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THE EFFECTS OF ORGANIZATIONAL FACTORS

ON THE TRANSFER OF TRAINING:

A STUDY OF FOUR ELECTRONIC INDUSTRIAL COMPANIES

IN SHENZHEN SPECIAL ECONOMIC ZONE, CHINA

By

Jin Xiao

A DISSERTATION

Submitted to Michigan State University in partial fulfillment of the requirements for the degree of

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Department of Educational Administration

ABSTRACT

THE EFFECTS OF ORGANIZATIONAL FACTORS ON THE TRANSFER OF TRAINING: A STUDY OF FOUR ELECTRONIC INDUSTRIAL COMPANIES IN SHENZHEN SPECIAL ECONOMIC ZONE, CHINA

By

Jin Xiao

In recent decades, developing the workforce with adult education and training has been a major effort to increase productivity in China. However, the concern over the unsatisfactory transfer of training has been growing among training practitioners, managers and researchers. This study provides the first empirical study of the effects of organizational factors in the process of the transfer of training.

A conceptual framework was conjectured which took into consideration the effects of organizational variables on the transfer of training in the workplace. Training was considered as a pre-condition to improve work efficiency by acquiring knowledge, skills and attitude (KSA) in the first place, but not sufficient for promoting the ultimate transfer of learning to the job. Many organizational variables in the workplace could intervene into the transfer of training.

This conceptual framework was applied to two state-owned and two joint-venture electronic companies in Shekou Industrial Zone, Shenzhen Special Economic Zone, China. One controlling card production line in each company was included in this study. A survey questionnaire was designed for data collection. Regression analyses were applied to data of the entire sample, and the state-owned and joint-venture companies separately as well for a comparison. Interviews were conducted with concerned company personnel to have an in-depth understanding of the transfer of training.

This study had four major findings. First, the statistical results indicated an interaction of the organizational factors with training achievement. This occurred in a way that training achievement and organizational variables mutually reinforced the effect on the transfer of training of one another. Second, the organizational factors contributing to the transfer of training varied in the two types of companies. A company's assumptions about organizational practices were associated to the difference. Third, the empirical results showed an interaction between training achievement and group peers support. In the less cooperative environment, training achievement of individual workers was a significant factor in the transfer of training, while in the more cooperative environment, peer support was a significant factor in the transfer of training, instead. Finally, the study found, among those organizational factors studied, human factors had the most statistical magnitude in predicting the transfer of training. Copyright by JIN XIAO

DEDICATION

To adult educators and learners who devote their careers for people to work better, live better, and love better

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CHAPTER 1

INTRODUCTION

1.1 Concern Over the Transfer of Training

Since the late 1970's, China has embarked on the road to economic development. Adult education and training (AET) appears to be an ideal route for developing the workforce in the process of economic growth. The concept of developing 'productive workforces' underlies the development of adult education and training in China. It is assumed that the precondition of production and the national economic development is the competency of the existing workforces. Hence, the development of productive workforces demand continuously raising the educational level and work-required skills of the people (Yao, 1984). It is also further believed that the trained workforces are more capable of handling new technology and will increase productivity (The Central Committee of the Communist Party of China and the State Council, China, 1981; The State Education Commission, China, 1987). Based on such assumption, adult education system has been formalized in the last decade. AET programs have been developed in various modes and made accessible to a large number of adult learners. 200 million people in workforces were involved in various kinds of training and educational programs in the last decade (Personnel News Bulletin, China, 1989).

However, the transfer of knowledge, skills and attitude (KSA) from training to the workplace were varied within similar programs. AET administrators, educators and work unit managers in Shenzhen Special

Economic Zone (SSEZ) in China have noticed that the transfer of KSA is low sometimes, or even zero in the workplace in some cases (Huang Fuchang, 1988; Situ, 1988; Zhong, 1988; Zhen, 1988; Huang Gaopin, 1988). On the one hand, large amounts of resources (e.g., time, personnel, facilities) have been invested in training employees to acquire job skills; on the other, the quality and quantity of work performance of employees were sometimes not satisfactory (SiTu, 1988; Huang Gaopin, 1988). This may suggest a costly waste in the investment in AET (Situ, 1988; Huang Gaopin, 1988). Hence, there has been a growing concern over the transfer of training in the workplace.

In addition to the AET program operation variables, some trainers noticed that industrial enterprises varied in their organization of training and production, which impacted the effectiveness of AET as well. Some factors intervening with the process of training transfer were suggested by some Chinese AET educators and human resources managers. First, there existed the mismatch of training and required KSA in the workplace (Zhen, 1988; Huang Fuchang, 1988; Huang Gaoping, 1988). Next, reward practices (e.g., bonus, wage system, and promotion) were not well linked to employee performance (Huang Fuchang, 1988; Zhong, 1988). Third, supervision is critical to the transfer of training in the workplace (Huang Fuchang, 1988). Therefore, it appeared that some organizational factors might contribute to, or inhibit AET effectiveness in the workplace.

Conceptually, training is defined as the systematic acquisition of knowledge, skills, or attitudes (KSA) by workers (Goldstein, 1986; The Central Committee of the Communist Party of China and the State Council,

China, 1981). It is assumed to result in improved worker performance and is seen as the primary means to meet the gap between the workers present performance status and the desired status (Bergsma, 1986; Savage & Samuel, 1986; Goldstein, 1986; The Central Committee of the Communist Party of China and the State Council, China, 1981; The State Education Commission, China, 1987). The ultimate end would be to exact the necessary transfer of learning from AET to performance and to keep the workforce competent in the changing world (The Central Committee of the Communist Party of China and the State Council, China, 1981; The State Education Commission, China, 1987). The purpose of AET, then, is to provide workers with the opportunities to acquire KSA and become competent; thus improving the productivity of the enterprise.

However, a positive transfer of training does not always come about as expected (Clark, 1987; Clark and Voogel, 1985). In the U.S.A., facing the problems of inflation, lagging productivity, foreign competition, recurring economic crises and chronic shortage of competent employees on all fronts (Finkel, 1987; U.S. Congress, 1990) and considering the huge investment in training, there is a growing recognition of the problem in the transfer in organizational training (Finkel, 1987; Michalak, 1981; Baldwin & Ford, 1988; Robinson & Robinson, 1985; Phillips, 1983; Goldstein, 1986; Reilly & Manese, 1979; Eurich, 1985; Gilbert, 1976a and 1976b). In many developing countries at the stage of economic development, AET is adapted as a route to workforce upgrading. Considering the scarce resources devoted, the transfer of training in the work environment has been a paramount concern in technology transfer and management training. The concern

over unsatisfactory transfer has been expressed, and possible intervening factors have been suggested in studies in: Indonesia (Spielman, 1983), India (Baumgartel & Jeanpierre, 1972), Sudan (Mohamed, 1984), Kenya and Brazil (Gor, et al. 1987), Pakistan (Sergsma, 1986), China (Xiao, 1989; Huang Fuchang, 1988; Situ, 1988; Zhong, 1988; Zhen, 1988; Huang Gaopin, 1988), and generally (Savage & Samuel, 1986).

In order to improve the transfer of training, practioners and researchers in previous studies focused on the improvement of training procedures of AET programs. These areas include teaching and learning theories, adult characteristics and learning environment, programs design an development and learning retention. Effective learning in AET programs is obviously important in the first place to improve the competency of the workforce, but is not necessarily sufficient to ensure the transfer of training in the workplace.

In recent years, some researchers (Baldwin & Ford, 1988; Spielman, 1983; Levin, 1987; Tsang & Levin, 1987; Tsang, 1988a; Gash & Kossek, 1989; Shi, 1989; Xu & Liu, 1989) suggest that while the education and training process is vital to acquire KSA, there are many factors in the organization of production that could affect the transfer of learning in the workplace after the training. This suggests that the internal effectiveness--acquisition of KSA--be a necessary but not sufficient variable leading to the external effectiveness and benefits--the application of KSA in the workplace. Literature in both America and China has suggested several organizational factors that have an effect on individual performance in the workplace. The factors include: (1) the involvement of trainees and their supervisors in training

orientation; (2) the work environment which includes the match/mismatch of workers' ability, job requirements, and supervisory and peer support; and (3) the reward system.

There had been no any parallel empirical study on the organizational variables intervening into the transfer of training done in China. This study attempted to explore the relationship between organizational factors and the transfer of training in the workplace. An in-depth field study of the effects of organizational factors on the transfer of training was conducted in two state owned companies and two joint venture companies in industrial settings in Shekou Industrial Zone (SKIZ), Shenzhen Special Economic Zone (SSEZ), China.

1.2 Rationale for the Study

Due to the fact that: 1) the literature both in China and in other countries indicated a possible relationship between certain organizational factors and the effectiveness of training transfer, 2) such organizational factors mentioned previously may explain the effectiveness of training transfer and 3) such research efforts have never been undertaken in the Shenzhen Special Economic Zone which is undergoing a fast growth, there was a need to conduct an investigation into organizational factors and the transfer of training in China where AET programs had been adopted as a means for workforce development.

This study was meaningful in the following ways:

(1) In many cases, AET programs in such modes as on-the-job training, spare-time training, and work-released training and education

resulted in excellent internal effectiveness. However, as suggested by some theoretical arguments and evidence in practice, the external effectiveness can be ultimately affected by organizational variables. Training programs, even with enteral effectiveness, are not sufficient considering the ultimate transfer of training. Therefore, it was necessary to examine factors which are external to the training process and which might contribute to or hinder the transfer of learning.

(2) Most of the literature on organizational factors affecting the transfer of training were arguments and conjectures based on limited research. One study (Tsang, 1987) showed that the match/mismatch of workers skills and work requirement can affect the workers' utilization skills in the workplace. Furthermore, such study was not designed to study the relationship between organizational factors and the transfer of training in the workplace. Hence, it was meaningful to design systematical empirical studies to investigate the association of the organizational factors with trained employees' performance in the workplace.

(3) The limited studies on supervisory support of trainees were done to evaluate the training programs on interpersonal skills. As reviewed by Baldwin and Ford (1988), the major problems in these studies were the static nature of the research in relation to the dynamic nature of the transfer process and the self-reported measure of effort toward the application of learning (Baldwin & Ford, 1988). Therefore, the "strong" support for the importance of environmental characteristics to the transfer of training cannot be inferred. Related literature also suggested that other organizational factors beside supervisory support

have an effect on workers' performance. Thus, an in-depth study on organizational factors in dynamic relationship with the transfer of training was needed.

(4) The newly developed SSEZ ratified the autonomy to business companies in making decisions on production in favor of their best interests. Hence, different types of organizations can provide variations in organizational factors which are not easily obtained and manipulated when taking an experimental approach. The cost of the study was relatively low. The comparison of the organizational factors in different types of companies was likely to provide contrasts and reveal meaningful information in which organizational factors were related to the transfer of training.

As an exploratory study, this research intended to provide meaningful information for enterprises adopting AET programs, for human resource managers, and AET educators to explain the transfer of training in the workplace beyond the incomplete evidence available at this stage.

1.3 The Purpose of the Study

As indicated in the literature, and argued by some prior researchers that certain organizational factors may contribute to or hinder the transfer of training and, the purposes of this study were as follows:

 Identify the organizational variables in the work environment, which had been suggested to be related to employee performance; and

2. explore the association of these organizational factors with the transfer of training in the workplace.

Therefore, this study had two major tasks: (1) develop a conceptual framework on how organizational variables in the workplace may affect the transfer of training on the job; and (2) conduct an empirical study of how the organizational variables affect the transfer of training in the workplace.

More specifically, this study first examined whether such factors as training orientation, the match/mismatch of worker skills with work design, supervisory assistance, peer support, and reward practices were associated in any way with trainees' persistent use of newly acquired skills, knowledge and attitudes in the workplace.

Then, this study explored in what way the organizational variables were associated with the transfer of training. As the sample included two state owned companies and two joint venture companies, this study compared the patterns of the transfer of training in two types of enterprises in the electronic industrial settings.

1.4 The Context of the Study

Shenzhen Special Economic Zone (SSEZ) is a newly developed industrial and commercial area in China and is considered the frontier of economic reform. Most of the business and industry in this area are under such different ownership as state-owned, joint-venture or foreign enterprises. The ratified autonomy in SSEZ allows these organizations to have many opportunities to develop international business (The

National People's Congress, 1980). These business and industry are global market-oriented and have a broad range for their development. The advanced technology, management practices and economic principles in the West have been introduced into SSEZ, contributing to its growth, or influencing changes occurring. For example, the enterprises have the autonomy to open new plants or divisions according to the economic principles of supply and demand. At a final step, practices that have proved to be successful in this area have been disseminated to inner China in the last decade and have benefitted the economic reform and development for overall China. In fact, another fourteen similar special economic zones along the coastal areas were given sanction by the State Council and started economic reform in 1984.

In order to keep their competency, organizations of different ownership have to adapt to changes to different degrees. AET has been the major means adopted by business and industry for their employees to acquire knowledge, skills and attitude expected in the workplace.

The field study was conducted in four electronic industrial companies, in Shekou Industrial Zone, Shenzhen (SKIZ), China. Among the four electronic companies, two were state-owned companies, and two were joint-venture companies. The state-owned electronic companies were established by electronic entities owned by the Chinese state government, one in September 1984 and one in August 1983. The organization of production was largely in congruence with the state interest. The joint-venture companies were jointly established in terms of investment and management by a Chinese state-owned electronic entity and a foreign electronic entity, one in December 1984 and one in October

1985. The organization of production in the joint-venture companies was modified in congruence with the interest of both parties.

The sample included two types of companies with similar production technology, and apparently different organizational practices. The two different types of organizations were expected to provide variation in organizational factors, which, when studied comparatively, might be much easier to extract than when studied individually. On the other hand, the manipulation of treatment and control groups regarding organizational factors is usually costly and difficult to administrate in business and industry. The comparison of the two types of intact manufacturing companies provided contrasts about the relationship between organizational factors and the transfer of training in reality at a relatively lower costs. As an exploratory stage, an in-depth case study was employed and considered more appropriate to investigate the relationship between the organizational factors and the transfer of training.

