the perceived ease of movement. . . . Members of low status group will perceive movement to be more difficult. . . . The longer the length of service . . . the fewer the extraorganizational alternatives perceived. . . . The larger the number of organizations visible to the participant, the greater the number of perceived extraorganizational alternatives. (pp. 100-103)

Finally, the number of organizations visible was affected by employee's inclination to search and visibility. March and Simon (1958) mentioned, "the greater the individual's propensity to search, the greater the visibility of organizations to him. . . . The greater the visibility of an individual to organizations, the greater the visibility of organizations to him" (pp. 104-105).

**Price's model of the relationships between the determinants, intervening variables, and turnover.** Price's model clearly showed the determinants such as pay, integration, instrumental communication, formal communication, and centralization produced the degree of satisfaction, all these variables were positive or negative related to satisfaction, which was the intervening variables. The degree of satisfaction plus the availability of options outside the organization have become the rationale of the decision for turnover.
Mobley's employee turnover decision process. In 1977, Mobley presented an employee withdrawal decision process model. This model showed the logical thinking by which an employee decided to quit a job in a ten-step process. The process started with an evaluation of the existing job (step 1). This evaluation resulted in either satisfaction or dissatisfaction with the job (step 2). The degree of satisfaction/dissatisfaction was the major factor that affected the intention to remain or leave. Mobley (1977) stated that "thinking of quitting is the next logical step after experienced dissatisfaction" (p. 237).

This decision process suggested that there were still some steps between intent to quit and actual quitting. The major factor that could influence those steps was the number of alternative jobs. Once an employee intended to quit (step 3), he or she usually evaluated the expected utility of search and the cost of quitting (step 4). The expected utility of search included "an estimate of the chances of finding an alternative to working in the present job, some evaluation of the desirability of possible
alternatives, and the costs of search" (Mobley, 1977, p. 237). The cost of quitting included the loss of seniority and benefits (Mobley, 1977). If the expected utility of search was high and/or the costs of quitting were low, this could stimulate the intention to search for alternatives (step 5).

After alternatives were available (step 6), an employee would have initiated an evaluation of alternatives (step 7), and compared the present job with alternatives (step 8). If the alternatives were better than the present job, it would stimulate the employee's intention to quit (step 9), and then actually quit the job (step 10).

Basically, this decision process indicated two major factors that influenced employee turnover which were job satisfaction and the alternatives. Mobley (1977) found that there was a "high negative correlations between satisfaction and frequency of thinking of quitting" (p. 239). The alternatives were the major factors that link thinking of quitting, intention of quitting and actual quitting.

Wanous' model of matching individuals and organizations. This model (Figure 4) clearly indicated that the degree of matching of employees and organizations would influence the employees' tenure in the organization. It showed two different ways of matching employees and organization. The top half of the model showed the matching between employees' abilities and organizations' job requirements, which represented job performance. The acceptable job performance caused an employee to remain in the organization and the low job performance caused an employee's termination. The bottom half of the model showed the major factor that affected turnover, which was job satisfaction. This has been affected by the matching of employee's needs and the capacity of the organization to reinforce those needs. Wanous (1978) stated that "the dependent variable of this model is tenure in an organization, and is influenced in two ways: (1) voluntary turnover, via low job satisfaction, and (2) involuntary turnover,
via low job performance" (p. 250). In other words, based on this model, the major factor that influenced voluntary turnover was job satisfaction.

![Diagram of turnover models]

Figure 4. Matching individual and organization.


The comparison of turnover models. As discussed earlier in this chapter, there were four turnover models. The first and the earliest one was March and Simon's employee's participation model which also became the foundation for the development of later models. In March and Simon's model, the major factors that influenced employee turnover were satisfaction (desired to move) and availability of options.
(perceived ease of movement). In fact, these two factors also have occurred repeatedly in the other three models.

In Price's model, satisfactions and opportunities were the intervening variables that directly related to employee turnover. In the decision process model, Mobley pointed out that job satisfaction and the alternatives were the main factors that influenced employee turnover. Wanou's model also showed how job satisfaction was the major factor that influenced employee turnover.

Generally speaking, these four models and most of the later developed employee turnover models such as the model of the primary variables and process of employee turnover presented by Mobley et al. (1979), the multidisciplinary model presented by Muchinsky and Morrow (1980), and the turnover structural model presented by Hom and Griffeth (1991) have one thing in common: The low degree of job satisfaction stimulated an employee's desire to leave an organization and the availability of other options became the considering factor that influenced an employee's decision of actually leaving an organization. In other words, the job satisfaction was an organization's internal factor that could initiate an employee's desire to quit, and the availability of other options was an external factor that could make an employee's desire to quit to become a reality.

Factors Related to Turnover

After 1970, a rapid growing number of studies have been conducted on employee turnover, which also stimulated many review articles. From these studies and reviews, one could sort out that there were several characteristic factors that related to turnover as follows:

Employment levels. The perceived external economy has a strong effect on turnover rate (Fry, 1973; March & Simon, 1958; Mobley, 1982; Price, 1977). There
has been an apparent relationship between turnover rate and the economic situation such as employment levels (March & Simon, 1958; Markham, 1985; Mobley, 1982; Price, 1977). When the employment level was high, the turnover rate was also high, but turnover rate had dropped when the unemployment rate rose (March & Simon, 1958; Markham, 1985; Mobley, 1982; Price, 1977). There have been many studies that attempted to link turnover rate with perceptual measures of employment opportunity (e.g., Price & Mueller, 1981), availability of acceptable alternatives (e.g., Mobley, Horner, & Hollingsworth, 1978; Gerhart, 1990), and ease of job mobility (e.g., Jackofsky & Peters, 1983; March & Simon, 1958). Hulin's study (cited in Mobley, 1982) "reported a correlation of -0.84 between unemployment and quits across thirty-one years" (p. 83). Based on the above studies, there was a strong negative relationship between unemployment levels and turnover rates.

**Demographic factors.** The demographic variables of the individual have also been related to turnover. Such factors included age, sex, education, family size, etc. Many reviewers of the turnover literature reported a negative relationship between age and turnover rate—younger employees had a higher probability of leaving (Cotton & Tuttle, 1986; March & Simon, 1958; Mobley et al., 1979; Porter & Steers, 1973; Price, 1977; Terborg & Lee, 1984). This might due to the fact that younger employees might have had more entry-level job opportunities and less family responsibilities. These situations made job changing easier.

Many researchers and reviewers found there was no definitive relationship between the sex of the employees and turnover rate (Haber, Lamas, & Green, 1983; Light & Ureta, 1990; Mobley et al., 1979; Price, 1977; Rubin, 1989). Others found that there was neither a strong nor a consistent relationship between educational level and turnover rate (Mobley et al., 1979; Price, 1977; Terborg & Lee, 1984).
Family size or number of dependents had a certain degree of influence on turnover rate (Cotton & Tuttle, 1986; Keller, 1984). Because the more family responsibilities, the less mobility of an employee.

**Job-related factors.** Job-related factors have been also related to turnover. Such factors included source of referral, level of skill, job satisfaction, organizational commitment, performance, and vocational interests. Several studies have showed that the source of new employee referral was associated with turnover (Gannon, 1971; Reid, 1972; Decker & Cornelius, 1979). According to these studies, applicants referred by informal sources such as employees or relatives, might have had a lower turnover rate than applicants referred by more formal sources such as employment agencies and advertising. But the relationship between the source of referral and turnover did require further explanation, because it was possible that applicants from the informal sources had more accurate information and expectations about the job (Decker & Cornelius, 1979; Wanous, 1980). Also they might not want to leave because they were working with friends.

Jobs with lower levels of skill usually have a higher turnover rate than jobs with higher levels of skill. Several researchers suggested that there was a negative relationship between level of skill and employee turnover (Behman, 1968; Ingham, 1970; March & Simon, 1958).

The relationship between job satisfaction and employee turnover has been heavily researched by many researchers such as Bardo and Ross (1982); Bartol (1983); Cotton and Tuttle (1986); DeLey (1984); Futrell and Parasuraman (1984); Hersch and Stone (1990); Jayaratne and Chess (1984); Jenkins (1988); Klenke-Hamel and Mathieu (1990); Kohl and Stephens (1989); Manger and Eikeland (1990); Shore and Martin (1989); Stumpf and Hartman (1984); Ward (1989); and Wall, Kemp, Jackson, and
Clegg (1986). The general conclusion of these studies and reviews was that there was a negative relationship between job satisfaction and employee turnover rate. That is, employees with low job satisfaction were more likely to start looking for other working opportunities or quit their jobs (Bartol, 1983; Futrell & Parasuraman, 1984; Jenkins, 1988; Kohl & Stephens, 1989; Wall et al., 1986).

Because the organizational commitment has had a strong relationship with job satisfaction, organizational commitment has been used to predict general turnover and absenteeism (Blau & Boal, 1987; Stumpf & Hartman, 1984). Cotton and Tuttle (1986) reviewed the studies relating turnover and organizational commitment. They concluded that there was a negative relationship between organizational commitment and turnover rate.

Some studies were focused on the relationship between turnover and performance, such as Cope, Grossnickle, Covington, Durham, and Zaharia, (1987); Distefano (1988); Jackofsky (1984); Keller (1984); O'Connor, Peters, Pooyan, Weekley, Frank, and Erenkrantz, (1984); and Sheridan (1985). Cotton and Tuttle (1986) and Teel and Kukalis (1988) reviewed the studies relating turnover and performance. They found the employees with low performance had a higher probability of leaving and concluded that there was a negative relationship between performance and turnover.

Porter and Steers (1973) reviewed the studies relating turnover and vocational interests. They found that the employees who had low vocational interests had a higher probability of leaving and concluded that there was a negative relationship between vocational interests and turnover rate.

Organizational variables. The organizational variables such as type of organization, organizational size, promotion opportunities, leadership style, and wages
have affected turnover rate. Price (1977) classified turnover rates by type of organization for 53 studies from 1947-1971. He found that manufacturing had the highest median separation rate and that goods-producing organizations had over twice the separation rate of service-producing organizations.

March and Simon (1958), Tharp (1988), and Todor and Dalton (1986) found larger organizations might have more internal opportunities, human resource development programs, and competitive compensation systems that can reduce turnover. Therefore, there was a possibility that organizational size was related to turnover. However, the research on turnover and organizational size found that the relationship between organizational size and turnover was inconsistent (Mobley et al., 1979; Porter & Steers, 1973; Price, 1977).

Promotion opportunities have been identified as a factor which could be related to turnover. Some reviewers such as Mobley et al. (1979), and Cotton and Tuttle (1986) reviewed the studies relating turnover and promotion opportunities. They concluded that there was a moderate negative relationship between promotion opportunities and turnover rate.

The leadership style in an organization has also been an important factor related to employee turnover. Graen, Linden, and Hoel (1982) found the leader-member exchange was a powerful predictor of employee turnover. Therefore, the leadership style held an important role in the employee withdrawal process (Graen et al., 1982; Mobley et al., 1979). Cotton and Tuttle (1986) reviewed the studies relating turnover and leadership style. They concluded that there was a strong negative relationship between satisfaction with leadership style and turnover rate.