Regarding the situations in China, it was unfortunate to note here that the political events of 1989 in China had set back the overall economic reform and development process. Nevertheless, the interviews and observation done by this researcher indicated that they had had a relatively small impact on the economic activities in SSEZ because of the stable economic activities and overall effective management in this area. China is still pursuing reform and open-door policies. This is especially so, as China gradually comes back to the route of economic reform, and successful practices of the SSEZ will continue to be disseminated through inland China.

1.5 Statement of the Problem

Nowadays, adult education and training (AET) has been adopted as the primary means to upgrading employees' knowledge, skills and attitude for adaption to changes in the stage of economic development in SSEZ, China. Improving the competency of the workforces is fundamental to keeping work units internally competent. However, the transfer of training in the workplace has been a disturbing concern to adult educators and managers in the work units when AET programs are adopted. This is compounded by the fact that different types of enterprises in SSEZ may have their training and production organized in different ways. Hence, the transfer of training in the workplace have varied to a great extent, even within similar programs.

The related literature indicates that the internal effectiveness of training programs is a necessary but not sufficient variable leading to the transfer of learning in the workplace and the increase in productivity. The transfer of training can be affected by organizational variables in the work environment. Such variables suggested by literature include training orientation, a match of trainees' capacity with job requirements, supervision assistance, peer support, and reward system.

However, few empirical studies have been conducted to determine what organizational factors may intervene in the transfer of training. Furthermore, if there are any intervening effects on the transfer of training, in what way are these organizational factors associated with the transfer of training? To date, no such studies have been conducted

in China, and also rarely in other countries.

As the effectiveness of training transfer is obviously vital to organizational effectiveness, this researcher sought 1) to examine the organizational factors which affected the transfer of training; 2) to explore the association of the organizational factors with the transfer of training in the workplace; and 3) to compare the transfer of training in two types of companies in the electronic industrial settings in SSEZ.

The primary research question guiding the research is stated as follows:

Is there any relationship between such organizational factors as training orientation, the match of trainee's KSA to work design, supervisory assistance, peer support, and reward system with the transfer of training in the workplace of four industrial settings in SSEZ, two state owned companies and two joint venture companies?

1.6 Definition of Terms

Some terms and variable used in the study are defined in this section.

Training orientation: activities or events organized to get workers prepared for the training and the subsequent application of KSA in the workplace.

Transfer of training: the persistent application of knowledge,

skills and attitude (KSA) acquired from AET programs in the workplace in conformity with the intention of the training objectives based on work requirements.

Organizational factors: the variables in the work environment that have been suggested to be related to workers performance in the workplace. The factors examined in this study include training orientation, match/mismatch of workers' skills to work-design, supervisory assistance, and peer support, and the reward practices.

Match/mismatch of trainee KSA with work-design: the conformity or nonconformity between the acquired KSA and the job requirement, production equipment, and information needed for accomplishing tasks.

Work environment: the sociotechnical system, or the physical, and social context within which any client system (a person, group or organization) is functioning. The physical context refers to the work design and technology; and social context refers to the human relationships in the work place.

Work-design: the designing of jobs for employee fulfillment and productivity. The technical intervention includes the technical opportunities to apply acquired KSA, the provision of information and equipment and worker discretion in applying KSA.

Supervisory assistance and peer support: the human relation aspect of the work environment. The assistance and support include the awareness of the trainees KSA and additional needs, and the facilitation and assistance to trainees in their application of acquired knowledge, skills and attitude in the workplace by the supervisors and peers.

Reward practices: the practices of recognition, wage increase,

bonuses, and promotion in regarding to the application of KSA in the workplace.

Internal effectiveness of training : the extent to which the trainees have satisfactorily acquired KSA in the training program where the designed learning experiences are facilitated.

External effectiveness: the extent to which the acquired KSA in the designed experience are applied in the workplace.

1.7 Limitations of the Study

The study has the following limitations:

1. The relationship between organizational characteristics and training transfer may be complex. As an exploratory study, the research focuses on the selected organizational factors which have been suggested to have effects on the employee behavior on the job. They are as follows:

- a. training orientation--the preparation of workers for the training and the subsequent application of KSA in the workplace;
- b. the match/mismatch of the trainees' KSA to the work-design;
- c. the supervisory assistance and peer support;

d. the reward practices.

Further research may examine the potentially relevant factors such as leadership, group design, task structure, and the organizational culture.

2. The case study assumed that the four manufacturing plants

selected for the study were typical of industrial plants in SSEZ, and the selected plants might still be subject to uniqueness of their own.

3. The study was conducted in an industrial area which had relatively more advantages over other inland China regions, such as autonomy in decision-making on business, relatively advanced production technology, and close geographic contact with the world economy. Hence, the generalizability of the findings of this study to other areas in China, or in other countries, should not be assumed; specific contextual factors of those areas should also be considered.

1.8 Organization of the Following Chapters

The remainder of this dissertation is organized into six chapters. In Chapter 2, to justify the research problem, pertinent literature is reviewed regarding approaches of studying the transfer of training. In Chapter 3, the organizational factors related to employee performance in the workplace are discussed and a conceptual framework which guides this study is presented. Also presented are the hypotheses made about the relationship of the organizational factors with the transfer of training transfer. Methodology for this study is discussed in Chapter 4. In Chapter 5, data analyses is presented and empirical results discussed. Finally in Chapter 6, a brief summary of this study is provided. Conclusion given regarding the findings, and policy implications are discussed. Recommendations for further research will are suggested, as well.

CHAPTER 2

REVIEW OF LITERATURE

Based on pertinent literatures, this chapter justifies this study of exploring organization factors in terms of their relationship with training transfer. The first section consists of a discussion based on relevant literatures on approaches to studying the transfer of training. In the second section, relevant literatures on organizational factors affecting worker performance are examined.

Empirical research on adult education in China is lacking. Most of the educational literature is the summary of education in descriptive manner, and expressions of subjective opinions without empirical support (Tsang, 1988b). The AET literature in recent years appears in the same manner, consisting of descriptions of adult education and training (AET) events, and conjecture on AET deducted from assumptions. Therefore, the literature used to guide this research will also include studies in other countries, especially the U.S. Though to some extent the literature is foreign to situations in China, it is hoped that given that 1) the nature of the systematic study of the literature, 2) the similarity of the major training and organizational features as observed by researchers and practioners around the world and 3) the knowledge of this researcher about adult training and education in China, the embedded biases will be reduced to the greatest extent possible for the present study. Furthermore, such an exploratory study could make a positive contribution to the adult education and training practice in, and literature on China.

2.1 Approaches to Studying the Transfer of Training

In recent years, huge resources have been invested in AET programs for employees to upgrade KSA. In a less developed country like China, 200 million people in the workforce have been involved in various of training and educational programs in the last decade (Personnel News Bulletin, China, 1989). The transfer of training is sometimes noticed low, or even zero in the workplace in some cases (Huang Fuchang, 1988; SiTu, 1988; Zhong, 1988; Zhen, 1988; Huang Gaopin, 1988). In order to increase the transfer of training, previous studies have focused on learning aspects of AET programs. These approaches intend to control and improve learning within the training process.

2.1.1 Major focus of Current Literature in the U.S.A.

Today, the unfulfilled expectations from training have induced trainers' to question how to maximize positive transfer of learning, and what elements it takes to maximize positive transfer (Baldwin & Fort, 1988; Goldstein, 1986; Wexley & Latham, 1981; Dickinson, 1985). Previous studies on improving learning transfer have focused on: (1) the traditional concepts including using identical elements, the teaching of underlying principles, and the use of overlearning (McGhee & Thayer, 1961; Goldstein, 1986); (2) philosophical concepts of adult learning including the consideration of learners' characteristics, providing the appropriate learning environment, and using flexible instructional strategies (Knowles, 1973; Cross, 1981; Knox, 1977, 1986; Brookfield, 1986; Darkenwald & Marriam 1882; Rogers 1969; Woldkowski 1986); (3)

program design and development including improving and controlling the components and techniques during the training process (Goldstein, 1986; Boyle, 1981; Cranton, 1989; Kowalski, 1988; Brookfield, 1986; Knowles, 1967; Laird, 1985; Dickinson, 1985); and finally (4) retention of skill and knowledge after training including posttraining strategies and relapse prevention (Wexley & Baldwin, 1986; Leifer & Newstrom 1980, Marx 1982). By giving attention to the improvement of transfer of learning, these approaches intended to enhance the learner's proficiency in acquiring and retaining KSA (e.g. by use of overlearning, the matching of learner's characteristics to the task), relapse prevention, (e.g., learning retention), or improve the quality of the training delivery (e.g., effective training strategies, flexible methods). At this point, it may be noted that these research practices all concentrate on the process within the training or educational scope, which are very crucial to ensure the learning required in the first place.

Training program development is an important aspect of training. Most often, training programs are developed in accordance with two kinds of models. The first kind, the conventional model, is usually a linear and cyclic model which consists of phases of needs assessment, program design, training implementation and evaluation. Many similar models have been built based on this framework, and provided good a guide for program design and development, which includes improving and controlling the components and techniques during the training process (Goldstein, 1986; Boyle, 1981; Cranton, 1989; Kowalski, 1988; Brookfield, 1986; Knowles, 1967).

The second kind (Kowalski, 1988) is the holistic model. Kowalski

(1988) has developed a holistic model of program planning based on the sociopolitical theory and social psychology of the organization. In his holistic model, there are three critical elements: the individual, the organization, and the external environment. These three elements all have values and needs which are congruent with their interests. The existence of these parties exerts power and influence over the goals, operations, and outcomes of the organization. In this model, the planning process simultaneously considers the three elements. The other three basic components developed for the systems approach are: inputs, throughputs, and outputs. Inputs are formulated using information from the three elements above and also from other items such as books, teachers, and instructional equipment. These three sources provide the needs and values necessary for the appropriate design of adult education programs. Throughputs refer to such procedures as programs which are designed instruction experiences and are conducted to bring about changes in the learner (e.g., changes in behavior or knowledge to improve performance). Outputs are the products of the educational experience and provide the basis for eventual program evaluations. This model provides a framework to look at training and education in an organization with a more dynamic view. Goldstein's model (1986) has some similar characteristics in common with Kolwalski's model in that it uses organizational analysis in the needs assessment precess.

The above models of training have provided adequate guidance for research and practices. In many cases, adult education and training programs using these models as the framework for analysis have produced internal effectiveness (Knowles, 1980). However, considering the
ultimate external effectiveness of training--the improved work efficiency and increased productivity, these models are not sufficient enough to provide us with a framework thorough enough to consider all the many organizational factors which can affect the transfer of learning after training.

2.1.2 Current Literature on AET in China

The literature on AET in China also shows that the major emphasis is on the controlling and increasing of the quantity and quality of the training process in the last ten years. Yet even though this researcher conducted an exhaustive search of literature on AET in China, (more than one hundred studies), she could only locate a few studies (LinHu, 1989; Shong et al., 1989; Chen & Chen, 1989; Yang, 1989; Wang & Lu, 1989; Angang Steel & Iron Company, 1989; Chendu Seamless Steel Plant, 1989)¹ done on the evaluation of the effectiveness of training in the workplace. These studies were by nature (1) the description of training events and general results and (2) the conjecture based on deductive assumptions. However, no empirical study was done on the specific variables that affect the transfer of training. Some studies (Linghu, 1989; Shong, 1989; Chen & Chen, 1989; Yang, 1989; Wang & Lu, 1989; Angang Steel & Iron Company, 1989; Chendu Seamless Steel Plant, 1989; Shi, 1989; Shu & Liu, 1989) described AET events in the past years and tried to identify economic benefits and new technological adaption

¹ These are papers written from 1986-1989 and collected as the best research papers in <u>Selected Papers on Continuing</u> <u>Engineering Education and Training in China</u>. China: China Geology University Press, 1989.

resulting from such training programs. Yet no specific problems were stated and variables specified. Though some statistics were gathered, none of them were based on systematic empirical research. However, results of the AET were all concluded to be positive and the outcomes of the training were expressed in general terms. The positive results were either the increased gross income or the new technological adaption. The other type of study on this topic (Shong, et. al. 1989) was based on the conjecture over the benefits of the AET in terms of economical, individual, technological and societal gain, yet without adequate research.

Yet, the major flaws with these studies, on the transfer of training, are the compounding effects of inflation and new technology on training results. In the last ten years, inflation has been rising so rapidly every year in China that it is doubtful that the increase of any productivity from the previous period has resulted from training. Along with this, adaption to new technology is usually an ongoing process and training is only part of the project anyway. Furthermore, this researcher would like to point out the fact that there was no systematic research design used in these studies on training transfer, which also leads her to doubt that profit and innovations were solely due to the training. The final problem with these studies is that they were all the best examples of AET programs, and not necessarily represent the average AET program's results. In Chinese culture, the unsatisfactory and inferior results are not always reported and, as a result, the real problems are usually left unconfronted.

Nevertheless, some AET practioners in SSEZ (Shi, 1989; Xu & Liu,

1989; Zhen, 1988; Huang Fuchang, 1988; Huang Gaoping; 1988 Zhong, 1988) touched on the idea that organizational factors such as an appropriate and legitimate reward system, working conditions, supervision, the match of training with job content, and responsibility and autonomy of the trainees, can be binding forces and motivators toward the utilization of KSA by the trainees on the job. In concordance with such concepts, the government had called on the legitimization of policies including human resource management (HRM), pay systems, and worker recruitment so that reinforcement could be provided for the utilization of trainees' KSA in the workplace, thus increasing the chances for the transference of training (Li, 1986).

In this researcher's experience (Xiao, 1989), organizational factors could affect the training transfer in the workplace. In the interviews with AET practitioners, and with managers in China in the summer of 1989, the impression was that (1) the incongruence of the job requirements and the trainees' newly acquired KSA created negative trainee attitudes toward the work unit in many cases, (2) wage increase and promotion based on seniority resulted in lowered motivation in applying KSA, and (3) managers' ignorance of the potential benefits of training could hurt employees who desired career development.