Researchers have established a strong relationship between wages and turnover rates (Cotton & Tuttle, 1986; Kohl & Stephens, 1989). In a detailed analysis of
manufacturing quit rates, Armknecht and Early (1972) found that the most important factor determining interindustry variations in voluntary separations was the relative level of earnings. Turnover has been highest in low-paying industries. Other studies have reached similar conclusions about the relationship between wages and turnover rate (Blau, 1973; Granger, 1989; Flinn, 1986; Fry, 1973; Kohl & Stephens, 1989; Leonard, 1987; Leonard & Jacobson, 1990; McKenna, 1986; Motowidlo, 1983; Price, 1977; Ruhm, 1987). Hellriegel and White (1973) found that certified public accountants who quit reported 20% higher earnings on their new jobs. Wertheimer (1970) and Dalton and Todor (1979) described that mobility resulted in net positive income to the movers. This conclusion could contribute to higher turnover rates as individuals seek higher-paying positions.

The conclusion that could be made from the literature has been that unemployment rate, age, job satisfaction, organizational commitment, performance, leadership style, and wages were consistently and negatively associated with turnover. In addition, the type of organizations was also related to turnover. Some research on the source of referral suggested that informal sources of referral showed lower turnover. But there was insufficient research to support a strong generalization. Family size, interests, level of skill, organizational size, and promotion opportunities have been related to turnover, but the amount, quality, and results of such research were insufficient to verify these relationships. Finally, there was no relationship between turnover and sex and education.

Selected Factors of Working Conditions That Might Affect Employee Turnover

Working conditions have been identified as an important factor that could affect turnover (Abelson, 1987), because the working conditions could directly influence an employee's satisfaction. Selected working condition factors that could be improved by
managers such as wages, employee benefits, alternative work schedules, training programs, and gainsharings were examined in this study.

**Wages.** Usually, wages were determined by governments' concern, economic situation, characteristics of industry, and the result of a bargain between the employer and the employee (International Labour Office, 1968; Dasgupta, 1976). Employees and their families have been dependent almost entirely on wages to provide their living, but, on the other hand, wages also have been the major part of employers' costs of production. Therefore, there has been a conflict between employee and employer regarding the settlement of wages (International Labour Office, 1968; Dasgupta, 1976). However, both employee and employer, even governments have attempted to minimize this conflict by fairness and reasonable demands, which benefit all (International Labour Office, 1968).

Most of the employee turnover researchers or reviewers agreed that the wages held a very important role in the employee turnover process (Cotton & Tuttle, 1986; Kohl & Stephens, 1989). Both the amount of the wages (Armknecht & Early, 1972) and the satisfaction with wages (Motowidlo, 1983) have been strongly related to turnover. That meant both the actual amount of the wages and the perception of an employee of appropriateness of wages have been the important data when measuring the wages as a factor in employee withdrawal process.

**Employee benefits.** Employee benefits could be related to turnover because appropriate benefits could increase satisfaction. (Beam & McFadden, 1988; Rosenbloom & Hallman, 1991). In general, high rewards produced greater job satisfaction (Rusbult & Farrell, 1983). Therefore, employee benefits could be also an important factor that influenced employee turnover. Employee benefits could include many different forms of payment or services for employees. In Mitchell's study, it was
found that the probability of worker mobility dropped 20% when a pension promise was made to workers (Mitchell, 1982). In Miller's study, it was found that the employer-sponsored child care reduced workers absenteeism and turnover (Miller, 1984). Therefore, both the actual payment for employee benefits and the employee's perception of appropriateness of employee benefits have been important data when measuring employee benefits.

**Alternative work schedules.** According to Bernstein's study, the degree of employee autonomy and flexible working hours met the needs of those who were available for work only at certain times and helped curtail turnover and absenteeism (Bernstein, 1988). In Dalton and Mesch's study, a 6 year analysis tested the effects of a flexible-scheduling program on absenteeism and turnover for the group implementing the program as well as a comparable control group. Results from this study indicated reductions in employee absenteeism and turnover after the flexible-scheduling has been implemented for the experimental group, while no such changes were evident in the control group. After the study was finished, the absenteeism and turnover of the experimental group was back to the level that it used to be (Dalton & Mesch, 1990). In addition, alternative work schedules have been a benefit for employees, because it could increase job satisfaction and reduce turnover (Pierce et al., 1989; Ronen, 1984).

**Training programs.** Training has been a useful learning process in an organization for developing human resources because it increases the employees' skills, knowledge and performance. In recent years, the printing industry has grown in its use of high technologies, such as computers, lasers, electronic devices and similar technological advancements for its production processes. The printing industry has been expanding, and many new technologies have been introduced to lower production costs and increase efficiency (Prust, 1989; Walker, 1986). Sometimes the rapid growth
in equipment sophistication has made it very difficult to keep up-to-date with equipment capabilities and operating procedures. The pace of change in printing technology has continued at rapid speeds. Current employees' skills have become outdated quickly (Petersen, 1991). How to update the current employees' skills and train new employees have made training a important issue in the printing industry.

As the printing industry moves into the 1990s, companies have found that as technology has became more complex, most employees have not kept up with the rapid growth. Most companies already have focused or will focus on intensive training of both new and current employees in order to enable them to adapt to new technology to meet the needs of the future (Ferris, 1991).

Presently, the contents of training in the printing industry include basic training, advanced technologies, new problem-solving and analytical thinking capabilities (Ferris, 1991; Murphy, 1989; Ruggles, 1984). According to a survey of commercial offset printers conducted by the National Association of Printers and Lithographers and American Printer Magazine in 1989, more than a third of the respondents believed that the skills problems of the printing industry were serious or very serious. Seventy-four percent believed some of their employees had a basic skills problem, and 63% replied that the negative events that occurred in their plants could be attributed to a lack of basic skills (Ferris, 1991). These results have been especially troubling not only because basic skills have been needed more than ever before, but as the field continued its move into the high-tech age, new problem-solving, analytical thinking, and communication capabilities have been necessary.

Ruggles (1984) divided the training that is commonly used in the printing industry into five types: "work experience, self-instruction, on-the-job training, seminars/short courses/workshops, and academic programs" (p. 7). When conducting
a training program, careful research is required to determine the training purposes and how to implement them, as well as what hardware and courseware can best meet the employees' needs. Careful research and assessment, appropriate decision and implementation planning and management, and critical evaluation will make training meet learner's needs and achieve the training objectives efficiently (Goldstein & Associates, 1989; Margolis & Bell, 1989; Nilson, 1990; Rosow & Zager, 1988).

Training increases employees' skills and help employees' to manage changes/improvements. In other words, training could improve employees' performance and reduce turnover. Lynch (1991) conducted a study by investigating 1,208 male and 1,314 female young workers who have left school for more than four years. He found that workers in good jobs have more chances to receive on-the-job training that resulted in higher wages and a lower turnover rate. Reinhardt (1988) also indicated that inadequate employee orientation programs could cost companies a high turnover rate and reduce productivity. Up to the present, there still has been insufficient studies to show the relationship between training and turnover rate. But this relationship could be easily inferred from the relationship between training and performance (Connor, 1983; Goldstein & Associates, 1989; Nilson, 1990), and the relationship between performance and turnover (Cotton & Tuttle, 1986; Teel & Kukalis, 1988). Therefore, training could be an effective means to reduce turnover.

Gainsharings. Graham-Moore and Ross (1990) defined gainsharings as a reward system that "involves a measurement of productivity combined with the calculation of a bonus designed to offer employees a mutual share of any increases in total organizational productivity. Usually all those responsible for the increase receive the bonus" (p. 20). Basically, the bonus has come from improved productivity, and both employees and the company share the financial gains. Therefore, there has been
neither a guarantee of a bonus nor a limit to the size of the bonus. In other words, a gainsharing plan could remedy the problems of commonly used profit sharing plans such as "create difficulties in relating profit to individual performance. Do not tie profit directly to labor productivity" (O'Dell, 1981, p. 23). Because a gainsharing plan has been tied to productivity improvement and cost saving in order to increase financial gains and then share the profit gains, it is an effective reward system which could improve employees' commitment, performance and satisfaction (Graham-Moore & Ross, 1990; O'Dell, 1981).

Presently, there has been no study to show the relationship between gainsharing and turnover rate. But this relationship could be easily inferred from the relationship between gainsharing and organizational commitment, performance and satisfaction (Graham-Moore & Ross, 1990; O'Dell, 1981) and the relationship between organizational commitment and turnover (Cotton & Tuttle, 1986), performance and turnover (Cotton & Tuttle, 1986; Teel & Kukalis, 1988), and satisfaction and turnover (Bartol, 1983; Futrell & Parasuraman, 1984; Jenkins, 1988; Kohl & Stephens, 1989; Wall et al., 1986).

Based on the literature, there has been insufficient research to show the direct relationships between benefits, alternative work schedules, training programs, gainsharing and turnover rate, but benefits, alternative work schedules, training programs, and gainsharing can improve performance and increase satisfaction, which were negatively related to turnover. Therefore, wages, benefits, alternative work schedules, training programs, and gainsharing should be related to turnover rate. In conclusion, it appears that job satisfaction and performance may influence turnover rate. It is also possible, however, that wages, employee benefits, alternative work schedules, training programs, and gainsharing may be effective. Therefore, it became
the purpose of this study to investigate the influence of wages, employee benefits, alternative work schedules, training programs, and gainsharings on turnover rate.

**Research Methodology**

**Research Design**

Based on the purpose and research question of this study, the type of research was correlational research. Dominowski (1980) stated, "Studying relations between variables is the hallmark of scientific work because understanding how variables are related to one another is the core of scientific understanding" (p. 241). Evidently, once the aforementioned relationships are determined, the finding of this study can be contributed to managerial decision-making on employee turnover management.

**Instrument and data collection.** The questionnaire survey technique was used to collect data for this study. Because mail questionnaires have advantages of standardized wording, no interviewer bias, respondent privacy, cost and time saving, and convenience, it is a commonly used method of data collection (Bailey, 1987; Balian, 1982; Balsley & Clover, 1988). But, at the same time, mail questionnaires have some certain disadvantages such as low response rate and possibility of instrumentation (Bailey, 1987; Balian, 1982; Balsley & Clover, 1988; Lang & Heiss, 1984). Therefore, for a high response rate and proper responses, a mail questionnaire must be carefully designed.

According to many researchers and scholars such as Bailey (1987), Balian (1982), Borg and Gall (1989), and Callahan (1986), to prepare a research instrument, a researcher should start defining research objectives. Because the contents of a research instrument depends on the objectives of the research (Borg & Gall, 1989; Callahan, 1986), questions should tie in to the research objectives and are necessary to answer the research problem, therefore the objectives of the research decide what data are needed.
(Balian, 1982; Sudman & Bradburn, 1982). After the research objectives have been clearly defined, the next step is to determine the population and samples (Bailey, 1987; Balian 1982; Borg & Gall, 1989). Basically, the population included should be the "entire group of unit of interest in a research study" (Balian, 1982, p. 99). The sampling techniques should be appropriate in order to make samples represent this population. Theoretically, the bigger sample size has been better, but because of the cost factor, the appropriate sample size has been, "sample a group large enough to give credibility to the research, but small enough to handle" (Balian, 1982, p. 115).