2.1.3 The Neglected Area in Training Transfer

Some practitioners and researchers have noted some organizational factors in the work environment might contribute to, or inhibit the training transfer (Gash & Kossek, 1989; Goldstein, 1986; Robinson & Robinson, 1985). Very few attempts have been made to study the

relationship between organization factors and training transfer (Baldwin & Ford, 1988).

Baldwin & Ford (1988), however, made a review of the literature on the transfer of training. The scope of the review included training design, learner characteristics and work-environment characteristics. The authors were able to locate a very limited amount of empirical studies on the transfer of training regarding work environment, such as perceived transfer climate. The major problems in these studies were the static nature of the research in relationship to the dynamic nature of the transfer process. The transfer criterion most frequently used was a self-reported measure of effort used to transfer learning to the job (Baldwin & Ford, 1988). Furthermore, those studies did not explore how the supervisory support was associated or related to the training transfer and most of them were gathered too soon after the training programs were completed. Therefore, the "strong" support for the importance of environmental characteristics to training transfer could not be inferred in such short period of time. Baldwin and Ford (1988) suggested that other organizational factors besides supervisory support might have effect on workers' performance. They then suggested that further research was needed to identify the key work-environment variables and to operationalize these variables. The authors also suggested that examination of the effects of environmental characteristics from a levels-of-analysis perspective, would be most useful.

Gash and Kossek, two researchers in human resource development (HRD), used organizational systems as a framework to study a computer

training program for the end-user (1989). They conjectured that there was both positive and negative impact of factors at three levels within the organization--the individual, the group, and the organization. They maintained that while the training process is vital to the increase of competency of the workforce, there are many factors in the organization that could inhibit the transfer of learning to job tasks in the workplace after the training. The organizational factors are trainees' characteristics, trainees' job tasks at the individual level; the internal status of the client group, skill deficiency at the group level; and organizational cultures and resources HRM system at the organizational level.

Two studies, that did reveal some significant indication of effects of organizational factors on training transfer were Spielman's experiment on an international technology transfer project (1983) and Tsang's empirical study of the impact of under-utilization of education on productivity in 22 U.S. Bell Telephone Companies (1987).

In the project studied by Spielman, new maintenance techniques were introduced to about 2,000 employees in Java, Indonesia. To ensure the appropriateness of technology for the local environment, a pilot project was established in which the maintenance techniques were adapted and applied. A well-planned technology transfer system and training courses was developed for workers as well. The training courses were successful in that trainees were able to operate the new equipment satisfactorily and clients were satisfied. Two years later when the author went back to follow up on the project, he was surprised to find that the long-term training results were not as good as anticipated. In many areas, old

work techniques returned and some supporting procedures were not being used. The author claimed that no amount of training nor well-organized systems of transference of technology will be successful unless the technology was integrated into the organization-specific system, and that this procedure required the commitment of the whole organization and management development.

Tsang (1987), in the field of economics of education, made attempts to measure the effects of underutilization of skill on productivity in twenty-two U.S. Bell Companies using the Tsang-Levin Model (1985). The model is based on a synthesis of literature on industrial psychology, workplace productivity and the conventional economic analysis of productivity. According to Tsang's review of the literature on industrial psychology, workers with more education than their jobs required (mismatch of workers' ability with job required skills) have been found to be more dissatisfied with their job. They may therefore, exhibit higher rates of absenteeism and turnover, and poorer health. The underutilization of education may thus result in reduced work effort, increased production costs and consequently lower productivity. Tsang (1987) found that each year of underutilization of education was associated with a loss of 8.35% in output, which was \$4.58 billion for the Bell Companies with a total annual output of \$54.9 billion for the 22 companies in 1981.

Another study also found that workers with more schooling than their jobs require will be less satisfied with their jobs and less productive in their jobs, and these workers and indicated a greater intention to turnover (Tsang, Rumberger, & Levin, 1991: 224).

The findings that the mismatch of workers' skills with required job skills (Tsang, 1987; Tsang et al. 1991) can result in adverse worker responses, thus leading to lower work effort and productivity, have significant implications for understanding training transfer in the transfer process. After training, certain worker characteristics have changed, which can incur changes in their expectations of the work environment. So, the mismatch of work environment with changed worker characteristics may cause failure in motivating the trained workers and in the transfer of training.

In short words, there have been very few attempts to study the impact of organizational factors on training transfer. However, the limited research does suggest that organizational factors are an area in need of our attention in order to improve the ultimate transfer of training to the work environment.

2.2 The Evaluation Problem

A few experts in training and educational evaluation have defined several levels of evaluation of education and training (Kirkpatrick, 1959; Parker 1973; Jackson & Kulp, 1979; Warr, Bird & Rackham, 1970; Phillips, 1983). The most popular approach is the Kirkpatrick (1959) approach which operationalized the evaluation process into four levels: (1) the reaction level--what the participants think of the training; (2) the learning level-- how much of the KSA presented in a program is learned; (3) the behavior level which is concerned with measuring job performance; and finally (4) the results of the programs--where

organizational improvement is considered.

For the purpose of analyzing educational costs and efficiency, Tsang (1988) put forward a framework that distinguishes external efficiency from internal efficiency of education. The internal efficiency component compares the costs of education to the outputs within education such as the acquisition of cognitive and non-cognitive skills; the external efficiency component compares the costs of education to the benefits of education that are external to education programs, such as higher productivity. The author points out that the external economic benefits of education depend not only on the quantity and quality of education, but also on the utilization of education in the workplace.

In many cases, evaluations of reaction and learning are conducted because these two usually take place in training and educational settings. This is true for the evaluation of teaching and learning achievement. The data are easy to obtain, and evaluation is within the control of the instructors. However, these two levels only measure the "internal" effectiveness of learning, without measuring the "external" effectiveness of training and education.

The perplexing part of the evaluation of training and education is the changes in employee behavior and benefits to the organization because the data are the most difficult to obtain, document and measure (Phillips, 1983; Baldwin & Ford, 1988). The reasons can be several. First, the learners are out of the instructional settings, and therefore out of the control of instructors. Second, learners are usually shifted to the supervision by another person on the job. It is usually not

trainers' responsibility to ensure that the newly learned KSA will be performed on the job. Third, during the shift from one setting to another, there are many other environment variables that can affect learners' perception and values, and subsequently their performance (Gash & Kossek 1989; Phillips, 1983; Goldstein, 1986; Tsang and Levin, 1985; Levin, 1987).

A positive transfer of learning as discussed by Baldwin and Ford (1988), is highly contingent on factors in the trainee's work environment. That is, the utilization of KSA in the workplace is simultaneously affected by variables which may not affect the learning in the training setting. Levin (1987) argues that the organization of work has a crucial impact on the productive utilization of both education and technology to increase productivity. However, in many cases, researchers and practitioners examine training issues separately from the work environment and focus on the improvement of quality learning in the training and educational settings, (which is necessary), to study the problem of transfer. We fail to consider the possible intervening factors on the transfer process during the shift of learners from the training setting to the work setting.

In summary, the relevant literature indicates that the internal effectiveness of AET is a necessary but not sufficient variable leading to the external effectiveness and benefits of training and education. The transfer of training can be affected by organizational variables (e.g. mismatch of trainees' KSA and job requirement), which are outside of the training process. In order to study the problem of transfer of training, we need to consider the possible intervening variables

affecting the transfer of training in the workplace. More specifically, what are the organizational variables that do promote or discourage the persistent use of acquired KSA on the job?

In conclusion, the relevant literatures have indicated that the current research on and practice of AET has focused on the training process in order to improve the internal effectiveness of training programs. Some studies presumed that adult education and training could resulted in increased productivity. While the quality of training programs is vital to the transfer of training in the first place, some literature also suggests that internal effectiveness is not sufficient for the effective transfer of training on the job. Certain variables external to AET programs could affect the transfer of training in the workplace. To bring about effective transfer of training in the workplace, there is a need to look beyond training process into organizational factors and examine their relationship to the transfer of training in the workplace. In the next chapter, this researcher will present a framework for understanding the relationship between organizational factors and the transfer of training, based on a more indepth review of the literature on the variables affecting employee behavior.

CHAPTER 3

THE CONCEPTUAL FRAMEWORK

In this chapter, the function of adult education and training (AET) in production organizations is first briefly discussed. Then selected organizational variables and their reciprocal relationship with individual behavior is reviewed in Section 3.2. Next, in Section 3.3, the conceptual framework guiding the dissertation research is presented. Finally, the hypotheses and variables conceived for this study are specified.

3.1 AET And Organizational Learning

According to Schein (1987), the organization forms and grows around two major concerns of the organization: survival in and adaptation to the external environment, and integration of its internal processes to ensure the capacity to continue to survive and adapt. Argyris (1964) also pointed out three similar core activities of the organization: (1) adapting to the external environment, (2) achieving objectives, and (3) maintaining themselves internally. The internal integration is the process of creating togetherness, which make groups capable of accomplishing tasks that individuals alone cannot accomplish (Schein, 1987). As the external environment changes, and economic, political, or technologic changes occur, the organization needs to readjust to these changes by rebuilding internal competency. At this point, organizational learning (Bennis & Nanus, 1986) takes place, in many

forms (e.g. employee training, management development, reorientation of production, and organizational development).

Training and education are seen as a primary means of adapting to changes because it offers opportunities to help employees acquire KSA. As for the role of education and training in organizational learning, AET is assumed to hold the ultimate goal of helping the individual and his/her organization remain competent and productive while adapting to the changing world. Therefore, the effective transfer of training or the persistent applying KSA in the workplace should be expected for purpose of the organizational learning.

A general assumption underlying much of the AET literature and practice is that AET will lead to higher productivity by increasing trainees' KSA ability. This positive linkage between AET and productivity typically comes from the idea that by improving KSA, workers will become more competent. The workforce competency, in turn, should improve productivity. However, there is a growing concern, as discussed in the previous chapter, over the unsatisfactory transfer of training. Relevant literature suggests that the employee KSA abilityproductivity premise is not at all that simple. The high AET investment, high quality of internal effectiveness of AET, and the unsatisfactory transfer of training, or the low return in productivity in the workplace indicates that something is intervening between internal and external effectiveness of training.

3.2 Organizational Factors and Employee Behavior

An organization is a group of people who are engaged in a common enterprise with missions, goals, and needs. The individuals join the enterprise and offer behaviors in attempts to make contributions and to receive reward in turn for their participation; and the organization on the other hand offer incentives in attempts to seek efforts from individuals to accomplish its mission and meet individual needs (Bennis, 1986; Arthur & Kram, 1989). Hence, there is a reciprocal relationship between the organization and individual. The focus of organizational efforts are upon human resources and their motivation and utilization in, and integration into the organization (Huge & Cummings, 1985).

This section focuses on some organizational variables that are suggested to have effects on organizational learning, and integration of human resources in/into the organization.

3.2.1 Training Orientation

Training orientation is the event developed to prepare the employees for training and the subsequent application of KSA on the job. Before trainees and the organization can benefit from any form of training, the employees must be prepared to learn. Sanders and Yanouzas (1983) note that trainees come to the learning environment with certain attitudes and expectations and these may or may not be helpful in the learning process. In their viewpoint, trainees with positive expectations and supportive attitudes are more likely to be ready to learn. Goldstein (1986: 70) agrees that motivational level affects

performance through an energizing function. And the motivation for training involves the attitude, purpose, and goal-direction. (Bourne & Edstrand, 1973).

To prepare the supervision and trainees for training and subsequent application, Laird (1985) suggests that training and development officers must ensure the following conditions: (1) reasonably definite objectives; (2) the preparation of the manager for assigning the trainee to work that will permit use of new insights, skills, or attitudes, and (3) reinforcing application of the new behavior, and (4) trainees' understanding the purpose of the programs. Baldwin and Ford (1988) also suggest that the extent to which the supervisor behaves in the ways congruent with the training objectives will have a major impact on transfer of trained skills by subordinates (Baldwin & Ford, 1988)

A well-designed training orientation can provide clear objectives and requirements, and better prepare trainees for learning with expected attitudes and motivation. On the other hand, the shared expectation of learning and subsequent application of KSA can also prepare the management for designing strategies to promote the transfer of training. Therefore, training can result in more relevant experience for both employee and the organization.

3.2.2 Work Environment

The work environment is referred to as the physical and social context, within which any client system (a person, group or organization) is functioning to achieve a goal, such as producing products (Huse & Cummings, 1985). Both organizational variables in the

work environment affect employee behavior and productivity. A recent contingency framework by Huse and Cummings (1985) further emphasizes the interaction between the technical and personal factors affecting workdesign success as important.

Intervening in the physical structure of an organization includes designing jobs and work groups for high levels of employee fulfillment (satisfaction) and productivity. When work is designed to fit personal factors, work experience is most likely to be both productive and humanly satisfying. In contrast, the mismatch of workers' ability with the job required ability can affect the satisfactoriness of job performance, personal satisfaction, as well as the proper utilization of workers' skills (Betz, Fitzgerald, & Hill 1989, Dalton, 1989; Tsang and Levin, 1985; Tsang, 1987). Similarly, dissatisfaction can also lead to the lowering of workers' efforts in the workplace (Tsang and Levin, 1985; Tsang, 1987).

Huse and Cummings (1985) offer a dynamic explanation of the effect of physical structure on productivity. According to them, work design can affect productivity directly. First, an appropriate work design as an intervention can improve communication and coordination among workers. Secondly, the appropriate work design intervention can improve employee motivation, particularly when they satisfy important individual needs. Motivation is translated into improved performance when people have the necessary abilities to perform well, and when the technology and work situation allows people to (positively) affect productivity. Thirdly, a good match between the technical and personal work factors (requirements) can improve the capabilities of employees, thus enabling

them to perform better.

The social context in the workplace affect worker performance and behavior as well (Dalton, 1989; Kenter, 1977; Zelezik, Christensen & Roethlisberger, 1958). In the social environment of a group, supervisor support is suggested as a key variable in terms of goal-setting. reinforcement, and modeling for the desired performance, and can affect the training transfer process (House, 1968; Baldwin & Ford, 1988). If used properly, supervisory assistance, with its five key elements defined by Huse and Cummings (1985), can involve supervisors and trainees in joint efforts in helping employees to work to their full capacity. The five key elements are (1) diagnosing trainees' job tasks; (2) determining meaningful goals for utilization of the required KSA on the job; (3) gaining commitment through participation of both the workers and the supervisor; (4) assessing progress according to the accepted work criterion and giving feedback connected to the behavior and performance; and (5) providing support and counseling when necessary. By orienting trainees to appropriate kinds of behaviors and work outcomes, supervisors can reinforce the commitment of trainees to transfer their learning in the work environment, which in turn, stimulate supervisors' support of the transfer of learning. When these conditions are met, supervisory assistance can be used as a powerful intervention "tool" for clarifying roles, developing employees, and improving motivation and performance (Huse & Cummings, 1985).

Besides the supervisory support, the interdependent relationship of group members also affects the effectiveness of both the group and individuals. Each individual brings something (e.g., ability, value) to

the relationship and derives something from it. It is through such relationships that much of the group work is done (Dalton, 1989) and individual needs are met. Zaleznik, et.al (1958) and Kanter (1977) found that negative group-member relationships can restrict both the group and its members to a very limited opportunity to grow and to assume responsibilities. It can also result in a lowered commitment of, and adverse behaviors by members.

3.2.3 Reward Practices

HRM reward policies regarding human resources directly affect an organization's efficiency. The equity of HRM activities in organizations affects employee's motivation toward just how much effort they may or should exert on the job (Milkovich & Boudreau, 1988). Generally, reward systems are designed to improve the organization by motivating people to join the organization, and to offer their efforts and to perform effectively. Specifically, performance can be enhanced by linking important rewards to good performance in a timely, causal manner. Here, employees must perceive the relationship between valued rewards and effective performance to be equitable. Moreover, workers must have trust that the organization will fulfill its promise to reward good performance. When these conditions are met, rewards systems can contribute to effective performance (Huse & Cummings, 1985).

3.2.4 Skill, Work Effort and Productivity

In studying how individuals determine their efforts and how their efforts affect productivity in the organization, Tsang and Levin (1985) developed a model of production for a firm which reveals the linkage between the level of over-education of workers to the firm's output.

In the Tsang-Levin Model (1985), workers are not just another "inert input" like other components such as capital, material, job structure, time and technology, which can be mechanically manipulated. The firm only obtains their work capacity when hiring workers, while their work effort is not guaranteed (Tsang & Levin, 1985: 98). Workers join a firm with such characteristics as ability, skills, needs and expectation. Workers then "assess their job environment and offer a level of effort consistent with their needs, skills and personality" (Tsang & Levin, 1985, p.99). Tsang and Levin (1985) define effort as an intangible input to the production function, which encompasses both this intangible input and other tangible inputs. In studying the impact of inputs such as the utilization of education on productivity, this model takes into account the effort of workers as an important intangible and dynamic input. The problem revealed is that the match/mismatch between the characteristics of the workers and the characteristics of the jobs directly and indirectly affect productivity. Workers with skills greater than required (the mismatch of worker ability with job-required ability) can show higher job dissatisfaction, lowered work efforts, higher turnover and absenteeism, and poor health due to the dissonance between the job and their abilities. Hence, under-utilization of education leads to lower work efforts and thus lower productivity.

The most salient feature of the model is that while considering other major tangible components in the process components of production, it explicitly specifies, in the dynamic approach, how the workers determine their effort at work. This has a direct impact on the final production output. According to the authors, an important task for the organization, then, is to devise a system of supervision and incentive schemes to extract more effort from workers.

Obviously, it can be inferred that after training, the workers' potential capacity, and their expectations have changed. In such case, workers changed characteristics may be incongruent with such organizational factors as task requirements, supervisory assistance, peer relation, or reward practices. The incongruence may then cause failure in motivating the workers to use the newly acquired KSA. Hence, workers can not work to full capacity, nor the firm can exact the expected potential out of workers after training. Therefore, a system of production with an environment appropriate to motivate workers and exert their abilities is critical to promote the transfer of training. Such organizational variables discussed above as training orientation, work design, supervisory assistance, group climate, and reward, can be used to motivate individuals. Thus, the appropriate manipulation of the organizational variables may end with the increased value of the investment in human resources development.

3.3 A Proposed Scheme of the Transfer of Training in the Workplace

Based on the literature on factors affecting employees' behavior, this researcher developed a conceptual framework for understanding the transfer of training in the workplace and for guiding this study. The conceptual framework is illustrated in Figure One.

First, an enterprise employs workers who have certain individual characteristics. These characteristics include the KSA that are attractive to the organization; these characteristics also include the workers' needs, value, expectation of working in the organization. The workers come to offer their contribution of KSA in hopes of receiving economic, social, and psychological rewards.

On the other hand, the organization hires the workers in hopes of extracting their KSA to accomplish the organizational goals. The organization will first attract workers, and then extract their KSA by manipulating such internal organizational factors as orientation, job design, supervisory support, peer support, and reward policies. The ideal manipulation should be in a way that worker KSA best matches up with the job required ability, and that human relations, e external variables such as government policies, economic fluctuation, and technological advancement, also have an impact on the organization. Here, any perceived or assessed internal incompetency will trigger the organization to make readjustments, (e.g., by introducing new technology, flattening the organizational structure, and reorienting production, and training).



FIGURE 1 Determinants of the Transfer of Training

If training and education are determined by needs assessment as the appropriate way to eliminate the gap between the present state and the expected state of workers' KSA, then they have the function of increasing the competency of the workforce. By teaching employees certain KSA, training can contribute to rebuilding the internal efficiency of the organization. Specifically, well-developed training programs can provide relevant learning experiences, and improve worker capacity, thus enabling them to work more effectively on the job.

At this stage of learning, it is necessary to postulate a potential linkage between newly acquired AET and improved performance and productivity. That is, there is only a relation in the sense that the workers have gained from training a potential KSA capacity of working more effectively (the internal effectiveness of training). After training, the KSA capacity is only "potential" because the direction of work behavior and the level of effort of the trainees on the job has not yet been demonstrated. While training improves workers' capacities of working efficiency, the it can also provoke changes in individual expectations of trainee himself and the organization. The trainees' new potential capacity and their expectations then may be incongruent with such organizational factors as company expectation, task requirements, supervision, peer relation, and reward systems. It can be inferred that in such a case, the direction of behavior and level of effort may not necessarily correlate positively with the potential capacities. This is because the transforming of the intangible input of workers into behavior and efforts in the workplace is based on the opportunities, reinforcement and outcomes of such input. Training and education, as a

subdivision or event within the organization, does not have much control on those organizational factors affecting employee behavior and therefore cannot ensure workers' behavior on the job. On the other hand, trainees assess the opportunities to use KSA and the outcomes of their behavior and efforts, weighing their own potential capacity and expectations. Such transforming process is subtle, individual, or even unconscious, over which the organization has only some control.

Anyway, the organization is able to promote the utilization of trainees' KSA potential by devising a system with relevant variables. The work unit can seek strategies to manipulate the organizational factors that will motivate workers to exert their new KSA, thus increasing work efficiency and productivity. While implementing AET programs, the organization needs to devise a system with an appropriate work environment which may include (1) starting training with a clear orientation; (2) matching of trainees' KSA with the work design (e.g., job task requirements, providing opportunities, information, and equipment); (3) providing supervisory assistance (e.g., task diagnosing, goal-setting, criteria, feedback, not only controlling or monitoring); (4) encouraging peer support; (5) stipulating appropriate rewards. These organizational factors in the workplace are expected to motivate the trainees to exert their potential capacity and improve their work efficiency.

First, training can be started with a clear orientation. The implementation of training orientation aims at helping both supervisors and employees to have an understanding of the company's goals and training objectives. The shared understanding of training programs and

expectation of parties involved prepares trainees and their supervisors for learning, and the subsequent applications. The preparation explicate the learning objectives, training contents, the relevancy with production and expected applications on the job. It prepares the organization to adopt appropriate strategies of promoting the utilization of KSA as well. On the contrary, the unprepared trainees and management can become frustrated with irrelevant learning, and restrained environment for applications, and unsatisfactory behavior on the job.

The potential KSA paired with the work design may result in either a match or mismatch. If the potential KSA is required as part of the worker ability needed for accomplishing the job, provided with appropriate equipment, information etc., then the trainees' KSA and the work design are in concordance with one another. The trainees are in the position and have the opportunity to use KSA gained from the training to accomplish their tasks. If the potential KSA is not described in the work design, then the trainees' KSA and job ability requirements come to a discord, or a mismatch. Trainees will find little opportunity to use KSA on the job.

However, the match in work design alone will not determine the transfer of training, the persistence use of the acquired KSA in the workplace. Besides, supervisory assistance and peer support, and the reward system, can affect the transfer of training.

For instance, if supervisors provide such support as goal-setting, information, allocating resources and giving feedback on trainees' application of their KSA, the trainee will perceive the available

assistance and feel encouraged to apply the KSA. Supportive peer relation also encourages application on the workplace. Positive feelings can stimulate peer learning and consultation. On the contrary, the negative feeling among peer will suppress the new ideas for being afraid of scorn or restrained cooperation for changes. If the reward system includes incentives for the application of KSA, improved performance and increased productivity, the trainee will feel motivated and see the application meaningful for both himself and the organization.

Although they may not be aware of the process, and others can't read, trained employees assess the organizational factors, and weigh their new KSA potential. During this assessment process, which is unobservable, trainees convert the information on the organizational factors, along with their own characteristics, into a decision on the behavior and efforts which they will demonstrate in the workplace. This is where the transfer process takes place. Such steps taken by individuals is sometimes conscious and sometimes very subconscious. Though this process of converting is unobservable, it can be inferred from worker behavior and productivity.

Given that the trainee himself is the constant regarding his characteristics, the organizational factors are variables which affect how trainees determine the direction of their behavior and the level of effort in the workplace. If the organization can promote the transfer of training by appropriately manipulating such organizational factors as training orientation, the match of trainees' KSA potential with the work design, supervisory assistance, peer support and adequate reward, the

responses exhibited from trainees are most likely the desired positive behavior and committed efforts. The application of KSA, along with committed efforts to the application, can lead to the transfer of training, or improved worker performance, thus increasing productivity in terms of quality and quantity. Both the organization and the workers will get rewards. The organization will regain internal competency and obtain increased productivity (external effectiveness of training), while the individuals will obtain their satisfaction in the terms of economic, social, psychological and career needs.

On the contrary, the lack of training orientation, opportunities, supervisory assistance and peer support, and of perceived inequity in HRM policies, can inhibit the transfer of training in the workplace, and lead to a negative transfer of KSA in the workplace. If trainees see little relevance of training with job tasks, fewer opportunities of application, or face a negative social climate in the workplace, and unfair and meaningless reward for the application of KSA, they may resort to a reserved behavior, thus not using the newly acquired KSA. Or, even worse, they may develop such adverse behaviors as engaging in activities not related to increasing productivity, remaining resistent to taking responsibility, or even quitting to seek a new organization which might expand the scope of their career. The failure in the transfer of training then results in input loss in investment in training. This loss is due to not being able to exert the trainees' potential capacities and integrate their efforts into the organization.

In conclusion, training is a necessary condition for developing the workforce, but not a sufficient condition for promoting the transfer of

training. Specifically, the internal training effectiveness, which is within the control of training process, is vital to the training transfer in the first place. However, many organizational factors which are outside of the training programs are associated with the ultimate transfer of learning on the job. This association could be in such a way that trainees determine the direction of behavior and level of efforts based on their assessing relevant organizational factors and the implied outcomes of applying KSA in the work environment. The appropriate manipulation of the organizational factors can promote the positive transfer of training, resulting in the desired work behavior and increased productivity.

3.4 Research Question and Hypotheses

Based on the framework presented in Section 3, the key elements in understanding the association of organizational factors on the transfer of training are as follows:

- trainees' and their supervisors' involvement in training orientation to be prepared for training and subsequent application;
- match/mismatch of trainees potential KSA with the work-design in the workplace;
- supervisory assistance for workers' application of KSA on the job;
- 4. peers support to each other for utilizing KSA;
- 5. reward practices in terms of a meaningful connection with trainees behavior and efforts;
- 6. the transfer of training in terms of trainees utilization of KSA on the job.

3.4.1 Primary Research Question

Is there any relationship between such organizational factors as training orientation, the match of trainee's KSA to work design, supervisory assistance, peer support, and reward system with the transfer of training in the workplace of four industrial settings in SSEZ, two state owned companies and two joint venture

companies?

3.4.2 Hypotheses

The exploration of the relationship of organizational factors with the transfer of training started with the estimation of the correlation of the organizational factors with the transfer of training. Therefore, it was assumed a correlation between the organizational factors and the transfer of training:

<u>HYPOTHESIS 1</u>: SUCH FACTORS IN THE WORKPLACE AS TRAINING ORIENTATION, THE MATCH OF KSA WITH WORK-DESIGN, SUPERVISORY ASSISTANCE, PEER SUPPORT, AND REWARD PRACTICE ARE CORRELATED WITH TRAINED WORKERS' UTILIZATION OF KNOWLEDGE, SKILLS AND ATTITUDE ACQUIRED FROM TRAINING ON THE JOB.

The further investigation of the association of organizational factors with the transfer of training in the workplace is the major thrust of this study. It is assumed that the organizational factors which are suggested having impact on employee behavior on the job affect the transfer of training in the workplace:

<u>HYPOTHESIS 2</u>: BY FACILITATING THE UTILIZATION OF KNOWLEDGE, SKILLS, AND ATTITUDE ACQUIRED IN TRAINING, SUCH ORGANIZATIONAL FACTORS AS TRAINING ORIENTATION, THE MATCH OF WORK-DESIGN WITH KSA, SUPERVISORY ASSISTANCE, PEER SUPPORT AND REWARD PRACTICE HAVE SIGNIFICANT AND POSITIVE IMPACT ON THE WORK EFFICIENCY.