However, a researcher needs to know the characteristics and reading level of samples in order to make the contents of instruments to fit the target group (Borg & Gall, 1989; Crowl, 1986; Cohen & Manion, 1985). After the target group has been identified, the actual items of an instrument can be developed.

Each item should be short in order to avoid instrumentation (Lang & Heiss, 1984), and "must be developed to measure a specific aspect of one of the objectives" (Borg & Gall, 1989, p. 427). In other words, each item must be short, precise, clear, easily understood, and necessary to answer the research questions (Balian, 1982; Sudman & Bradburn, 1982; Crowl, 1986; Cohen & Manion, 1985). If a response scale is used, then a five-point Likert scale is appropriate for "relatively simple questions with average spread in responses expected" (Balian, 1982, p. 88).

The questionnaire then can be constructed after each item was developed. The length has been the major concern when constructing the questionnaire. Borg and Gall (1989) recommended that the questionnaires should be "as short as possible consistent with the objectives of the study" (p. 432). After a clear, brief, and organized questionnaire has been developed, it then is ready for a pilot test for improving the questionnaire. A pilot test has been a very important procedure for developing a
questionnaire because "every questionnaire must be tested and refined under real-world conditions" (Sudman & Bradburn, 1982, p. 282).

When conducting a pilot test, the sample should hold some characteristics that are the same as the subjects of the study in order to gain proper feedbacks (Bailey, 1987; Sudman & Bradburn, 1982). Bailey also recommended that a researcher should make respondents realize that "they are participating in a pretest" (Bailey, 1987, p. 141), and then ask them to complete the questions, identify any question that was unclear or difficult to answer, and make comments. Sudman and Bradburn (1982) also recommended that the feedback and information can be gathered "from comments written on the questionnaire" (p. 284). Once the information of a pilot test have been analyzed and the questionnaires have been revised based on the information, then the cover letter can be developed.

The cover letter could influence the response rate by its length, contents, and sponsorship (Bailey, 1987; Borg & Gall, 1989). Generally, the purpose and significance of the study, protection for respondents, and respond date have been necessary ingredients for a cover letter; a short letter usually has a better response rate (Bailey, 1987; Borg & Gall, 1989). Sponsorship could be an important factor for increasing response rate (Bailey 1987; Sudman & Bradburn, 1982; Wiersma, 1991). Bailey (1987) further mentioned that "organizations generally receive a good response rate from their own membership" (p. 154). Therefore, an appropriate letterhead is very important for increasing response rate (Bailey, 1987; Wiersma, 1991). According to Bailey (1987), there has been no difference between salutations to the respondent by name or "Dear Sir or Madam," and furthermore there has been no difference between a real signature or a reproduced signature.
Once the cover letter was developed, the cover letter and questionnaires were ready for printing. When printing, the researcher should choose the paper with appropriate colors if possible. According to Bailey (1987), the colors of yellow and blue have the best response rates. If questionnaires need to be identified for follow-up and other purposes, it could be done "by assigning each questionnaire an identification number before it is mailed and recording this number by the respective respondent's name" (Bailey, 1987, p. 168).

For all mail questionnaire surveys, a stamped, preaddressed envelope to go with the questionnaire has been necessary. Bailey (1987) stated, "response rates would be damaged if the respondent were required to supply his or her own envelope is apparently universal" (p. 160). Questionnaires should not be sent too close to a major holiday, because "at such times the respondent will have more important things to do than answer the questionnaire" (Bailey, 1987, p. 161). According to Bailey (1987), for a better response, questionnaires are better when "received by the respondent late in the week" (p. 162).

Follow-up has been the last procedure for a mail questionnaire survey. It could greatly increase the response rate (Bailey, 1987; Balian, 1982; Borg & Gall, 1989; Wiersma, 1991). According to Bailey (1987), telephone calls have been the effective way for follow-up. Usually, the number of follow-up depended on the response rate, but however, according to Wiersma (1991), "unless response is low or an unusually high response rate is required, repeated follow-ups are not common" (p. 183).

Generally, for a high response rate, an attractive, short, and clear questionnaire, an appropriate sponsored, well written cover letter, and a stamped and preaddressed envelope has been necessary. Appropriate mailing time and follow-up procedure also have a function for increasing response rate. According to Wiersma (1991), there has
been an additional procedure that could improve response rate, he stated, "Contacting the respondent prior to mailing the questionnaire is another suggestion for enhancing response" (p. 182). Therefore, before collecting the data, a letter was sent to the top management of all the members of population to request participation in this study, this would be an useful procedure for increasing response rate.

**Data analysis.** Every study has its own characteristics as well as the analysis technique. Therefore, to select a data analysis technique has been a very important procedure for a study. Statistical analysis has been used for analyzing data for studies, because "statistical analysis provides an objective tool for researchers to use in measuring their findings and comparing them to their previous expectations" (Balian, 1982, p. 121).

When choosing a statistical technique, a researcher should choose an appropriate one. Usually, a decision has been made based on the variables, hypotheses, and levels of data measurement of a study.

Since the purpose of data analysis in this study was to analyze the relationships between the dependent variable and the set of independent variables, correlational analyses were the appropriate technique to analyze the data in this study. In addition to simple correlation, multiple regression analysis was used for predicting the value of the dependent variable from the value of a set of independent variables (Glebocki & Lancaster 1984; Hamburg, 1983).

The stepwise method has some advantages such as the equation only includes the significant correlated variables, it clearly shows the steps to build the equation, and identifies the differences of relationships between the dependent variable and a set of independent variables in each step (Mason & Lind, 1990). Therefore, it is an
appropriate choice to employ the stepwise method to build the multiple regression equations.

According to Campion (1991), the information for a turnover study should collect from the employees and the management for accuracy and completeness, because "employees and supervisors may have different perspectives" (p. 209). To accommodate this, two multiple regression analyses were conducted, one based on the data from management and the other one based on the data from technical operators regarding their perceptions of the factors of working conditions.
CHAPTER III
METHODOLOGY

Type of Research and Variables

The purpose of this study was to determine how technical operator turnover rate related to selected working condition factors in Taiwan's printing industry. As defined in this study, these factors included wages, employee benefits, alternative work schedules, training programs, and gainsharings. Therefore, the type of research was correlational research. The dependent variable was technical operator turnover rate. The independent variables were wages, employee benefits, alternative work schedules, training programs, and gainsharings.

Research Instrument

A questionnaire survey technique was employed in this study. The three sets of questionnaires (see Appendix C) which were used to collect data were developed by the author based on an appropriate process (discussed in Chapter II). The questionnaire to personnel directors was designed to obtain the actual number of (a) technical operators for each quarter, (b) technical operators who left on their own, and (c) the weeks technical operators chose the alternative work schedules for each company in 1991. The questionnaire to financial directors was designed to obtain the (a) monthly wages, (b) employee benefit costs, (c) training costs, and (d) gainsharing payments for technical operators in each company in 1991. The questionnaire to technical operators was designed to obtain their perceptions of each company's practice in (a) wages, (b) employee benefits, (c) alternative work schedules, (d) training programs, and (e) gainsharings. A Likert scale with five alternative choices was used for this measurement.
After the questionnaires were developed, they were pilot tested to improve the validity in order to gain proper responses. Ten medium size lithographic printing companies were randomly selected from Official Iowa Manufacturers Directory (Business Publications Co., 1991) for the test in English, and ten medium size lithographic printing companies were randomly selected from Register of Taiwan Printing Industry Association (Taiwan Printing Industry Association, 1989) for the test in Chinese.

A letter of request (see Appendix A) and questionnaires were sent to top management of each company to request their assistance for completing this pilot test. The top management of each company was asked to (a) distribute questionnaires to the personnel director, financial director, and a technical operator in its company; (b) collect those questionnaires when done; and (c) return them in the provided envelope. Six companies in Iowa and eight companies in Taiwan returned their questionnaires. One Iowa company did not make any response on the questionnaires because there was only one full time technical operator working in that company.

According to the feedback from the respondents, the questionnaires were easily understood. However, some comments and suggestions were made, such as a need to clarify the degree to which the work schedules were adjusted; and that "not sure" is more appropriate than "undecided" in Chinese as a response option. Based on the feedback, this author found there were some companies that did not have programs such as alternative work schedules, training programs, or gainsharings. Therefore, there was a need to add one item in the instruction section that asked respondents to mark an "X" before that particular question/statement if their companies did not have those programs. This would help respondents to complete the questionnaires more easily and increase the accuracy of the responses. After the questionnaires were revised
and translated to Chinese, the personnel directors' questionnaire was printed on light blue paper, the financial directors' questionnaire was printed on white paper, and the technical operators' questionnaire was printed on yellow paper.

**Population and Sample**

The population of this study consisted of medium size (between 20 and 60 employees) lithographic printing companies which were members of the Taiwan Printing Industry Association between January 1991 and June 1992. According to the file of Taiwan Printing Industry Association, there were 81 companies within this category.

A letter and a blank form (see Appendix B) were mailed to the top management of all the members of population on May 25, 1992 to request participation in this study. They were asked to give (a) the names of the personnel director, (b) the names of the financial director, and (c) the names of all of the technical operators who had worked for that company between January 1, 1991 and December 31, 1991. There were 75 companies that responded and agreed to participate in this study. The actual sample for this study consisted of all the companies that returned the questionnaires.

**Data Collection**

Before sending out the questionnaires, each company was assigned a number (e.g., 1, 2, 3,) and each director was assigned a number (e.g., personnel director: 1-1, financial director: 1-2). One technical operator was randomly selected from each company in each of the following four categories: (a) scanner operators, (b) camera operators, (c) strippers, and (d) offset-press operators. Each of them was also assigned a number (e.g., 1-3, 1-4, 1-5, 1-6).

A master record was formed, consisting of the names and numbers of these companies, their directors and technical operators. Then the questionnaires were
marked by the numbers based on the master record. This procedure was for matching and follow-up purposes.

The questionnaires with the cover letter were then mailed to the personnel directors, financial directors, and the randomly selected technical operators of each participating company on June 8, 1992. Ten days after the questionnaires were sent out, a follow-up procedure was carried out by telephone calls to those who had not responded. It was discovered that some did not receive the first mailing of questionnaire. Identical questionnaires with the same cover letter were mailed to those who did not receive one. By June 30, 1992, there were 68 companies that responded completely.

After returned questionnaires were organized based on the master record sheet, the following items were calculated for each company: turnover rate, mean wages, mean benefit costs, mean training costs, mean gainsharing payments to technical operators, the mean number of weeks that technical operators chose the alternative work schedules, and the mean scores of technical operators' perceptions of each independent variable.

The results of calculation were recorded on a data collection sheet (see Appendix D). The information included each company's number, turnover rate, mean wages, mean benefit costs, mean training costs, mean gainsharing payments for technical operators, the mean number of weeks that technical operators chose the alternative work schedules, and the mean scores of technical operators' perceptions of wages, benefits, alternative work schedules, training programs, and gainsharings.

Data Analysis

Based on the characteristics of these data, the turnover rate, mean wages, mean benefit costs, mean training costs, mean gainsharing payments for technical operators,
the mean number of weeks that technical operators chose the alternative work schedules, and the mean scores of technical operators' perceptions of each independent variable of each company were considered to be interval data. According to Balian (1982), the interval and ratio data both belonged to continuous data. Balian (1982) and Balsley and Clover (1988) also further suggested that it was appropriate to select multiple regression analysis for testing the relationships among groups of continuous data. For answering the research question, the multiple regression analysis was employed to analyze the relationships between the dependent variable and the set of independent variables.

The Statistical Package for Social Sciences (SPSS), a statistical computer program was used to perform the computations. This program developed the stem and leaf displays for each variable based on the data collection sheet to show the distribution of each variable. Then the correlation matrix was developed based on the data collection sheet to show the simple correlation coefficients among all the variables, which included the dependent variable and five independent variables as defined in this study. At the same time, for testing the significance of each correlation coefficient, a t test at the 0.05 significant level was conducted by the computer program.

The stepwise method was employed to build the equation for more efficient development of the multiple regression equation (Mason & Lind, 1990), and to reduce the standard errors of all estimates (Norusis, 1982). In this method, a series of equations were developed. The first equation selected the independent variable which had the highest correlation with the dependent variable. The second equation selected the two independent variables whose composite had the highest correlation with the dependent variable. This selection process was continued until the multiple R could not further be improved with additional variables.
Using the stepwise method, two multiple regression equations were conducted in this study. Both equations used the same dependent variable, namely technical operator turnover rate. For the first equation, the independent variables included the mean wages, mean benefit costs, mean training costs, mean gainsharing payments for technical operators and the mean number of weeks that technical operators chose the alternative work schedules. For the second equation, the independent variables included the mean scores of technical operators' perceptions of wages, benefits, alternative work schedules, training programs, and gainsharings.
CHAPTER IV
FINDINGS

This study investigated the relationships between the technical operator turnover rate and selected working condition factors in Taiwan's printing industry. As defined in this study, these factors included wages, employee benefits, alternative work schedules, training programs, and gainsharings. The correlation analyses consisted of determining the multiple correlation of technical operator turnover rate and a set of working condition factors as mentioned above. The abbreviations for each variable are shown in Table 1.

Table 1
Abbreviations for Variables

<table>
<thead>
<tr>
<th>Abbr.</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Company number</td>
</tr>
<tr>
<td>T</td>
<td>Turnover rate</td>
</tr>
<tr>
<td>MW</td>
<td>Mean wages (monthly)</td>
</tr>
<tr>
<td>MB</td>
<td>Mean benefit costs (annually)</td>
</tr>
<tr>
<td>MT</td>
<td>Mean training costs (annually)</td>
</tr>
<tr>
<td>MG</td>
<td>Mean gainsharing payments (annually)</td>
</tr>
<tr>
<td>MWK</td>
<td>Mean weeks that technical operators chose the alternative work schedules (annually)</td>
</tr>
<tr>
<td>PW</td>
<td>Mean scores of technical operators' perceptions of each company's practice in wages</td>
</tr>
<tr>
<td>PB</td>
<td>Mean scores of technical operators' perceptions of each company's practice in employee benefits</td>
</tr>
<tr>
<td>PA</td>
<td>Mean scores of technical operators' perceptions of each company's practice in alternative work schedules</td>
</tr>
<tr>
<td>PT</td>
<td>Mean scores of technical operators' perceptions of each company's practice in training programs</td>
</tr>
<tr>
<td>PG</td>
<td>Mean scores of technical operators' perceptions of each company's practice in gainsharings</td>
</tr>
</tbody>
</table>
The Stem and Leaf Displays

The Statistical Package for Social Sciences (SPSS) statistical computer program developed the stem and leaf displays for each variable (see Appendix E) to show the distribution of each variable. Based on the stem and leaf displays for each variable, all of the variables demonstrated a reasonably normal distribution. The mean wages, mean benefit costs, and mean gainsharing payments were positively skewed because most company’s mean wages, mean benefit costs, and mean gainsharing payments were under NT$30,000 (new Taiwan dollars) and relatively few companies' mean wages, mean benefit costs, and mean gainsharing payments were spanning a wide range of values above NT$30,000. The mean scores of technical operators' perceptions of each company's practice in training programs and gainsharing were negatively skewed

Table 2

The Number of Cases, Mean, and Standard Deviation for Each Variable

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. of Cases</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>68</td>
<td>22%</td>
<td>13%</td>
</tr>
<tr>
<td>MW (monthly)</td>
<td>68</td>
<td>NT$26,474</td>
<td>NT$3,342</td>
</tr>
<tr>
<td>MB (annually)</td>
<td>68</td>
<td>NT$29,687</td>
<td>NT$7,316</td>
</tr>
<tr>
<td>MT (annually)</td>
<td>62</td>
<td>NT$3,426</td>
<td>NT$955</td>
</tr>
<tr>
<td>MG (annually)</td>
<td>60</td>
<td>NT$20,948</td>
<td>NT$6,610</td>
</tr>
<tr>
<td>MWK (annually)</td>
<td>41</td>
<td>5.8 Weeks</td>
<td>2.7 Weeks</td>
</tr>
<tr>
<td>PW</td>
<td>68</td>
<td>2.78</td>
<td>0.70</td>
</tr>
<tr>
<td>PB</td>
<td>68</td>
<td>3.26</td>
<td>0.81</td>
</tr>
<tr>
<td>PA</td>
<td>41</td>
<td>3.30</td>
<td>0.66</td>
</tr>
<tr>
<td>PT</td>
<td>62</td>
<td>3.54</td>
<td>0.86</td>
</tr>
<tr>
<td>PG</td>
<td>60</td>
<td>3.63</td>
<td>0.86</td>
</tr>
</tbody>
</table>

Note. US$1 = NT$24.65 on July 1, 1992.
because the mode for these two variables were 4 on a 5-point scale. The number of valid cases, mean, and standard deviation for each variable are shown in Table 2. In Table 2, for mean training costs, there were 62 valid cases and six missing cases because there were six companies that did not have training programs. For mean gainsharing payments, there were 60 valid cases and eight missing cases because there were eight companies that did not have gainsharings. For mean weeks that technical operators chose the alternative work schedules, there were 41 valid cases and 27 missing cases because there were 27 companies that did not have alternative work schedules. For mean scores of technical operators' perceptions of each company's practice in alternative work schedules, there were 41 valid cases and 27 missing cases because there were 27 companies that did not have alternative work schedules. For mean scores of technical operators' perceptions of each company's practice in training programs, there were 62 valid cases and six missing cases because there were six companies that did not have training programs. For mean scores of technical operators' perceptions of each company's practice in gainsharings, there were 60 valid cases and eight missing cases because there were eight companies that did not have gainsharings.

The Correlation Matrix

As a first step in analyzing the relationships between the technical operator turnover rate and selected working condition factors (including wages, employee benefits, alternative word schedules, training programs, and gainsharings) in Taiwan's printing industry, the SPSS statistical computer program developed the correlation matrix. This correlation matrix showed the simple correlation coefficients among all the variables. The output from SPSS is shown in Table 3.
Table 3

The Correlation Matrix of Technical Operator Turnover Rate and Selected Working Condition Factors

<table>
<thead>
<tr>
<th></th>
<th>T</th>
<th>MW</th>
<th>HB</th>
<th>HT</th>
<th>MG</th>
<th>HNW</th>
<th>PW</th>
<th>PB</th>
<th>PA</th>
<th>FT</th>
<th>PG</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>1.0000</td>
<td>0.7568</td>
<td>-0.6563</td>
<td>-0.6833</td>
<td>-0.5838</td>
<td>-0.4900</td>
<td>-0.6942</td>
<td>-0.7850</td>
<td>-0.6831</td>
<td>-0.7981</td>
<td>-0.8799</td>
</tr>
<tr>
<td>MW</td>
<td>-0.7568</td>
<td>1.0000</td>
<td>0.7043</td>
<td>0.6599</td>
<td>-0.7000</td>
<td>0.5874</td>
<td>0.6444</td>
<td>0.7092</td>
<td>0.6772</td>
<td>0.7038</td>
<td>0.7664</td>
</tr>
<tr>
<td>HB</td>
<td>-0.6563</td>
<td>0.7043</td>
<td>1.0000</td>
<td>0.7775</td>
<td>0.7811</td>
<td>0.5910</td>
<td>0.4998</td>
<td>0.7167</td>
<td>0.7116</td>
<td>0.6161</td>
<td>0.6853</td>
</tr>
<tr>
<td>HT</td>
<td>-0.6833</td>
<td>0.6599</td>
<td>0.7775</td>
<td>1.0000</td>
<td>0.7297</td>
<td>0.5532</td>
<td>0.5032</td>
<td>0.6458</td>
<td>0.6034</td>
<td>0.7521</td>
<td>0.6433</td>
</tr>
<tr>
<td>MG</td>
<td>-0.5838</td>
<td>-0.7000</td>
<td>0.7811</td>
<td>0.7747</td>
<td>1.0000</td>
<td>0.6042</td>
<td>0.5395</td>
<td>0.6337</td>
<td>0.6348</td>
<td>0.7047</td>
<td>0.7198</td>
</tr>
<tr>
<td>HNW</td>
<td>-0.4900</td>
<td>0.5674</td>
<td>0.5810</td>
<td>0.5532</td>
<td>0.6062</td>
<td>1.0000</td>
<td>0.2584</td>
<td>0.3096</td>
<td>0.6785</td>
<td>0.4716</td>
<td>0.3956</td>
</tr>
<tr>
<td>PW</td>
<td>-0.6942</td>
<td>0.4444</td>
<td>0.4999</td>
<td>0.5162</td>
<td>0.5475</td>
<td>0.7584</td>
<td>1.0000</td>
<td>0.6479</td>
<td>0.3559</td>
<td>0.4139</td>
<td>0.6373</td>
</tr>
<tr>
<td>PB</td>
<td>-0.7050</td>
<td>0.7092</td>
<td>0.7167</td>
<td>0.6658</td>
<td>0.6337</td>
<td>0.3096</td>
<td>0.6799</td>
<td>1.0000</td>
<td>0.5427</td>
<td>0.7045</td>
<td>0.7118</td>
</tr>
<tr>
<td>PA</td>
<td>-0.6031</td>
<td>0.4772</td>
<td>0.7116</td>
<td>0.6034</td>
<td>0.6348</td>
<td>0.6785</td>
<td>0.3559</td>
<td>0.5427</td>
<td>1.0000</td>
<td>0.6719</td>
<td>0.6163</td>
</tr>
<tr>
<td>FT</td>
<td>-0.7981</td>
<td>0.7038</td>
<td>0.6161</td>
<td>0.7521</td>
<td>0.7047</td>
<td>0.4714</td>
<td>0.6139</td>
<td>0.7045</td>
<td>0.6219</td>
<td>1.0000</td>
<td>0.7718</td>
</tr>
<tr>
<td>PG</td>
<td>-0.8799</td>
<td>0.7664</td>
<td>0.6685</td>
<td>0.6433</td>
<td>0.7198</td>
<td>0.3956</td>
<td>0.6733</td>
<td>0.7118</td>
<td>0.6163</td>
<td>0.7718</td>
<td>1.0000</td>
</tr>
</tbody>
</table>
Since turnover rate was the dependent variable, this author was particularly interested in which independent variable has the strongest correlation with turnover rate. As indicated in the output, the mean scores of technical operators' perceptions of each company's practice in gainsharings (PG) had the strongest correlation (-0.88) with turnover rate. The negative sign indicated that as the mean scores of perceptions of gainsharings increased, the turnover rate decreased. The remaining independent variables also had considerably strong correlation with turnover rate, they were (a) mean scores of technical operators' perceptions of each company's practice in training programs (PT, -0.80), (b) mean scores of technical operators' perceptions of each company's practice in employee benefits (PB, -0.79), (c) mean wages (MW, -0.76), (d) mean scores of technical operators' perceptions of each company's practice in wages (PW, -0.69), (e) mean training costs (MT, -0.68), (f) mean scores of technical operators' perceptions of each company's practice in alternative work schedules (PA, -0.68), (g) mean gainsharing payments (MG, -0.66), (h) mean benefit costs (MB, -0.66), and (i) mean weeks that technical operators chose the alternative work schedules (MWK) had the least association with turnover rate (-0.49).