This conceptual framework is applied to both the state-owned and joint-venture companies in Shekou Industrial Zone (SKIZ), Shenzhen Special Economic Zone (SSEZ), China. It is expected that in the two types of companies there is a difference in the organizational factors in the workplace, which might lead to the varied patterns of the transfer of training. Therefore, it is hypothesized that:

<u>HYPOTHESIS 3</u>: THERE IS A DIFFERENCE IN THE ORGANIZATIONAL FACTORS AND WORK EFFICIENCY GAINED BY UTILIZING KNOWLEDGE, SKILLS AND ATTITUDE ON THE JOB BETWEEN THE STATE-OWNED AND JOINT-VENTURE COMPANIES.

To compare the patterns of the transfer of training in the stateowned and joint-venture, it is hypothesized that:

<u>HYPOTHESIS 4</u>: IN THE STATE-OWNED COMPANIES, BY FACILITATING THE UTILIZATION OF KNOWLEDGE, SKILLS, AND ATTITUDE ACQUIRED IN TRAINING, SUCH ORGANIZATIONAL FACTORS AS TRAINING ORIENTATION, THE MATCH OF WORK-DESIGN WITH KSA, SUPERVISORY ASSISTANCE, PEER SUPPORT AND REWARD PRACTICE HAVE SIGNIFICANT AND POSITIVE IMPACT ON THE WORK EFFICIENCY.

<u>HYPOTHESIS 5</u>: IN THE JOINT-VENTURE COMPANIES, BY FACILITATING THE UTILIZATION OF KNOWLEDGE, SKILLS, AND ATTITUDE ACQUIRED IN TRAINING, SUCH ORGANIZATIONAL FACTORS AS TRAINING ORIENTATION, THE MATCH OF WORK-DESIGN WITH KSA, SUPERVISORY ASSISTANCE, PEER SUPPORT AND REWARD PRACTICE HAVE SIGNIFICANT AND POSITIVE IMPACT ON THE WORK EFFICIENCY.

3.4.3 Defining Variables

In accordance with the hypotheses derived from the conceptual framework, the variables conceived to accomplish this study are defined in the following.

The Dependent Variable

WORK EFFICIENCY GAINED BY UTILIZING KSA. In this study, work efficiency gained by utilizing KSA is defined as the degree of improved work efficiency to which the trained worker gained by utilizing KSA learned from the training, in terms of work speed and quality. It has been suggested that some organizational factors may correlate with the utilization of KSA (Baldwin & Ford, 1988; Goldstein 1986; Spielman, 1983; Baumgartel, & Jeanpierre, 1972; Mohamed, 1984; Levin, 1987; Tsang & Levin, 1987; Tsang, 1988; Gash & Kossek, 1989; Shi, 1989; Xu & Liu, 1989). In this study, perceived work efficiency gained by utilizing KSA on the job is an overall measure of work efficiency in terms of work speed, quality and scrap. Based on researcher's conceptual framework, the organizational factors which may contribute to, or inhibit learning transfer in the workplace include training orientation, the match of KSA with work-design, supervisory assistance, peer support, and rewarding practices.

The Independent Variables

TRAINING ORIENTATION. Training orientation is defined as the degree to which the worker realized that she was prepared for the training and the utilization of KSA on the job after the training. By orienting trainees to appropriate kinds of behaviors and work outcomes, it can reinforce the commitment of the trainees' to transfer their learning to the real environment, and subsequently stimulate their supervisors' support of the transfer of learning (Huse and Commings, 1985). And it is also said that employees who perceive that the

training programs are important to the supervisor will be more motivated to attend to, learn, and transfer acquired KSA to the job (Baldwin & Ford, 1989). In SKIZ, an orientation is usually given before training by the supervisor. It is to orient workers to a new learning by giving information of the training content, importance and the expected consequence of the training. In this study, training orientation is an overall measure of how the workers were prepared for the training and utilization of KSA.

MATCH OF KSA WITH WORK-DESIGN. The match of KSA with job-design is defined as the degree to which the technical physical structure of the job and KSA come to a fit so that trained workers have opportunities to utilize KSA on the job. The mismatch of workers' ability with the job required ability can affect the satisfactoriness of job performance and personal satisfaction, as well as the proper utilization of workers' skills (Betz et. at 1989, Dalton, 1989; Tsang and Levin, 1985; Tsang, 1987; Levin, 1987). A good match between the technical and personal work factors (requirements) can improve the capabilities of employees, thus enabling them to perform better (Huse & Cummings, 1985). In this study, the match of KSA with work-design is an overall measure. The variable takes into consideration of the way the job is designed so that using KSA is required to finish the tasks, that the information such as production flow chart and equipment appropriate are provided, and that workers have some discretion in using KSA in proper ways.

SUPERVISOR ASSISTANCE. Supervisor assistance is defined as the degree of assistance to which the worker experienced and obtained from her supervisor. Social context in the workplace can affect worker

performance and behavior (Dalton, 1989; Kenter, 1977; Zalezik, et. at. 1958). Supervisor support is a key work-environment variable (House, 1968; Baldwin & Ford, 1988) and has been indicated as an important organizational factor affecting the transfer of training process for trainees (House, 1968; Baldwin, 1988). Supervisor assistance includes diagnosing job tasks, determining meaningful goals on the job, assessing progress according to the accepted work criterion and giving feedback, providing support and counseling when necessary (Huse and Cummings , 1985). In this study supervisor assistance includes setting goals and criteria for utilizing KSA in accomplishing job tasks, provide help in solving problems in utilizing KSA, and providing feedbacks.

PEER SUPPORT. Peer support is defined as the degree to which the workers help and care each other when utilizing KSA in accomplishing tasks. Peer relationship is another important social environment variable. The interdependent relationship of group members affects the effectiveness of both the group and individuals because it is through such relationships that much of the group work is done (Dalton, 1989). In this study, peer support includes peer care and help in applying KSA.

REWARDING PRACTICES. Rewarding practices is defined as the incentives given to trained workers when KSA is utilizing on the job satisfactorily. The equity of HRM activities in organizations affects employee's motivation toward just how much effort they may or should exert on the job (Milkovich & Boudreau, 1988). HRM reward policies regarding human resources directly affect an organization's efficiency (Gordon, 1987). If rewards are linked with good performance in a causal manner, rewards systems can contribute to effective performance (Huse &

Cummings, 1985). In this study, rewards to satisfactory utilization of KSA include verbal appraise, bonus, wage increase, and skill level promotion.

TRAINING ACHIEVEMENT. Training achievement is defined by the score that the worker obtained for a training achievement test. In SKIZ, a test is given after each training to assess how much the worker have learned--internal effectiveness of training. The training achievement test written by the management and technicians comprises two parts: (1) the learning of job-related knowledge, skills, and required attitude on the job; and (2) the application of KSA on the job. The test scores are also filed as the reference for decision on promotion of working proficiency level which is the basis of wage pay.

Worker Characteristic Variables

The following control variables regarding worker background characteristics are selected. Theories on industrial psychology and organization (Betz et al., 1989; Arygris, 1964; Huse & cummings, 1985; Vroom, 1964) suggest that the overall interaction between worker characteristics and job characteristics can influence the capabilities of workers and their performance. It is also believed that they are needed as controls in Tsang and Levin's theoretical framework, in Tsang's empirical study (1987), and in Min and Tsang's empirical study (1990).

WORK EXPERIENCE. The worker experience is defined as the years of working in the electronic company.

WORK PROFICIENCY LEVEL. Work proficiency level is defined as the

level of performance proficiency appraised, notified by the company as the wage baseline. The work proficiency level is assessed once a year based on the performance appraisal and the training achievement by supervisors and managers. It is expected that workers at higher work proficiency level have higher work efficiency which leads to higher productivity. The work skill efficiency level in SKIZ ranks from 1 to 3, with 1 as the lowest and 3 as the highest level.

EDUCATION. The education attainments is defined as the years of schooling completed by the workers. Recruitment of workers requires that workers should have at least 12 years of education.

AGE. Age in the survey was coded into the following age groups: 18 to 25 years, 26 to 30 years, 31 to 35 years, and above 36 years. In the electronic industry in Shenzhen, young women are assumed to be more quick to learn, accurate and patient in handing with the electronic cells onto the printed circuit control card than women of older ages. 18 is the age of the majority of high school graduates with 12 years of education.

CHAPTER 4

METHODOLOGY

In Chapter 3, a theoretical framework was established as the conceptual foundation for this study. Hypotheses were made, and variables included in the study were defined. In this chapter, the methodology employed to conduct the empirical investigation is discussed.

This chapter consists of five sections. Section 4.1 begins with a general overview of the methodology employed for this study. Section 4.2 provides a brief description of field settings of the investigation, and a discussion of the sample included in the study. In Section 4.3, the measurement of the variables is discussed in detail. Section 4.4 then provides a discussion on the reliability and validity of the measurement. Finally, the overview of the data is provided.

4.1 Overview of Methodology

To fulfil the purpose of this exploratory case study, several instruments were designed to collect data. The major instrument for this study was a survey questionnaire completed by the trained workers. In order to have in-depth views of the transfer of training in the industrial sector, supplementary instruments were employed in the study, they were: 1) interview protocols for the trained workers, their supervisors, training officers, or managers; 2) a survey questionnaire to the supervisors, and 3) the workers' performance and productivity

file records were checked.

Since there were no instruments ready for studying the relationship between organizational factors and the transfer of training, the instruments were constructed and designed by the researcher, based on the related literature (Likert, 1967; Insel & Moos, 1981; Eddy, et. al., 1967; Hand, et. al., 1973; Huczynski & Lewis, 1980; Baumgartel & Jeanpierre, 1972; Fleishman, 1953; Hariton, 1951). The scales constructed to measure the variables in this study were constructed in accordance with the conceptual framework.

4.1.1 Questionnaires

The major set of data for this study was collected by the survey questionnaire to trained workers (See Appendix A). The survey questionnaire for trained workers consisted of six parts. Part One was designed to elicit information about the training programs that the trained workers attended. Part Two to Part Five contained scales which measure the hypothetical variables of training orientation, the match of acquired KSA (Knowledge, Skills, and Attitude) with work design, supervisory assistance, peer support, reward practice, self-perceived productivity efficiency gained by applying KSA. In accordance with the conceptual framework, each variable consisted of more than one content aspect. In order to precisely measure the related property of the variables, scales that were composed of a number of related items were developed. Therefore, each variable was measured by a number of items related to the specific variable. Each item was a statement followed by five responses with one indicating the lowest level of the perceived
practice, four indicating the highest perceived practices, and N indicating not applicable in the situation. Part Six was designed to collect demographic and personal data about the respondents.

In order to have an overall understanding of the sampled population, a supplementary questionnaire for the supervisors of the trained workers was designed with the same corresponding parts and constructs (See Appendix B).

4.1.2 Interviews

Three supplementary semi-structured interview protocols were designed for the trained workers, their supervisors, and managers/trainers. This was done in order to elicit in-depth and background information about the variables to be studied.

The interview with management/training personnel (See Appendix C) was divided into four parts. Part One contained questions on training orientation; Part Two contained questions on such work organization environmental factors as the match of KSA with work design, supervisory assistance, and peer support; Part Three contained questions eliciting information of the performance appraisal and reward policies; and Part Four contained questions about workers' productivity.

The interview for trained workers, with 15 questions (See Appendix D), and interview for supervisors, with 14 questions (See Appendix E) were both constructed to elicit information corresponding to scales measured in the questionnaires. These questions were focused on the training orientation, the match of KSA with work design, supervisory assistance, peer support work organization environmental factors, reward

practice, and perceived work efficiency by utilizing KSA.

4.1.3 Performance and Productivity Records Checking

An attempt was made by the researcher to obtain the information on performance and work efficiency rate of the surveyed workers. The information about worker performance and work efficiency rate was gathered by checking files which consisted of the following three parts (See Appendix F).

1. The trained workers' performance was measured in terms of skill, attitude, work effort, commitment and ability. The data was gathered by checking the performance appraisal done by supervisors. Each performance aspect was measured by a 4 point scale, with 1 indicating the lowest valued performance and 4 indicating the highest valued performance; and N indicating not applicable in the situation.

2. Indirect productivity was measured in terms of worker's attendance/absence on the job by the measurement of hours monthly.

3. Direct productivity, (the productivity of the group) was measured in the terms of monthly quantity and scrap rate.

Due to the fact that the filing system for the employee performance records and production records were not consistent and complete in the four companies², the data gathered with the instrument were incomplete. Therefore, the data on scrap rate were used only for supplementary data analysis (See Appendix I about t-tests on scrap rate).

² In SKIZ, filing and human resource management systems have not been well established yet. Each company has autonomy on its organization and management of production.

4.1.4 Sample and Field Study

The field study was conducted in four electronic industrial companies, in Shekou Industrial Zone (SKIZ), Shenzhen, China, between mid August to the end of November, 1990. The electronic industry in SKIZ was made up of 38 industrial enterprises, about 30% of the whole industry sector in SKIZ. In selecting the sample for this case study, background information on production technology, products, training programs, worker population, company establishment date, and company size, were first carefully reviewed. Eight of the 38 electronic companies were selected for the first field visit. After observing the working environment and interviewing the managers and trainers in each company, 4 companies were selected for this study.

Among the four electronic companies, two were state-owned companies and two were joint-venture companies. The state-owned electronic companies were established by electronic industrial entities owned by the Chinese state government. One state-owned company was established in September 1984, and one in August 1983. The joint-venture companies were jointly established in terms of investment and management by a Chinese state-owned electronic industrial entity and a foreign electronic industrial entity. One joint-venture company was established by a Japanese electronic industrial entity and a Chinese state-owned electronic industrial entity in December 1984, and the other one was established by a Hong Kong electronic industrial entity with a Chinese state-owned electronic industrial entity in October 1985. All of them had experienced their developmental period and now was in a more stabilized status.