Based on the correlation matrix, the independent variables were themselves correlated. The examples were (a) the correlation between the mean wages and mean benefit costs was 0.70, (b) the correlation between the mean wages and mean gainsharing payments was 0.70, (c) the correlation between the mean benefit costs and mean training costs was 0.78, (d) the correlation between the mean benefit costs and mean gainsharing payments was 0.78, (e) the correlation between the mean training costs and mean gainsharing payments was 0.72. This meant that there were strong correlations among the mean wages, mean benefit costs, mean training costs, and mean
gainsharing payments. Thus, a company with higher wages also offered better benefits, training programs and gainsharings.

There were also strong correlations among the mean scores of technical operators' perceptions of each company's practice for each independent variable. The examples were (a) the correlation between the "perceptions of benefits" and "perceptions of training programs" was 0.70, (b) the correlation between the "perceptions of benefits" and the "perceptions of gainsharings" was 0.71, (c) the correlation between "perceptions of training programs" and "perceptions of gainsharings" was 0.77, and (d) the correlation between "perceptions of wages" and "perceptions of benefits" was 0.70. Thus, a company with a higher score for technical operators' perceptions of wages, also scored higher in perceptions of benefits, training programs, and gainsharings.

Finally, there were strong correlations between the actual amount of each selected working condition factor defined in this study and the technical operators' perceptions of those factors. They were (a) the correlation between mean wages and perceptions of wages was 0.64, (b) the correlation between mean benefit costs and "perceptions of benefits" was 0.72, (c) the correlation between mean training costs and "perceptions of training programs" was 0.75, (d) the correlation between mean gainsharing payments and "perceptions of gainsharings" was 0.72, and (e) the correlation between mean weeks that technical operators chose the alternative work schedules and the "perceptions of alternative work schedules" was 0.68. Such results indicated that technical operators have better scores on perceptions with better offers.

**The Multiple Regression Equations**

Using the stepwise method, two multiple regression equations were conducted in this study. Both equations used the same dependent variable, namely technical
operator turnover rate. For the first analysis, based on the management data, the independent variables included the mean wages, mean benefit costs, mean training costs, mean gainsharing payments for technical operators and the mean number of weeks that technical operators chose the alternative work schedules. The equations based on the data from management are shown in Table 4 and 5.

Table 4

The Statistical Summary of the Multiple Regression Analysis Between Turnover Rate and Working Conditions (MW, MT, MB, MG, and MWK)

<table>
<thead>
<tr>
<th>Dependent Variable: turnover rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent Variable Entered on Stepwise Selection: mean wages and mean training costs</td>
</tr>
</tbody>
</table>

Multiple R .79

Analysis of Variance

<table>
<thead>
<tr>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>2</td>
<td>1431.07</td>
</tr>
<tr>
<td>Residual</td>
<td>37</td>
<td>876.75</td>
</tr>
</tbody>
</table>

N = 40

F = 30.20

p < .00005

Variables in the Equation

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>Beta</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>MW</td>
<td>-.0011</td>
<td>-.45</td>
<td>-3.36</td>
<td>.00</td>
</tr>
<tr>
<td>MT</td>
<td>-.0034</td>
<td>-.42</td>
<td>-3.16</td>
<td>.00</td>
</tr>
<tr>
<td>(Constant)</td>
<td>58.89</td>
<td></td>
<td>7.92</td>
<td>.00</td>
</tr>
</tbody>
</table>
The stepwise method with the criteria of (a) the default value for "probability of 
F-to-enter" was 0.05, (b) the default value for "probability of F-to-remove" was 0.10, 
and (c) the default value for "the proportion of a variable's variance not accounted for 
by other independent variables in the equation" (SPSS Inc., 1988, pp. 854-855) was 
0.0001 (pIN = .05, pOUT = .10, and tolerance = .0001) were employed to select the 
important working condition variables and to determine the optimum number of 
working condition variables for the multiple regression equation. The Beta values have 
the function for indicating the importance of variables. Norusis (1982) stated, "One 
way to make regression coefficients somewhat more comparable is to calculate BETA 
weights, which are the multipliers of the independent variables when the variables are 
expressed in standardized (Z score) form" (p. 113). The working condition variable 
which had the highest Beta coefficient, mean wages, was selected and tested first. 
Because mean wages met the entry requirement (pIN < .05), it was entered into the 
equation (R = .72). The working condition variable which had the next highest Beta 
coefficient, mean training costs, was selected and tested next. The results indicated 
that mean training costs were also entered into the equation (R = .79). Because the 
significant correlations were between working condition variables, using more working 
condition variables did not result in a significant difference in prediction (.07). 
However, because mean benefit costs, mean gainsharing payments, and mean weeks 
that technical operators chose the alternative work schedules did not meet the entry 
requirement, forward selection stopped. Therefore, mean wages and mean training 
costs were considered for predicting the turnover rate from working condition factors. 
The final multiple regression between turnover rate and working condition factors was: 
Turnover rate (%) = 58.89 - .0011 X mean wages (NT$) - .0034 X mean training 
costs (NT$).
Because the independent variable, mean weeks that technical operators chose the alternative work schedules (MWK), had 27 missing cases, the SPSS deleted those 27 cases when computed. Since the "MWK" had the smallest Beta coefficient, this author took "MWK" out from the stepwise selection for including more cases and the output is shown in Table 5.

Table 5

The Statistical Summary of the Multiple Regression Analysis Between Turnover Rate and Working Conditions (MW, MT, MB, and MG)

Dependent Variable: turnover rate
Independent Variables Entered on Stepwise Selection: mean wages and mean benefit costs

<table>
<thead>
<tr>
<th>Multiple R</th>
<th>.81</th>
</tr>
</thead>
</table>

Analysis of Variance

<table>
<thead>
<tr>
<th>df</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>2</td>
<td>4466.50</td>
</tr>
<tr>
<td>Residual</td>
<td>57</td>
<td>2401.10</td>
</tr>
</tbody>
</table>

N = 60 F = 53.02 p < .00005

Variables in the Equation

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>Beta</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>MW</td>
<td>-.0019</td>
<td>-.57</td>
<td>-5.31</td>
<td>.00</td>
</tr>
<tr>
<td>MB</td>
<td>-4.50E-04</td>
<td>-.30</td>
<td>-2.82</td>
<td>.01</td>
</tr>
<tr>
<td>(Constant)</td>
<td>83.25</td>
<td>11.79</td>
<td></td>
<td>.00</td>
</tr>
</tbody>
</table>
In Table 5, the stepwise selection was with a higher number of cases (60), but with fewer independent variables (without MWK). The results indicated that mean wages still was the most significant independent variable, and that the mean benefit costs also entered into the equation, but the mean training costs did not meet the entry requirement. Because the correlation between mean training costs and mean benefit costs was .78, which was considerably high, it was understandable that those two factors were interchangeable. For supporting this assumption, this author developed four equations based on the combination of the independent variables of (a) MW and MB (R = .78), (b) MW and MT (R = .79), (c) MW and MG (R = .79), and (d) MW and MWK (R = .73). These results indicated that MB, MT, MG, and MWK were interchangeable.

For the second analysis, based on the operator's data, the independent variables included the mean scores of technical operators' perceptions of wages, benefits, alternative work schedules, training programs, and gainsharings. The equation based on the data from technical operators are shown in Table 6 and 7.

The stepwise method with the criteria (pIN = .05, pOUT = .10, and tolerance = .0001) were employed to select the important working condition variables and to determine the optimum number of working condition variables for the multiple regression equation. The working condition variable which had the highest Beta coefficient, "perceptions of gainsharings," was selected and tested first. Because "perceptions of gainsharings" met the entry requirement (pIN < .05), it was entered into the equation (R = .80). The working condition variable which had the next highest Beta coefficient, "perceptions of training programs," was selected and tested next. The results showed that "perceptions of training programs" was also entered into the equation (R = .84). Because there were significant correlations between working
Table 6

The Statistical Summary of the Multiple Regression Analysis Between Turnover Rate and Working Conditions (PW, PB, PA, PT, and PG)

Dependent Variable: turnover rate
Independent Variable Entered on Stepwise Selection: perceptions of gainsharings and perceptions of training programs

Multiple R .84

Analysis of Variance

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N = 40  F = 45.54  p < .00005

Variables in the Equation

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<td>PT</td>
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<tr>
<td>(Constant)</td>
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condition variables, using more working condition variables did not result in a significant difference in prediction (.04). However, because "perceptions of wages," "perceptions of benefits," and "perceptions of alternative work schedules" did not meet the entry requirement, forward selection stopped. Therefore, "perceptions of gainsharings" and "perceptions of training programs" were considered for predicting
the turnover rate from working condition factors. The final multiple regression between turnover rate and working condition factors was: \( \text{Turnover rate (\%)} = 57.85 - 6.91 \times \text{the mean score of perceptions of gainsharing} - 3.94 \times \text{the mean score of perceptions of training programs}. \)

Table 7

<table>
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<th>The Statistical Summary of the Multiple Regression Analysis Between Turnover Rate and Working Conditions (PW, PB, PT, and PG)</th>
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<td>Dependent Variable: turnover rate</td>
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<td>Independent Variables Entered on Stepwise Selection: perceptions of gainsharing and perceptions of benefits</td>
</tr>
<tr>
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<td>Analysis of Variance</td>
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<td>df</td>
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<td>( N = 60 )</td>
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<td>Variables in the Equation</td>
</tr>
<tr>
<td>Variable</td>
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<tr>
<td>PG</td>
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<td>PB</td>
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<td>(Constant)</td>
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</table>
Because the independent variable, perceptions of alternative work schedules (PA), had 27 missing cases, the SPSS deleted the 27 cases when computed. Since the mean scores of technical operators' perceptions of each company's practice in alternative work schedules had the smaller Beta coefficient, this author took "PA" out from the stepwise selection for including more cases and the output is shown in Table 7.

In Table 7, the stepwise selection was with a higher number of cases (60), but with fewer independent variables (without PA). The results indicated that "perceptions of gainsharings" still was the most significant independent variable, the "perceptions of benefits" also entered into the equation, but the "perceptions of training programs" did not meet the entry requirement. Because the correlation between "perceptions of benefits" and "perceptions of training programs" was .70, which was considerably high, it was understandable that these two factors were interchangeable. For supporting this assumption, this author developed four equations based on the combination of the independent variables of (a) PG and PT (R = .89), (b) PG and PB (R = .90), (c) PG and PW (R = .89), and (d) PG and PA (R = .83). These results indicated that PT, PB, PW, and PA were interchangeable.
CHAPTER V
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to determine how technical operator turnover rate related to selected working condition factors in Taiwan's printing industry. As defined in this study, these factors included wages, employee benefits, alternative work schedules, training programs, and gainsharings. If the results of this study showed that technical operator turnover rate was related to these selected factors, then the findings of this study would be helpful to a manager making decisions on turnover management.

The need for this study was based on the following factors:

1. Employee turnover has had a strong negative impact on a company, therefore, it should be carefully analyzed and managed.

2. The turnover rate of technical operators in the printing industry was four times higher than that of the national average of manufacturing labor in Taiwan.

3. Interviews with experts provided information that labor turnover, especially for the technical operators, has been a serious problem in the printing industry in Taiwan, which, in their opinion, needs to be investigated.

4. To date, no research was conducted to determine the relationships between technical operator turnover rate and selected working condition factors in Taiwan's printing industry.

For this study, the following question was formulated: What are the relationships between the technical operator turnover rate and selected working condition factors, namely wages, employee benefits, alternative work schedules, training programs, and gainsharings? To answer the question in this study, three sets of questionnaires were used (see Appendix C): (a) one designed for personnel
directors, (b) one targeted at financial directors, and (c) one aimed at technical operators. The data from these questionnaires were analyzed by using the multiple regression analysis at the 0.05 level of significance.

The review of the literature focused on two areas: (a) the discussion of employee turnover and (b) the research methodology used in this study. Models and processes of employee turnover were reviewed and it was concluded that a low degree of job satisfaction stimulated an employee's desire to leave an organization and the availability of other options became the factor that influenced an employee's decision to actually leave an organization. Many studies showed that unemployment rate, age, job satisfaction, organizational commitment, performance, leadership style, and wages were consistently and negatively associated with turnover. In addition, the type of organization was also related to turnover. Some research on the source of referral suggested that informal sources of referral showed lower turnover. However, there was insufficient research to support a strong generalization. Family size, interests, level of skill, organizational size, and promotion opportunities have been shown to relate to turnover, but the amount, quality, and results of such research were insufficient to verify these relationships. Finally, there was no relationship among turnover, sex, and education.

Working conditions could affect turnover because the factors of working conditions could directly influence an employee's satisfaction. Selected working condition factors that could be improved by managers such as wages, employee benefits, alternative work schedules, training programs, and gainsharing were examined in this study because the literature shows a lack of examination on these factors.
In the second part of the literature review, the research design was discussed. The dependent variable was technical operator turnover rate. The independent variables were wages, employee benefits, alternative work schedules, training programs, and gainsharings. The population of this study consisted of medium size (between 20 and 60 employees) lithographic printing companies which were members of the Taiwan Printing Industry Association between January 1991 and June 1992. The data were collected by three sets of questionnaires which were developed by the author and validated by graphic arts professionals both in the United States and Taiwan. Statistical analysis was accomplished using the multiple regression analysis to determine how technical operator turnover rate related to selected working condition factors as defined in this study (wages, employee benefits, alternative work schedules, training programs, and gainsharings) in Taiwan's printing industry.

The following findings were based on results of statistical analyses of the data:

1. Based on the stem and leaf displays for each variable, all of the variables demonstrated a reasonably normal distribution.

2. As indicated in the correlation matrix, all of the independent variables had considerably strong correlations with turnover rate.

3. Based on the correlation matrix, the independent variables were themselves correlated. In other words, a company with higher wages, was likely to offer better benefits, training programs, and gainsharings. A company with a higher score on technical operators' perceptions of wages, was likely to score higher in perceptions of benefits, training programs, and gainsharings.

4. Because the correlations among those independent variables (MW, MT, MB, MG, and MWK) were considerably high, it was considered that those factors were interchangeable in predicting turnover rate.
5. Because the correlations among those independent variables (PW, PB, PA, PT, and PG) were considerably high, it was considered that those factors were interchangeable in predicting turnover rate.

6. There were considerably strong correlations between the actual amount of selected working condition factors defined in this study and the technical operators' perceptions of those factors. This indicated that employees were likely to have a high employee perception of working conditions for companies that had better working conditions.

Conclusions

The following conclusions were based on the findings of this study in which the relationships between technical operator turnover rate and selected working condition factors were investigated:

1. There were significant correlations between technical operator turnover rate and working condition factors (including wages, employee benefits, alternative work schedules, training programs, and gainsharings).

2. High coefficients between any two working condition variables indicated the existence of intercorrelations. The results of the strong correlation among the working condition variables contributed to the result of linear combination. This interdependency among working condition variables caused the stepwise method to select only some of the working condition variables in building a multiple regression equation. Consequently, the prediction of turnover rate from working condition variables only needed two specific working condition variables. Using more than two working condition variables did not result in an evident improvement in prediction.

3. Technical operator turnover rate can be predicted from working condition variables based on the information either from management or operators.
4. In general, the companies with higher wages tended to have better benefits, training programs, gainsharings, and alternative work schedules. At the same time, the technical operators' perceptions of these companies' practice in wages, employee benefits, alternative work schedules, training programs, and gainsharings were also higher. The turnover rates for these companies were lower.

Recommendations

The results of this study showed that there were significant correlations between technical operator turnover rate and selected working condition factors (including wages, employee benefits, alternative work schedules, training programs, and gainsharings) in Taiwan's printing industry. The recommendations for employee turnover management and further study were made based on the methodology, findings, and conclusions of this study.

Recommendations for Employee Turnover Management

The recommendations for employee turnover management were made based on the findings and conclusions of this study:

1. Management interested in employee turnover management should be aware of the importance of working conditions.

2. Management should note the strong correlations between the actual amount of each selected working condition factor defined in this study and the technical operators' perceptions of each factor.

3. Management needs to re-evaluate the employees' working conditions when employee turnover rate begins to increase.

Recommendations for Further Study

The recommendations for further study were made based on the methodology of this study:
1. Extending the selected working condition factors and include the external economic climate, internal size of operation, line of business, personal factors, and psychological motivation factors.

2. Enlarging the population needed for further study which may include small, medium, and large size lithographic printing companies and the non-member lithographic printing companies, adding the company size and membership as independent variables.

3. Stretching the time frame of future study to 3 years for the purpose of verifying the long-term effects of working conditions on employee turnover rate.

4. Repeating this study in different countries and compare these results with the results of this study for the purpose of finding out the effects of different cultures and environments.

5. Conducting this same study at a later date and compare the results of these two studies to see what changes might have occurred through time.
REFERENCES


Todor, W. D., & Dalton, D. R. (1986). Workers stay longer when they have a chance to transfer. Sociology and Social Research, 70(4), 276.


APPENDIX A

THE COVER LETTER FOR PILOT TEST
March 31, 1992

Top management's name

Company

Company address

Re: Requesting a pilot test of questionnaires.

Dear top management's name:

I am writing to request your assistance to complete a pilot test of questionnaires which will be used in my doctoral dissertation at the University of Northern Iowa, tentatively titled "An investigation of the relationships between technical operator turnover rate and selected factors pertaining to working conditions in Taiwan's printing industry." Since the questionnaires are newly developed, a pilot test is necessary. The purpose of the pilot test is to determine if the questions are easily understood in order to gain a proper response.

Enclosed you will find three different questionnaires, one for the personnel director, one for the financial director, and the last one for the technical operators, including scanner operators, camera operators, strippers, and offset-press operators. Please distribute these questionnaires to the personnel director, financial director and one technical operator in your company, ask them respond to these questions, indicate if these instructions and questions are clear and comprehensible, and offer some comments and suggestions if possible. Please collect and return them in the provided envelope at your earliest convenience.

As I am pressed for time, I would appreciate your response within the next two weeks.

If questions arise, please call me at (319) 273-2509 for clarifications and explanations. Thank you for your assistance.

Sincerely,

Ling-Hsiao Lee
Graduate Student

Enclosures

This study is being conducted under the direction of Dr. John T. Fecik, Professor, Department of Industrial Technology, University of Northern Iowa.
負責人姓名大躍：

本人於美國北愛荷華大學進修所提博士論文，初步訂名為“台灣印刷工業技術操作員異動率與工作環境之相關性之研究”，此研究所使用之問卷，需進行使用前之測試，目的在確定問卷中之問題，是否容易理解及獲得適當之答案。敬請協助完成本項測試。

隨函附上三種不同問卷：一份致人事主管，一份致財務主管，另一份致技術工作人員。操作員包括捆包機操作員、照相操作員、排版員、和平版印刷機操作員。請將問卷交由貴公司有關之人員填寫，並請他們不吝惜地指出這些說明和問題是否清晰，是否容易理解，並請儘量提供意見和建議。

問卷填妥後，請收集，並儘可能在一週之內以所附之回件信封寄回。

敬謝協助。

敬祝

大安

李凌霄（Ling-Hsiao Lee）
敬上
民國81年3月31日

※此項研究由北愛荷華大學工業技術系教授Dr. John T. Fecik指導進行。
APPENDIX B

THE COVER LETTER AND BLANK FORM FOR TOP MANAGEMENT
The cover letter to top management:

TAIWAN PRINTING INDUSTRY ASSOCIATION

May 21, 1992

Dear top management's name:

Turnover is expensive and may negatively affect the attitude of those who remain and stimulate more turnover. Since the technical operator turnover rate in printing industry was relatively high, we have decided to conduct a study regarding technical operator turnover. The purpose of this study is to determine how turnover rate is related to working conditions (wages, employee benefits, alternative work schedules, training programs, and gainsharings). Since all these factors can be improved by managers, the finding of this study certainly can help you to make decisions when you plan to reduce turnover rate in your company.

Your participation will enhance the accuracy of this study. Please fill out the enclosed form with the name of your employees, including personnel director, financial director, scanner operators, camera operators, strippers, and press operators. Please return it in the envelope provided before May 30, 1992. This list is only for questionnaire survey purpose. Each questionnaire will be treated as a confidential document and will not be individually reported.