There were three production lines/groups in each company; controlling card board lines, semi-products assembling lines, and assembling and testing lines. The production groups of controlling card boards in each company were included in this study, the production of which required trained and skillful workers for handling complicated electronic cells. In order to have an adequate investigation on the transfer of training, workers on the controlling card board lines, their supervisors, and two managers from each company was sampled. Anonymity for respondents and for the sampled companies were guaranteed.

Before the survey, interviews were first conducted with two to three trained workers on the production line, their supervisors, and the factory managerial or training personnel. The information from the interview was used to improve the questionnaires. A pretest was administrated to a small group of 8 workers in the four companies.

The questionnaires were then administrated to all the workers on the production line of controlling card board in each of the four electronic industrial companies. The completion of each questionnaire took about 20 to 25 minutes. The sample size of production line workers were 26, 24, 32, and 24 in Company 1, Company 2, Company 3, and Company 4 respectively. The supplementary questionnaires were, at the same time, administrated to the supervisors responsible for the production line in each of the four electronic industrial companies. The supervisor sample size were 2, 2, 3, and 2 in Company 1, 2, 3, and 4 respectively. Totally, 106 workers,9 supervisors, 8 managerial/training personnel were included in this study. The performance and productivity data were gathered by checking on the company available files.

The data gathered from the trained worker questionnaires were analyzed in accordance with the theoretical framework by employing correlation, regression models, and t-tests. The supplementary information gathered with supervisors' questionnaires, interviews, and performance and productivity efficiency file checking are used additionally to interpret statistical analysis results, when necessary.

4.2 The Four Electronic Companies

The electronic industry in SKIZ is made up of 38 industrial enterprises, about 30% of the whole industry sector in SKIZ. The electronic industry in SKIZ is considered the leading section of high technology in Shenzhen Special Economic Area. These enterprises are engaged in developing and producing products ranging from computer magnetic heads, computer mother boards, computer power switches, computer CPU, computer hard-and-software controlling boards, hard disk units, assembled computers, supersonic detectors, nuclear magnetic graph scanners, silicon crystal transmitters, solar Casio calculators, TV sets, electronic machinery and Nintendo game cards. These enterprises are both domestic and international market oriented, and many of their products, and intermediate-products have been exported to countries such as Japan, Taiwan, Korea, Hong Kong, the USA, Canada and other Southeast Asian countries.

Four electronic industrial companies, two state-owned companies and two joint-venture companies, were chosen for the case study for the following reasons. First, the electronic industry makes up of the

largest proportional share of the industrial sector in SKIZ. Second. the four companies all have similar production equipment which requires skilled workers engaged in production. Third, the introduction of advanced production technology in the four companies from foreign countries requires training for the native workers. Fourth, in the four companies, the workers are assumed representing the employee population in the electronic industry in SSEZ because the requirements and qualification of the recruitment are the same (e.g. 12-year high school graduates, from rural areas of Guangdong, and the majority is female). The newly recruited workers had no experience of living and working in the urban and industrial areas. In order to stay abreast of the advancing electronic technology, training is continuously provided to both the newly recruited and experienced workers once a year. Fifth, the electronic companies in SKIZ are largely market-oriented. Their work organization is oriented to high quality electronic products at low cost. Last, the electronic industry provides a setting where a mixture of state-owned and joint-venture enterprises with contrasting organizational practices exists. With the assumed difference in the ownership nature and organizational practices, the study was expected to reveal more information about the association of organizational factors with the transfer of training.

4.2.1 Products and Production Technology

The products of the four plants (See Table 1) are uninterrupted power switches (UPS) for computers, and solar calculators with printers. Though the final assembled products of Company 3 are different from

Table 1 Comparison of Four Electronic Compar	ies
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COMPANY NAME*	1	2	3	4				
Company type	State-owned	State-owned	Joint-venture	Joint-venture				
Establishment	Sept. 1984	Aug. 1983	Dec. 1984	Oct. 1985				
Employee size	156	152	180	186				
Maj or Products	UPS**	UPS	SCP***	UPS				
Product Markets	Domestic & International	Domestic & Internationa	Internationa 1	l Domestic & International				
Production Technology	Standardized Production line	Standardized Production line	Standardized Production line	Standardized Production line				
Sample unit	Controlling board group	Controlling board group	Controlling board group	Controlling board group				
Processing parts	Controlling card board	Controlling card board	Controlling card board	Controlling card board				
Processing step 1	Cells installing	Cells installing	Cells intalling	Cells installing				
step 2 step 3 step 4 step 5	welding inspection repairing cleansing	welding inspection repairing cleansing	welding inspection repairing cleansing	welding inspection repairing cleansing				
- Sample size workers supervisors	26 2	24 2	32 3	24 2				

* Since anonymity is guaranteed, the companies are referred as to COMPANY 1, 2, 3, and 4.
** Uninterrupted Power Supply for PC computers.
*** Solar Calculator with Printer.

those of the other three companies, the production process for the controlling card board is very similar.

The controlling card board is the most important part in electronic products. On production lines, workers process the printed circuit cards by installing cells of different functions and sizes onto the card boards, welding cells to the card boards, then inspecting the quality, and repairing the flaws. These are operated manually. Finally the boards are cleansed and shifted to the next processing line.

Each controlling card boards contains about 120 to 250 tiny different electronic cells, depending on the model of the card board. Cells are tiny and look similar, but are different in function, size, and capacity. Different colors, strip signs, numbers, and shapes are used on the tiny cells to illustrate their function, size, capacity, and polar direction. The production line standardizes and simplifies the process so that each worker on the line is responsible for finishing 10 to 20 cells. The number of cells assigned to workers is decided by supervisors according to individual worker's knowledge and skill proficiency; and also based on their knowledge and experience of production organization in the frontline. Usually, the process requires about 24 to 30 or so workers on the production line at the same time when the conveyer is turned on. Good knowledge of basic electronics, accurately reading the cell signs and the processing flow charts, and excellent operation skill proficiency are required of each worker on the line. Any mistake in installing the cells, or flaws in welding will cause the malfunction of the whole product later. Besides knowledge and skill proficiency, good work attitude and commitment on the line is

critical to accuracy and quality of the work.

4.2.2 Supervisors and Workers

The workers at controlling card boards are organized as a production group with 2 or 3 supervisors. Workers in SKIZ are recruited every year on a two to three-year contract. They are recruited from rural areas or small towns in Guangdong Province as is required by the Guangdong government. 12-year education attainment is also requested by electronic industry in recruitment. Almost all the workers on the line are young women in ages of 18 to 25 years old. The underlying assumptions on recruiting young women are that (1) they are patient and accurate in handling tiny cells smaller than the finger tips; (2) young women have better eye-hand coordination (e.g., like doing embroidery); (3) young girls can adjust better to jobs requiring patience, and longhour concentration. As the contract ends, some workers go back to their hometown, and other some may search for another similar jobs in SKIZ and start another contract.

The supervisors are usually responsible for assigning tasks and coordinating production operation on the line, material supply, quality control, performance appraisal, and worker grooming. Supervisors in the SKIZ electronic industry are promoted from the workers. Workers are recruited on a two to three-year contract. When the contract ends, a few workers having acquired excellent knowledge, skills, and kept good performance records may get a contract renewed or tenure. Among these few best workers, those who proved to have the ability to organize production on the frontline will get a promotion. Therefore, the

supervisors are usually well experienced on the production frontline and capable of taking responsibilities of the frontline production.

4.2.3 Training

The recruited workers in the electronic industry are normally rural area high school graduates from the Guangdong Province. The education system in the rural areas is devoted to general basic education. Therefore, the workers usually had little knowledge and experience working and living in urban and industrial areas. The introduction of advanced production technology from foreign countries requires training for the native workers. On the other hand, the models of electronic products are changing rapidly every year. In order to stay abreast of electronic technology advancement, continuous training is needed for both the newly recruited and experienced workers. Therefore, training is required of every worker, and usually provided by the electronic company at least once a year. Workers, who have had their required training, can volunteer for training sponsored by either her company, or by other organizations like the SKIZ training center, or by the mother company.

Training programs in the electronic companies are developed and conducted by the personnel managers and technical personnel in the same company. Managers and personnel officers first examine the workers KSA status and the needs of the production. Training usually consists of two major parts for workers: 1) work orientation, and 2) job required skills learning. Personnel manager is responsible for program development of the first part; and technicians and engineers are

responsible for curriculum development of the second part. This part is in accordance with both the requirements of the basic electronic knowledge and skills stipulated by the Bureau of Electronic Industry (it was called Should-Know and Be-Able-to-Operate by Electronic Workers), and the job requirement of production in the company.

Training is usually conducted in the first quarter and early in the second quarter of the year when production was not very busy. This is also the time when new workers started their first working days (after the New Year and Chinese Spring Festival). The last time training was conducted in the four companies was the end of the winter quarter, 1990.

Training was conducted in two locations in the company. Orientation and lectures on knowledge and skills usually occurred in the conference room. Skill learning and practice took place on the factory floor at scheduled time. During the orientation, new workers are expected to learn the history of the company, adjust to the working environment, and foster an expected working attitude. This part of training is conducted by managers. The managers lecture on the history of the company; supervisors and workers are invited to talk about their experience in the company; and regulation and rules of working and living are also interpreted and illustrated by managers in detail. For instance, these rules and regulations include how to use a toilet, how to dine in the dining hall, how to park a bicycle, how to behave on the production line, how to respond to supervisors and peers and how to report problems. Workers also tour each division of the company, and the whole Shekou Industrial Zone. In retraining, workers are asked to review problems in production and their operation. They also make

comments on the organization of production and management in each division.

In technical skill learning, technicians and engineers are responsible for teaching job required knowledge and skills. The learning includes basic electronic knowledge, and operation skills. Usually, knowledge is taught in the evenings, or spare-time, and operation skills are taught and practiced in on-the-job training mode. The retraining for workers often consists of in-depth study of knowledge and job-related problem solving skills, and continuous emphasis on quality control by fostering workers' attitude and commitment on job.

Training usually lasts for one to two weeks, 6 7-hour days per week. Evenings may be used for training when production is busy. Training may also last for more than two week in rare cases when production is not busy.

From Table 2, one can see that for 87.8% of the workers, training was sponsored by the work unit. 92.5% of the workers attended training in the workplace. 87.7% of the workers attended training sponsored by the company because of the requirement. For 83.0% of the workers, costs were paid by the company. Those 10.4% who paid their own fees seem to be in the group who volunteered for training and who attended training in such other places as the SKIZ training center. 73.6% of the workers had on-the-job training, and 19.8% had training in the evenings so as not to lower production when the production was busy. Only 2.8% had work-released training. For 75.5% of the workers attending training, the purpose of their training is to learn job related KSA;

VARIABLES
F TRAINING
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Table 2 D

	Overall	Company 1	Company 2	Company 3	Company 4
(Sample size)	(106)	(26)	(24)	(32)	(24)
Variables	х	ч	х	ж	×
SPONSOR UNIT					
by work unit	87.70	76.9	95.8	93.8	83.3
by mother company	•	7.7		•	8.3
by others	5.70	3.8	•	3.1	•
missing date	6.60	11.5	4.2	3.1	8.3
LOCATION					
on-spot	92.50	92.3	100	93.8	83.3
other place	2.80	•	•	3.1	8.3
missing data	4.70	7.7	•	3.1	8.3
TRAINING COST					
paid by work unit	83.00	92.3	85.0	87.5	85.0
paid by trainees	10.40	•	10.8	3.1	10.8
paid by trn center	1.90		•	6.3	
missing data	4.70	7.7	4.2	3.1	4.1
TRAINING CHOICE					
by work unit	87.70	88.5	87.5	87.5	87.5
voluntary	10.40	3.5	12.5	12.5	12.5
missing data	1.9	7.7	•	I	·
TRAINING MODE					
on-the-job	73.60	61.5	87.5	81.3	62.5
spare-time	19.80	23.1	12.5	18.8	25.0
work-released	2.80	7.7	•	•	4.2
missing data	3.80	7.7	•		8.3

any 1 Company 2 26) (24) x 7.7 87.5 8.3 7.7 8.3 4.2 11.5 4.2 11.5 20.9 26.9 20.9	Company 3 (32) x 75.0 18.8 6.3 6.3 6.3 71.9 71.9	Company 4 (24) x 58.3 16.7 16.7 8.3 8.3 8.3 8.3 8.3 8.3 8.3 8.3 8.3
x x 30.8887.5 7.7887.5 8.3 4.2 4.2 11.5 20.9 26.9 20.9 26.9 20.9 26.9 20.9 26.9 20.9 26.9 20.9 26.2 27.2 27.	x 75.0 18.8 6.3 6.3 71.9 71.9	x 58.3 16.7 16.7 8.3 8.3 8.3 8.3 8.3 8.3 8.3
30.8 87.5 7.7 87.5 7.7 8.3 - 4.2 11.5 4.2 72.0 79.2 26.9 20.9 26.4 54.2	75.0 18.8 6.3 - 71.9 28.1	58.3 16.7 16.7 8.3 37.5 -5
30.8 87.5 7.7 8.3 - 4.2 11.5 4.2 20.9 79.2 26.9 20.9 26.4 54.2	75.0 18.8 6.3 - 71.9 28.1	58.3 16.7 16.7 8.3 37.5 5,5 5,5
7.7 8.3 - 4.2 11.5 4.2 26.9 79.2 26.9 20.9	18.8 6.3 - - 71.9 28.1	16.7 16.7 8.3 37.5 5.5
- 4.2 11.5 4.2 26.9 79.2 12.4 54.2	6.3 - 71.9 - 28.1	16.7 8.3 37.5 5.5
11.5	- 71.9 - 28.1	8.3 37.5 62.5
79.2 - 26.9 20.9 +2.4 54.2	71.9 - 28.1	37.5 - 5 62 5
72.0 79.2 - 26.9 20.9 +2.4 54.2	71.9 - 28.1	37.5
- 26.9 20.9 42.4 54.2	- 28.1	- - -
26.9 20.9 12.4 54.2	28.1	60 5
42.4 54.2		1.10
12.4 54.2		
	62.6	62.5
15.3 16./	3.1	20.8
34.6 8.3	6.2	·
7.7 20.8	28.1	16.7
7.70 8.3	6.5	16.0
3.80 12.5	9.6	8.0
30.80 54.2	45.2	56.0
57.70 25.0	38.7	20.0
7.70 8.3 3.80 12.5 80.80 54.2 57.70 25.0		6.5 9.6 45.2 38.7

* This variable was asked to be specified by the surveyed workers. ** 60 is usually the score for a pass in the 100-score system.