After the study is completed, you will receive a copy of the abstract of this study, which will be useful for you when you manage turnover. Thank you for your assistance.

Sincerely,

C. T. Tang
Chairman
Taiwan Printing Industry Association
會公業同業工刷印區播台

負責人姓名
先生大聲：

員工異動所費不貲，且可能對現職員工工作態度起負作用，或刺
激更高之員工異動率。故於印刷業之技術操作員異動率相當高，美國
北愛荷華大學李凌霄先生在本會協助下決定進行有關技術操作員異動
之研究。此項研究目的為確定異動率和工作環境之相關性，所謂
工作環境包括薪資、員工福利、彈性工時、訓練和績效績金等項。

這些項目，均需管理階層可改進之要素，故此項研究之成果，將有助
於貴公司降低員工異動率之決策。

姓名（包括人事主管、財務主管、電腦機操作員、照相操作員、拼版
工）的及時參與此研究，可增進研究之精確度。請將貴公司員工之
姓名

中華民國
年
月
日

（照大郵政）A六號一七及二陸安仁市北台；北
五之一三四九三，四七二九一九三：及
000561-8：照大郵政 四九二九一九三：長保雜誌

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APPENDIX C

THE COVER LETTER AND QUESTIONNAIRES
Dear respondent's name:

The purpose of this study is to determine how turnover rate related to working conditions (wages, employee benefits, alternative work schedules, training programs, and gainsharing). Your response is very important for this study. This questionnaire was designed to be completed in less than 20 minutes. Please complete and return it in the envelope provided before June 15, 1992.

Each questionnaire will be treated as a confidential document and will not be individually reported. Thank you for your assistance.

Sincerely,

C. F. Lu
Chairman
Taiwan Printing Industry Association
會公業同業工刷印區灣台

答卷者姓名先生：

所寄上的問卷，是以研究『員工異動』和『工作環境』之相關性為主要的

目的 所謂『工作環境』，包括工資、時間、福利、作業等，於工作之選擇性

改善之進修，以及『績效獎金』之有無。

此問卷可在二十分鐘內完成。西安後，請用問卷中所附之回郵信封，填

寫之際，先此言謝。

此問卷之內容，僅為研究之用，保證保守機密，絕對不準對外發表，協

助之請，先此言謝。

國八十八年九月十八日以前投郵為盼。

此問卷之內容，僅為研究之用，保證保守機密，絕對不準對外發表，協

助之請，先此言謝。

理事長呂進發

（大業印刷）A六號二七九二路慶安市北台：發

五百零六一九三。四七二九一九三：收

0000561-8：編劇政部 四九二九一九三：英語活電

會公業同業工刷印區灣台

答卷者姓名先生：

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目的 所謂『工作環境』，包括工資、時間、福利、作業等，於工作之選擇性

改善之進修，以及『績效獎金』之有無。

此問卷可在二十分鐘內完成。西安後，請用問卷中所附之回郵信封，填

寫之際，先此言謝。

此問卷之內容，僅為研究之用，保證保守機密，絕對不準對外發表，協

助之請，先此言謝。

理事長呂進發

（大業印刷）A六號二七九二路慶安市北台：發

五百零六一九三。四七二九一九三：收

0000561-8：編劇政部 四九二九一九三：英語活電
Questionnaire A: The questionnaire to personnel directors.

TECHNICAL OPERATOR TURNOVER SURVEY

This questionnaire contains three questions about your company. Specific instructions are given at the beginning. Please read them carefully. The questions are designed to obtain the actual number of (a) technical operators for each quarter, (b) technical operators who left on their own, and (c) the weeks technical operators chose the alternative work schedules in your company last year. Thank you for your cooperation.

Instructions for Responding

1. Technical operators are limited to Full-time scanner operators, camera operators, strippers, and offset-press operators, and do not include trainees.

2. Alternative work schedules are those work schedules adjusted (either a change of shift or hours) by employees.

3. Please respond to all of the following questions, if your company does not have alternative work schedules, please mark an "X" before the question #3.

4. Please respond as precisely as you can to the questions.

(1) How many full time technical operators were in the following time frames in 1991?
1st Quarter _____ 2nd Quarter _____ 3rd Quarter _____ 4th Quarter _____

(2) How many full time technical operators left on their own in 1991?

(3) How many weeks each technical operator chose the alternative work schedules in 1991?
Operator A: _____ Operator B: _____ Operator C: _____
Operator D: _____ Operator E: _____ Operator F: _____
Operator G: _____ Operator H: _____ Operator I: _____
Operator P: ___________ Operator Q: ___________ Operator R: ___________
Operator S: ___________ Operator T: ___________ Operator U: ___________
技術操作員異動調查之一

本問卷提出三項有關貴公司之問題。其目的在於獲得貴公司去年之：1. 每季技術操作員人數，2. 自願離職之技術操作員人數，及3. 技術操作員選擇彈性工時之週數。
上述2及3.兩項請詳閱下列說明。謝謝您的合作。

回答說明

1. 技術操作員乃限於全職之掃描機操作員、照相操作員、排版員、和平版印刷機操作員，但並不包括受訓人員。
2. 「彈性工時」指上班工作起訖時間由員工志願調整（包括班次或上下班時間的選擇）。
3. 請回答下列所有問題。如果貴公司未設彈性工時，請在第三題前面劃一個 "×"。
4. 請盡可能提供精確的答案。

(1) 民國八十年冬季之全職技術操作員人數：

第一季 人 第二季度 人 第三季 人 第四季 人

(2) 民國八十年間自願離職之全職技術操作員計 人。

(3) 民國八十年間各技術操作員選擇「彈性工時」之週週數（週數以整數及半數（1.0 或 0.5）為單位）:

操作員 A 週 操作員 B 週 操作員 C 週 操作員 D 週 操作員 E 週 操作員 F 週 操作員 G 週
操作員 H 週 操作員 I 週 操作員 J 週 操作員 K 週 操作員 L 週 操作員 M 週 操作員 N 週
操作員 O 週 操作員 P 週 操作員 Q 週 操作員 R 週 操作員 S 週 操作員 T 週 操作員 U 週

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Questionnaire B: The questionnaire to financial directors.

TECHNICAL OPERATOR TURNOVER SURVEY

This questionnaire contains four questions about your company. Specific instructions are given at the beginning. Please read them carefully. The questions are designed to obtain the monthly wages, employee benefit costs, training costs, and gainsharing payments for technical operators in your company last year. Thank you for your cooperation.

Instructions for Responding

1. Technical operators are limited to Full-time scanner operators, camera operators, strippers, and offset-press operators, and do not include trainees.

2. The wages do not include overtime pay.

3. Employee benefits are all benefits and non-wage payments, that are provided in part or in whole by employers to employees, including the employer's share of payments, insurance, payments for time not worked, cost of services to employees, and miscellaneous benefits.

4. Training is a learning process and a major approach to provide employees new knowledge and skill in order to manage changes/improvements. Training costs are the expenses for training.

5. Gainsharings are a reward system which encourages employees to improve productivity. All employees who contribute to the improvement of the company share the gains that reflect increases in productivity.

6. Please respond to all of the following questions, if your company does not has those programs such as training and gainsharings, please mark an "X" before that particular question.

7. Please respond as precisely as you can to the questions.

(1) What were the monthly wages for each full time technical operator in 1991?
Operator A: ____________Operator B: ____________Operator C: ____________
Operator D: ____________Operator E: ____________Operator F: ____________
Operator G: ___________ Operator H: ___________ Operator I: ___________
Operator P: ___________ Operator Q: ___________ Operator R: ___________
Operator S: ___________ Operator T: ___________ Operator U: ___________

(2) What were the total costs (in dollars) of employee benefits for all technical operators in 1991?

____________________________________

(3) What were the total training costs (in dollars) for all technical operators in 1991?

____________________________________

(4) What were the total gainsharing payments (in dollars) for all technical operators in 1991?

____________________________________
技術操作員能力調查之二

本問卷是問四個有關貴公司在民國八十一年中情況，其目的是在於獲得貴公司去年下列資料：(1)技術操作員之月薪，(2)員工福利費用，(3)訓練費用，和(4)績效獎金發放金額。謝謝您的合作。有關四個問題之說明如下：

1. 技術操作員乃指於機械操作員、照相操作員、排版員、和平版印刷機操作員，但並不包括受訓人員。
2. 薪資不包括超時加班費。
3. 員工福利包含所有之福利包括非薪資之給付。這是貴公司所負擔之全額或部份費用，包括保險，非工作時間之給付。提供員工各項服務之費用和各項福利。
4. 所謂訓練是一種學習過程和一種提供員工新知識和技術的機會，作爲改善管理的主要方法。訓練費用為訓練之各項開支。
5. 結果獎金為一種激勵員工以增加生產力之獎勵辦法。所有對促進公司營業有貢獻之員工，均可分享因生產力提昇而增加之收益。
6. 請回答下列所有問題，如果貴公司無訓練或績效獎金，請於該項問題前面劃個 "X"。
7. 請儘可能提供確切的答案。

(1) 民國八十一年各技術操作員之月薪（單位：新台幣元）：
   操作員A（ ）元  操作員H（ ）元  操作員O（ ）元
   操作員B（ ）元  操作員I（ ）元  操作員P（ ）元
   操作員C（ ）元  操作員J（ ）元  操作員Q（ ）元
   操作員D（ ）元  操作員K（ ）元  操作員R（ ）元
   操作員E（ ）元  操作員L（ ）元  操作員S（ ）元
   操作員F（ ）元  操作員M（ ）元  操作員T（ ）元
   操作員G（ ）元  操作員N（ ）元  操作員U（ ）元

(2) 民國八十一年全體技術操作員之全部員工福利費用（單位：新台幣元）：
   新台幣（ ）元

(3) 民國八十一年提供訓練貴公司技術操作員之全部費用（單位：新台幣元）：
   新台幣（ ）元

(4) 民國八十一年發放給全體技術操作員之全部績效獎金（金額）為多少？
   新台幣（ ）元
Questionnaire C: The questionnaire to technical operators.

TECHNICAL OPERATOR TURNOVER SURVEY

This questionnaire contains five statements about your perception of your company's practice in wages, employee benefits, alternative work schedules, training programs, and gainsharings. Specific instructions are given at the beginning. Please read them carefully. Thank you for your cooperation.

Instructions for Responding

1. Each of the following statements is intended to find out how you feel about your company's practice in wages, employee benefits, alternative work schedules, training programs, and gainsharings. On the scale following each statement, circle the number which best describes your agreement with the statement. Please use the following key:
   1 = Strongly disagree
   2 = Disagree
   3 = Not sure
   4 = Agree
   5 = Strongly agree

2. The wages do not include overtime pay.

3. Employee benefits are all benefits and non-wage payments, that are provided in part or in whole by employers to employees, including the employer's share of payments, insurance, payments for time not worked, cost of services to employees, and miscellaneous benefits.

4. Alternative work schedules are those work schedules adjusted (either a change of shift or hours) by employees.

5. Training is a learning process and a major approach to provide employees new knowledge and skill in order to manage changes/improvements.

6. Gainsharings are a reward system which encourages employees to improve productivity. All employees who contribute to the improvement of the company share the gains that reflect increases in productivity.

7. Please respond to all of the following statements, if your company does not has those programs such as alternative work schedules, training, and gainsharings, please mark an "X" before that particular statement.
(1) The wages I earned in 1991 were appropriate to my responsibilities or tasks.

1 = Strongly disagree
2 = Disagree
3 = Not sure
4 = Agree
5 = Strongly agree

(2) My company's employee benefits in 1991 were appropriate to my responsibilities or tasks.

1 = Strongly disagree
2 = Disagree
3 = Not sure
4 = Agree
5 = Strongly agree

(3) My alternative work schedules that adjusted in 1991 were beneficial to me.

1 = Strongly disagree
2 = Disagree
3 = Not sure
4 = Agree
5 = Strongly agree

(4) My company's training programs in 1991 were effective and helpful in performing my responsibilities or tasks.

1 = Strongly disagree
2 = Disagree
3 = Not sure
4 = Agree
5 = Strongly agree

(5) My company's gainsharing program in 1991 was satisfactory to me.

1 = Strongly disagree
2 = Disagree
3 = Not sure
4 = Agree
5 = Strongly agree
技術操作員異動調查之三

本問卷包括五個項目，針對您對貴公司現行之薪資、員工福利、彈性工時、訓練和績效獎金的看法。請詳閱下列說明，感謝您的合作。

答 證 明

1. 本問卷所問的五個項目，目的在於獲知您對貴公司現行之薪資、員工福利、彈性工時、訓練和績效獎金的看法。請在各項目之「不同意」、「非常不同意」、「不確定」、「同意」、「非常同意」中，選出最能表達您對該項目之「同意程度」。請於所選的阿拉伯數字前面劃一個 ✓。例：如果您「不同意」請劃：
   □ 1. 非常不同意  □ 2. 不同意  □ 3. 不確定  □ 4. 同意  □ 5. 非常同意

2. 薪資不包括超時加班費。

3. 員工福利為所有之福利及非薪資給付，這是貴公司所負擔之金額或部份費用，包括保險、非工作時間之給付，提供員工各項服務之費用和各項福利。

4. 彈性工時指上班工作起迄時間由員工自願調整（包括班次或上下班時間的選擇）。

5. 所謂訓練是一種學習過程和一種提供員工新知識和技術的機會作爲改善管理的主要方法。

6. 經效獎金為一種鼓勵員工以增進生產力之獎勵辦法。所有對增進公司營業有贡献之員工
   均可分享因生產力提昇而增加之收益。

7. 請反覆下列所有敘述，如果您對貴公司現行之薪資、員工福利、彈性工時、訓練和績效獎金，請於該項目敘述前面
   劃一個 ✓。

(1) 我在民國八十一年所賺領之薪資，與我的工作或責任相稱。
   □ 1. 非常不同意  □ 2. 不同意  □ 3. 不確定  □ 4. 同意  □ 5. 非常同意

(2) 我公司在民國八十一年所授之員工福利，與我的工作或責任相稱。
   □ 1. 非常不同意  □ 2. 不同意  □ 3. 不確定  □ 4. 同意  □ 5. 非常同意

(3) 我在民國八十一年間，自行調整之彈性工時，對我是有益的。
   □ 1. 非常不同意  □ 2. 不同意  □ 3. 不確定  □ 4. 同意  □ 5. 非常同意

(4) 我公司在民國八十一年所舉辦之訓練課程相當有效，並有助於我執行我的工作或責任。
   □ 1. 非常不同意  □ 2. 不同意  □ 3. 不確定  □ 4. 同意  □ 5. 非常同意

(5) 我對我公司在民國八十一年所實行的績效獎金辦法感到滿意。
   □ 1. 非常不同意  □ 2. 不同意  □ 3. 不確定  □ 4. 同意  □ 5. 非常同意
APPENDIX D

THE DATA COLLECTION SHEET
### The Data Collection Sheet

| C   | T | U      | KU | P | R | N | AT | H | HG | R | N | K | HX | NU | U | CV | KU | C        |
|-----|---|--------|----|---|---|---|----|---|---|---|---|---|---|---|----|---|---|---|---|---------|
| 1.00|    | 23.00  | 22927 | 0.0 | 29008 | 974 | 0.0 | 10972 | 0.0 | 12.00 | 22343 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 |
| 2.00|    | 16.00  | 22343 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 |
| 3.00|    | 12.00  | 30 | 35 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 |
| 4.00|    | 10.00  | 59312 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 |
| 5.00|    | 8.00   | 59312 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 |
| 6.00|    | 6.00   | 59312 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 |
| 7.00|    | 4.00   | 59312 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 |
| 8.00|    | 2.00   | 59312 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 |
| 9.00|    | 0.00   | 59312 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 |
| 10.00|   | 0.00   | 59312 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 |
| 11.00|   | 0.00   | 59312 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 |
| 12.00|   | 0.00   | 59312 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 |
| 13.00|   | 0.00   | 59312 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 |
| 14.00|   | 0.00   | 59312 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 |
| 15.00|   | 0.00   | 59312 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 |
| 16.00|   | 0.00   | 59312 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 |
| 17.00|   | 0.00   | 59312 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 | 3700 | 0.0 | 29360 | 29008 | 12.00 | 22343 | 0.0 | 29360 | 29008 |

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The Stem and Leaf Displays

1. Turnover rate:

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4 Extreme scores (54), (57), (67)

Stem width = 10
Each leaf = 1 case

2. Mean Wages:

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Stem width = 10000
Each leaf = 1 case

4. Mean training costs:

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1 Extreme score (6250)

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5. Mean gainsharing payments:

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<tr>
<td>15</td>
<td>1 . 566667778889999</td>
</tr>
<tr>
<td>13</td>
<td>2 * 0001111222244</td>
</tr>
<tr>
<td>13</td>
<td>2 . 55556667889999</td>
</tr>
<tr>
<td>3</td>
<td>3 * 002</td>
</tr>
<tr>
<td>1</td>
<td>3 . 5</td>
</tr>
<tr>
<td>1</td>
<td>4 * 0</td>
</tr>
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</table>

Stem width = 10000
Each leaf = 1 case

6. Mean weeks that technical operators chose alternative work schedules:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Stem &amp; Leaf</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 * 7</td>
</tr>
<tr>
<td>4</td>
<td>2 . 4557</td>
</tr>
<tr>
<td>5</td>
<td>3 * 23466</td>
</tr>
<tr>
<td>7</td>
<td>4 . 0013467</td>
</tr>
<tr>
<td>8</td>
<td>5 * 01222346</td>
</tr>
<tr>
<td>6</td>
<td>6 . 245559</td>
</tr>
<tr>
<td>2</td>
<td>7 * 04</td>
</tr>
<tr>
<td>0</td>
<td>8 .</td>
</tr>
<tr>
<td>3</td>
<td>9 * 234</td>
</tr>
<tr>
<td>3</td>
<td>10 . 056</td>
</tr>
</tbody>
</table>

2 Extreme scores (11.5), (12.8)

Stem width = 1
Each leaf = 1 case

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7. Mean scores of technical operators’ perceptions of each company’s practice in wages:

<table>
<thead>
<tr>
<th>Frequency</th>
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</tr>
</thead>
<tbody>
<tr>
<td>3</td>
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</tr>
<tr>
<td>0</td>
<td>1 .</td>
</tr>
<tr>
<td>19</td>
<td>2 * 0000000000222222333</td>
</tr>
<tr>
<td>10</td>
<td>2 . 555566667</td>
</tr>
<tr>
<td>23</td>
<td>3 * 0000000000000000022223</td>
</tr>
<tr>
<td>8</td>
<td>3 . 55555577</td>
</tr>
<tr>
<td>5</td>
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</tbody>
</table>

Stem width = 1
Each leaf = 1 case

8. Mean scores of technical operators’ perceptions of each company’s practice in employee benefits:

<table>
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</thead>
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<td>Extreme score (1.0)</td>
</tr>
<tr>
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<td>1 *</td>
</tr>
<tr>
<td>1</td>
<td>1 . 5</td>
</tr>
<tr>
<td>8</td>
<td>2 * 00000003</td>
</tr>
<tr>
<td>12</td>
<td>2 . 555567777777</td>
</tr>
<tr>
<td>11</td>
<td>3 * 00000000333</td>
</tr>
<tr>
<td>19</td>
<td>3 . 555556777777777</td>
</tr>
<tr>
<td>13</td>
<td>4 * 000000000223</td>
</tr>
<tr>
<td>2</td>
<td>4 . 57</td>
</tr>
<tr>
<td>1</td>
<td>5 * 0</td>
</tr>
</tbody>
</table>

Stem width = 1
Each leaf = 1 case
9. Mean scores of technical operators' perceptions of each company's practice in alternative work schedules:

<table>
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<th>Stem &amp; Leaf</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>5</td>
<td>2 . 55667</td>
</tr>
<tr>
<td>11</td>
<td>3 * 000002222223</td>
</tr>
<tr>
<td>12</td>
<td>3 . 5555556666677</td>
</tr>
<tr>
<td>6</td>
<td>4 * 000002</td>
</tr>
<tr>
<td>1</td>
<td>4 . 5</td>
</tr>
<tr>
<td></td>
<td>1 Extreme score (4.8)</td>
</tr>
</tbody>
</table>

Stem width = 1  
Each leaf = 1 case

10. Mean scores of technical operators' perceptions of each company's practice in training programs:

<table>
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<th>Stem &amp; Leaf</th>
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</thead>
<tbody>
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<td>2 * 0222</td>
</tr>
<tr>
<td>4</td>
<td>2 . 555555667</td>
</tr>
<tr>
<td>9</td>
<td>2 . 555555667</td>
</tr>
<tr>
<td>12</td>
<td>3 * 0000000002233</td>
</tr>
<tr>
<td>8</td>
<td>3 . 556677777</td>
</tr>
<tr>
<td>9</td>
<td>4 * 000000000000000002</td>
</tr>
<tr>
<td>5</td>
<td>4 . 77777</td>
</tr>
<tr>
<td>4</td>
<td>5 * 0000</td>
</tr>
</tbody>
</table>

Stem width = 1  
Each leaf = 1 case
11. Mean scores of technical operators' perceptions of each company's practice in gainsharing:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Stem &amp; Leaf</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>2 * 00000223</td>
</tr>
<tr>
<td>4</td>
<td>2 . 5566</td>
</tr>
<tr>
<td>8</td>
<td>3 * 0000023</td>
</tr>
<tr>
<td>10</td>
<td>3 . 566667777</td>
</tr>
<tr>
<td>18</td>
<td>4 * 00000000000000000002</td>
</tr>
<tr>
<td>10</td>
<td>4 . 557777777</td>
</tr>
<tr>
<td>2</td>
<td>5 * 00</td>
</tr>
</tbody>
</table>

Stem width = 1
Each leaf = 1 case