Table 2 (cont'd)

13.2% of the workers had training to update their job related KSA. 64.9% of the workers specified training content as job-related; 0.9% had training to raise education level. 34.% of the respondents didn't specify anything. 55.6% of workers had training within one week; 13.4% had training within two weeks; and 12.1% had training for more than two weeks. The rest was missing data.

Usually, a test is given after training to assess how much the worker has learned. The training achievement tests in four companies, written by the management and technicians, are made up two parts (See Appendix G) in similarity: (1) job-related knowledge, skills, and expected work attitudes; and (2) the application of KSA on the job and problem solving. A one-hundred score system is used in measuring learning. In such a score system, 60 is considered as a pass; 60 to 75 then is considered as an intermediate level; 76 to 89 as satisfactory level, and 90 and above is excellent.

The test scores are also filed as the reference for decision of promotion on work skill proficiency level which is the wage base line. One can find from Table 2 that over 82.1% of the workers had scores above 76 which is considered satisfactory learning from training.

4.3 Measurement of the Variables

The data collected with the worker questionnaire consist of three subgroups of variables: variables eliciting information on training programs (See Table 2), variables eliciting information on the transfer of training, and variables eliciting information about worker

characteristics. The variables included in the statistical analysis are the latter two groups: variables eliciting information on the transfer of training, and variables eliciting information about worker characteristics. The definition of the variables are provided in Chapter 4. Here, the preparation and measurement procedure of each set of variables are discussed.

4.3.1 Variables For Estimating the Transfer of Training

In this study, variables eliciting information on the transfer of training included training orientation, work-design, supervisory assistance, peer help, reward practice, perceived work efficiency by utilizing KSA on the job, and training achievement.

Training orientation, work-design, supervisory assistance, peer help, reward practice, perceived work efficiency by utilizing KSA on the job were measured by a scale with a value of one for the lowest level of perceived practices in the work unit, a value of four for the highest level of in the work unit, and N as not applicable in the workplace. The measurement scale of each variable was based on a set of items (See Appendix A). Each of the items was a statement followed by five responses with a one-to-four value scale, and an N for not applicable indication. For each of the statements, the workers were allowed to choose one of the five mutually exclusive responses which best tells their response to that statement. Since each variable was measured by several statement items, the values from the responses to these statements measuring the same variable were added, and then the arithmetic mean is taken as that variable value. It was an overall

measure of each variable. For each statement item, N, the notapplicable indication, was estimated by running frequency. The frequency over 30% of the overall sample was arbitrarily considered indicating that the statement was not applicable in this study, and then was dropped. Since no statement had "Not Applicable" indication more than 5 counts (4.7%) in the overall sample, all of the items measuring the variables were considered applicable in the situation, thus being included in the analysis.

Training achievement test score was an interval variable measured by the Chinese hundred-point scoring system, for which 60 is a pass point; 60 to 75 is considered intermediate achievement level; 76 to 89 is considered good achievement level; and above 90 is considered excellent achievement level. Training achievement tests were made up of two parts (See Appendix G): (1) job-related knowledge, skills, and expected work attitudes; and (2) the application of KSA on the job and problem solving. As training curriculum were developed and tests were written in accordance with the requirement of the Bureau of Electronic Industry in China (it was called "Should-Know and Be-Able-to-Operate by Electronic Workers"), the training achievement scores were treated as a control variable for the training programs conducted by the companies.

One can find from Table 2 that for over all sample, 82.1% of the workers had scores above 76 which was considered satisfactory learning from training. Individually, 88.5% of the workers in Company 1 had score above 76; 79.2% in Company 2; 83.9% in Company 3; and 76% in company 4. Arbitrarily, 75 percent was often used by managers in these company as refers to majority in estimating training results. As the

percentage of trainees who had obtained satisfactory scores from training achievement tests of 1990 in all the companies is above 70%, training in the four companies were considered controlled.

4.3.2 Worker Characteristic Variables

The measurement of worker characteristics included in the estimation are discussed in the following.

- WORKER EXPERIENCE: The years of working in the current electronic company. It is measured by the actual years working in the electronic company.
- WORK PROFICIENCY: The work proficiency level. It is an ordinal variable measured by the level of performance proficiency appraised, notified by the company as the wage baseline. The lowest level -1, intermediate level - 2, and highest level - 3. In SKIZ, the highest level of performance proficiency is 3. Among 106 workers surveyed, 10 workers indicated work skill proficiency from 4 to 8. They were recruited from electronic factories in inland China as skilful workers to help the new and inexperienced workers. The work proficiency level of these workers was coded as 3.
- EDUCATIONAL ATTAINMENT: The amount of a formal schooling completed by the workers. It was measured by the number of years that a worker had attended school.
- AGE GROUP: In the analysis, age is a dummy variable with a value of zero for workers aged over 26 and a value 1 for workers aged 25 and under. The age data in the survey were coded into the following age groups: 18 to 25 years, 26 to 30 years, 31 to 35 years, and

above 36 years. The discrete age variable with a borderline at age 25 was chosen because in electronic industrial in Shenzhen, for most of the workers, the 2-to-3 year job contract ends before the workers reach the age of 26. Younger women was assumed to be quicker to learn, be accurate and patient in installing the electronic cells onto the printed circuit control card than older women.

The above variables or items of statements do not include every item in the questionnaire. The study was exploratory by nature. Most of the items of the scales were constructed by this researcher in accordance with the theoretical framework and based on some related literature (Likert, 1967; Insel & Moos, 1981; Eddy, et. al., 1967; Hand, et. al., 1973; Huczynski & Lewis, 1980; Baumgartel & Jeanpierre, 1972; Fleishman, 1953; Hariton, 1951). A few items were constructed in order to have more general, or possible in-depth view of the context of the transference of training. For instance, items 5 and 6 in Section 3 (See Appendix A) were included in the survey to elicit information about how well the training programs were designed and implemented in accordance with the production need, but not like item 4 which measures how close the KSA is matched with the work design. For this reason those items eliciting background or in-depth information in the survey were not included in the analysis.

4.4 Reliability and Validity

Considering that the conceptual framework for this exploratory study is developed based on existing literature outside China, and most of the items of the scales are constructed by this researcher, reliability and validity of these measurements were carefully examined.

4.4.1 Reliability

Since the study was an exploratory in nature, and the sample was small, the reliability of the scales were estimated by using the data collected from the sample.

In any survey, it is important that the responses to the items measuring a given variable agree reasonably well with each other so that the respondent can express explicitly and clearly the given organizational practices that she experienced and perceived in the workplace. Both Cronbach's alpha and the standardized alpha (See Appendix H for equations) were employed to estimate the reliability of the scales measuring the theoretic framework variables.

Cronbach's α is one of the most commonly used reliability coefficients and is based on the "internal consistency" of a test. That is, it is based on the average correlation of items which are assumed to measure, to a certain extent, a common property. The standardized alpha is an α value that would be obtained when all of the items in the scale are standardized to have a variance of 1. If the items on the scale have widely differing variances, the Cronback's α and the standardized α may differ substantially. If the items in the scale have fairly

COMPARISON OF CRONBACH'S ALPHA AND THE STANDARDIZED ITEM ALPHA Table 3

VARIABLE	NUMBER OF ITEMS	RELIABILITY:	RELIABILITY:	RANGE	OF		
NAME	ON MEASUREMENT SCALE	CRONBACH'S ALPHA	STANDARDIZED ITEM ALPHA	INTERS	CALE	S	
Training Orientation	5	.58	.59	0.43	ដ	0.51	
Technícal Envíronment	ور	.74	.75	0.21	to	0.50	
Supervisor Assistance	ور	.75	.76	0.34	ţ	0.57	
Peer's Support	2	.74	.75	0.60	ţ	0.60	
Reward	8	.84	.83	0.012	to	0.76	
KSA utilization	ور	. 83	. 83	0.20	3	0.65	1

comparable variances, the two α 's would be very close.

Table 3 contains both Cronbach's alpha and the standardized item alpha's for the scales in the worker's survey questionnaire this study. In basic research or research at early stages, a reliability alpha of .70, or higher will suffice; a reliability alpha at 0.8 would be money and time consuming (Nunnally, 1978). All the scales, except training orientation, appeared to possess the satisfactory reliability. Besides, the two α 's were fairly close in the magnitude which apparently meant that the items in each scale had fairly comparable variances. Yet, training orientation appeared to have alphas below a recommended point. This was due to the moderate to low average correlation of items on the scale, and may mean that the items on the training orientation need improvement in a future study.

4.4.2 Validity

The scale employed to measure each of the organizational factors should have satisfactory discriminant validity so that the respondents could distinguish each aspect of the organization variables in the workplace and respond accordingly. Discriminant validity is judged to be adequate if the intrascale reliability estimates for each scale are higher than the interscale correlations (Marsh and Mannari, 1977; Chew, 1984). All of the scales in this study had intrascale reliability (both Cronbach's alpha and the inter-item correlation reliability coefficient, or standardized item alpha) that was higher than the interscale correlations (See Table 3). Therefore, the scales in this study were

presumed to possess adequate discriminant validity for the attribute to be measured.

The overall content validity was established by conducting interviews and discussions with policy and development researcher in SKIZ, the trainers in SKIZ, managers, supervisor and workers in the four electronic companies, and by revising the items accordingly. Trainers, managers, workers and supervisors were invited to review the instruments about the variable definitions, the specific content universe to be sampled by the variables, the appropriateness of the items selected to measure each variables, the language clarity and rhetoric of the items and instruction. Questionnaires were administrated to a small group of eight trained workers from the target population as a pretest. Some revisions were made based on suggestions, and the final questionnaire items were considered to be appropriately constructed. The questionnaires were administrated to all the workers on the controlling card production line in two state-owned and two joint-venture companies.

4.5 A General Overview of The Data

In this section, the descriptive statistics of the variables for the companies are presented first, and then those of the two different type of companies are reviewed.

In Table 4, one can find that the mean value of training orientation is 2.69, showing that workers felt that they were moderately prepared for the training and utilization of KSA after training. The

Variable	Mean	Std Dev	Variance	Minimum	Maximun	Valid N
Training Achievement Test Score	80.17	19.35	374.49	11	66	106
Training Orientation	2.69	.55	.30	1.00	4.00	102
Match of KSA with Work Design	2.87	.55	.31	1.50	4.00	104
Supervisor Assistance	2.72	.53	.28	1.00	4.00	103
Peer Support	2.87	.55	.30	1.50	4.00	101
Reward Practice	2.00	.73	.53	1.00	3.80	103
Perceived Work Efficiency Gained by Utilizing KSA	3.15	.60	.36	1.67	4.00	102
Work Experience in the Electronic Company	2.54	1.23	1.50	1	6	100
Skill Proficiency Level	1.73	0.80	0.64	1	£	64
Education Attainment (Year)	11.93	1.02	1.03	9	14	66
Age	1.10	.33	.11	7	£	100

mean value of match of KSA with job design is 2.87, showing that the generally there is a reasonable match of KSA with the work design. The mean of supervisor assistance is 2.72, showing that workers generally sensed moderate assistance by the supervisor on the job. The mean of peer support is 2.87, showing that workers generally provided support to each other in utilizing KSA. The mean of the reward practices is 2.00, showing that workers usually felt that they got relatively low reward when they had utilized KSA. The mean of the training achievement test is 80.17, showing that on the average, the workers had satisfactory mastery of the KSA. The mean of perceived work efficiency is 3.15, showing that workers generally felt that they had relatively high level of work efficiency by utilizing KSA.

The mean of work experience for all the workers in the present electronic companies is 2.54 years with a standard deviation of 1.23 years. The very low average work experience is related to the fact that most of the young women work in the electronic companies on a 2 to 3year contract condition and most of the workers have work experience varying from 1 to 3 years. As the contract is due, most of them go back to their rural hometown. Only some very good ones can get a renewed contract, or obtain tenure by being promoted to a supervision position. The standard deviation appears large due to the fact that about one third of the workers are recruited every year. The mean of work proficiency level is 1.73 with a standard deviation of 0.80, showing that most of the worker were at the satisfactory skill proficiency level of 2. The average education workers obtained is 11.93 with a standard

Variable	Mean	Std Dev	Variance	Minimum	Maximum	Valid N
Training Achievement Test Score	79.88	21.08	444.48	11	96	50
Training Orientation	2.65	67.	.24	1.60	4.00	47
Match of KSA with Work Design	2.93	.48	.23	1.80	4.00	48
Supervisor Assistance	2.58	.57	.32	1.00	4.00	47
Peer Support	2.83	.57	.33	1.50	4.00	45
Reward Practice	1.99	.69	.48	1.00	3.80	47
Perceived Work Efficiency Gained by Utilizing KSA	3.15	.58	.34	1.67	4.00	48
Work Experience in the Electronic Company	2.76	1.16	1.34	1	6	97
Work Proficiency Level	1.44	0.76	0.58	1	3	50
Education Attainments	12.16	.55	.30	12	14	45
Age	1.16	.42	.18	1	3	45

Table 5 DESCRIPTIVE STATISTICS (State-Owned Companies)

Variable	Mean	Std Dev	Variance	Minimum	Maximum	Valid N
Training Achievement Test Score	80.43	17.85	318.79	11	66	56
Training Orientation	2.71	.60	.36	1.00	4.00	55
Match of KSA with Work Design	2.82	.61	.37	1.50	4.00	56
Supervisory Assistance	2.83	.48	.23	1.17	3.71	56
Peer Support	2.89	.53	.28	2.00	4.00	56
Reward Practice	2.00	.76	.58	1.00	3.63	56
Perceived Work Efficiency Gained by Utilizing KSA	3.15	.63	.39	1.67	4.00	54
Work Experience in the Electronic Company	2.35	1.26	1.59	1	S	54
Work Proficiency Level	1.98	0.75	0.56	1	3	56
Education Attainments	11.73	1.26	.75	1	£	54
Age	1.05	.23	.05	1	2	55

deviation of 1.02, showing that almost all the workers graduated from twelve year senior high schools. This is so because it was required that all the workers recruited in the electronic industry should have, at least, graduated from senior high schools. The mean of the age group for all the workers is 1.10 with a standard deviation of 0.33, showing that most of the workers were in the age group of 18 to 25 years old. This is also associated with the work contract policy; and most of the workers have their contract ended before they are over 25 years old.

In Tables 5 and Table 6, one can find that the average values of training orientation, match of KSA with job design, peer support, reward practices and perceived work efficiency by utilizing KSA for both kinds of companies are very close, except the average value for supervisor assistance. The joint-venture companies seemed to have a relatively higher level of supervisory assistance (2.83) to workers from the stateowned companies (2.58).

Regarding work experience in the present companies, the state-owned companies tended to have workers having, on the average, 0.41 more years of work experience than the joint-venture companies. The workers in the joint-venture companies tended to have 0.43 less years of education than workers in the state-owned companies. While comparing work efficiency level, the joint-venture companies had, on the average, 0.54 higher than workers in the state-owned companies. The mean value of age in both state-owned and joint-venture companies are very close, 1.16 and 1.05, showing that most of the workers in both kinds of companies were between 18 to 25. Statistic tests on the variables for the two types of companies are discussed in the next chapter.

In Chapter 5, the data analysis models will be presented and the empirical results discussed.

CHAPTER 5

DATA ANALYSIS AND EMPIRICAL RESULTS

Investigating the impact of organizational factors on the transfer of training in the workplace was the primary focus of this researcher. Statistical analyses were employed to achieve such a purpose.

This chapter consists of six sections. In Section 5.1 the statistic models for data analysis are presented first. Then, the empirical results are discussed in the following sections. In Section 5.2, the Pearson correlation matrix containing all the variables in the study are presented and discussed. In Section 5.3, the regression results for estimating the transfer of training in the workplace are examined. In Section 5.4, the differences in the organization factors between two types of companies are discussed. In Section 5.5, the regression results for estimating the transfer of training in two types of companies are examined. Section 5.6 contains a summary of the data analysis.

5.1 Methods of Analysis

Most of the studies on the transfer of learning focus on such factors as the learning process, learner characteristics, program design and development, and reinforcement of learning. All those factors are largely controlled within the training process. Limited studies suggest that organizational factors may contribute, or inhibit the transfer of training in the workplace. None of them have investigated the direct

relationship of organizational factors on the transfer of training in the workplace. The major effort of the study is to examine the association of the organizational factors in the work environment with the transfer of learning on the job. Models employed to estimate the relationship are discussed in this section.

5.1.1 Estimating Correlation of Organizational Factors

The exploration of the impact of organizational factors on transfer of training started with estimating the correlation of organizational factors with the transfer of training (perceived work efficiency gained by utilizing knowledge, skills and attitude (KSA) acquired in the training). It was hypothesized that:

SUCH FACTORS IN THE WORKPLACE AS TRAINING ORIENTATION, THE MATCH OF KSA WITH WORK DESIGN, SUPERVISORY ASSISTANCE, PEER SUPPORT, AND REWARD PRACTICE ARE CORRELATED WITH TRAINED WORKERS' UTILIZATION OF KNOWLEDGE, SKILLS AND ATTITUDE ON THE JOB. (Hypothesis 1).

To estimate the direction and strength of the hypothesized correlation, correlation coefficients are estimated. The Pearson correlation coefficient is commonly used to measure such relation.

5.1.2 Regression Models

Estimating the impact of organizational factors on the transfer of training in the workplace was the major thrust of this study. In accordance with the theoretical framework, it was hypothesized that:

BY FACILITATING THE UTILIZATION OF KNOWLEDGE, SKILLS, AND ATTITUDE ACQUIRED IN TRAINING, SUCH ORGANIZATIONAL FACTORS AS TRAINING

ORIENTATION, THE MATCH OF WORK-DESIGN WITH KSA, SUPERVISORY ASSISTANCE, PEER SUPPORT AND REWARD PRACTICE HAVE SIGNIFICANT AND POSITIVE IMPACT ON THE WORK EFFICIENCY (Hypothesis 2).

Models employed to test the Hypothesis are listed as follows:

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 +$$

$$b_{4}X_{4}+b_{5}X_{5}+b_{6}X_{6}+b_{7}X_{7}+b_{8}X_{8}+b_{9}X_{9}+b_{10}X_{10}+e_{1}$$
(1)

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6 + e_2$$
(2)

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 +$$

$$b_4X_4 + b_5X_5 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + e_3$$
 (3)

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + e_4$$
(4)

$$Y = a + b_{\delta} X_{\delta} + e_{5}$$
⁽⁵⁾

In these equations, Y = Perceived Work Efficiency Gained byUtilizing KSA; $X_1 = Training Orientation; X_2 = the Match of KSA with Job$ $Design; <math>X_3 =$ Supervisor Assistance; $X_4 =$ Peer Support; $X_5 =$ Reward Practices; $X_6 =$ Training Achievement Score; $X_7 =$ Age; $X_8 =$ Education Attainments; $X_9 =$ Work Skill Efficiency Level; $X_{10} =$ Work Experience; e of each equation = deviation of a worker's Perceived Work Proficiency from an expected value based on the model; the deviations were assumed to be independent and normally distributed. The unit of analysis in these models was the individual worker on the production line.

EQUATION (1) includes all the organizational factor variables, and training achievement score, and the worker characteristic variables. EQUATION (2), (3), (4), (5) are alternative equations. EQUATION (2) tests the hypothesis without taking account of worker characteristics. In EQUATION (3), the estimation excludes training achievement. EQUATION (4) only includes the organizational factors in the workplace. EQUATION (5) regresses the perceived work efficiency gained by utilizing KSA only on the training achievement score. Within each model, T tests and their significant levels associated with the standardized regression coefficient, Beta, for the independent variables will be discussed. The total explanatory power of each of these five regression models (R square) will be examined. This analysis was based on the entire sample.

5.1.3 Estimating the Difference in Organizational Factors

It was expected that the difference in the ownership of companies was related to certain difference in the organizational factors in the workplace, which might explain the difference in the transfer of training. Therefore, it was hypothesized:

THERE IS A DIFFERENCE IN THE ORGANIZATIONAL FACTORS AND WORK EFFICIENCY GAINED BY UTILIZING KNOWLEDGE, SKILLS AND ATTITUDE ON THE JOB BETWEEN THE STATE-OWNED AND JOINT-VENTURE COMPANIES (Hypothesis 3).

The difference in organizational factors and work efficiency between the two types of companies was tested by t-test. The pooledvariance t-test was used because it was assumed that the population variances in the state-owned and joint-venture companies were equal.

5.1.4 Estimating Transfer of Training in Two Types of Companies

To compare the patterns of the transfer of training in the stateowned and joint-venture, it was hypothesized that:

a. IN THE STATE-OWNED COMPANIES, BY FACILITATING THE UTILIZATION OF KNOWLEDGE, SKILLS, AND ATTITUDE ACQUIRED IN TRAINING, SUCH ORGANIZATIONAL FACTORS AS TRAINING ORIENTATION. THE MATCH OF WORK-DESIGN

WITH KSA, SUPERVISORY ASSISTANCE, PEER SUPPORT AND REWARD PRACTICE HAVE SIGNIFICANT AND POSITIVE IMPACT ON THE WORK EFFICIENCY (Hypothesis 4);

b. IN THE JOINT-VENTURE COMPANIES, BY FACILITATING THE UTILIZATION OF KNOWLEDGE, SKILLS, AND ATTITUDE ACQUIRED IN TRAINING, SUCH ORGANIZATIONAL FACTORS AS TRAINING ORIENTATION, THE MATCH OF WORK-DESIGN WITH KSA, SUPERVISORY ASSISTANCE, PEER SUPPORT AND REWARD PRACTICE HAVE SIGNIFICANT AND POSITIVE IMPACT ON THE WORK EFFICIENCY (Hypothesis 5).

To compare patterns of the transfer of training in the two types of companies, regression models (1) to (5) were applied the subsamples of the state-owned companies and joint-venture companies separately.

In this study, some of the independent variables were expected to be intercorrelated significantly one with another. Therefore, multicollinearity was suspected in regressions. Stepwise regression procedures were then used to select out those highly intercorrelated variables. Two-tailed tests at significant level of 0.1 were used to test hypotheses. This was because that the study was exploratory by nature and the sample was small.

5.2 The Correlation of Organizational Factors

The Pearson correlation coefficient was used to measure the correlation of organizational variables with the transfer of training. In Table 7, correlation coefficients of variables are presented.

First, one can find from this table that three organizational variables, the match of KSA with work design, supervisory assistance, and peer support were positively and significantly correlated with the

<pre>11 Work el Exper.</pre>																				** 1.0000	
ski t Lev																		.0000		.3471	
Education																1.0000		0264 1		t0885	
Age															0000	1286		1691		1290*1	
Training Score													.0000		.0329 1.0	. 0467		.1331 .1		.0442 .4	
Work Efficiency											1.0000		.2740** 1		0944	1445 -		2516* -		.0197	
Reward Practice									1.0000		.1046		0287		.1353	.1819		0991		1360	
Peer Support							L.0000		.1336		.3277**		.0026		0245	.0645		2484*		.0988	
Supervisor Assistance					1.0000		.4112**]		.2922**		**7997		.1426		1009	0077		0327		0376	
KSA-Work Match			1.0000		.3774**		.1971*		.2516*		.2770**		0628		.0482	.2561*		1999		0047	
Training l Orientation	1.0000	Ę	.2970**		.2947**	_	.0449		.1215		.1924		.0825	_	0759	.0065		0785		.2367*	
Variable Name	Training	Orientatio	KSA-Work	Match	Supervisor	Assistance	Peer	Support	Reward	Practice	Work	Efficiency	Training	Test Score	Age	Education	Attainment	Work Skill	Level	Work	Experience

Table 7 MATRIX OF CORRELATION COEFFICIENTS (Overall Sample)

* Signif. LE .05 ** Signif. LE .01

(2-tailed)

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perceived work efficiency gained by utilizing KSA on the job. The statistical results are consistent with the findings and theories in the literature of organizational behavior, management, industrial psychology, and economics of education which suggest that match/mismatch of workers' ability with work design, supervisory assistance and peer relationship affect the workers' performance in the workplace (Baldwin & Ford, 1988; Goldstein 1986; Spielman, 1983; Baumgartel & Jeanpierre, 1972; Mohamed, 1984; Levin, 1987; Tsang & Levin, 1985; Tsang, 1987; Gash & Kossek, 1989; Shi, 1989; Xu & Liu, 1989; Robinson & Robinson, 1985). In this study, the high correlation meant that the these three organizational factors in the workplace were positively associated with the transfer of training.

Reward practice and training orientation were not found significantly correlated with perceived work efficiency. Regarding reward practice, all workers interviewed, and 25% (26 workers) surveyed indicated in the open questions of the organizational practices that they had worked very hard to achieve the companies's goals of productivity. However the reward was not enough to meet their expectation.

In the Chinese culture, people often work hard even if the reward has not been appropriate because hard-working has been a highly valued merit of the culture. Keeping the worthy image of oneself is always valued more than working for rewards. This cultural uniqueness might, to some degree, influence the workers attitude in the workplace. Another reason that workers keep working hard might be that there is a chance for a small number of excellent workers to be retained in the
company and receive a promotion after their initial contract. Therefore, the correlation of reward practice with work efficiency, which was not significant, may have indicated that reward was not practiced in a way to contribute to the transfer of training.

Training orientation didn't show significant correlation with the work efficiency, either. In the previous chapter, the reliability of training orientation measurement was also found low. This may indicate that on the average, training orientation had a low correlation with the workers' performance on the job. This might be due to 1) orientation was not organized well enough to prepare the workers for training and the subsequent utilization of KSA; and 2) orientation occurred before training and the time elapse might dim their recall of the event.

The correlation coefficients supported the hypothesis that the match of KSA with work design, supervisory assistance, and peer support were significantly correlated to the utilization of KSA on the job; and the correlation coefficients did not support the hypothesis that training orientation and reward practices were significantly correlated to the utilization of KSA on the job by trained workers.

Second, Table 7 also shows that training achievement was highly correlated with the perceived work efficiency gained by utilizing KSA on the job. This meant that KSA acquired in training was associated with the transfer of training on the job.

Thirdly, it is evident that among several organizational variables the intercorrelations were moderate to moderately high. These were expected because it was indicated in the organizational theories that organizational factors could affect one another (Schein 1987; Bennis,

1986; Huse & Cummings, 1985; Dalton, 1989; Kenter, 1977; Zalezik, et. at. 1958; Gash & Kossek, 1989). In this study, supervisory assistance and the match of KSA with work design had significant correlation coefficients with every organizational variable. These correlation coefficients reflect the reality that supervisors had the major responsibility in coordinating and supervising production on the factory floor. The match of KSA with work design was the basic necessary condition of production and utilizing KSA acquired in training. Training orientation, peer support, and reward practices also had significant correlation coefficients with some organizational variables. These intercorrelations need our caution about the multicollinearity in regressions later.

Finally, one finds that among the worker characteristic variables, only work skill proficiency had significant, but negative correlation with perceived work efficiency gained by utilizing KSA. It also had an significant, but negative correlation with peer support.

In SKIZ, the highest level of performance proficiency was 3. Among 106 workers surveyed, 10 workers indicated their work skill proficiency from 4 to 8. (The work proficiency level of these workers was coded at 3.) In interviewing the managers, it was known that 10 workers were recruited from other state-owned electronic factories in inland China, which used a different work skill proficiency system from 1 to 8, with 1 as the lowest and 8 as the highest level. These workers were recruited as a skilful workers to help the inexperienced workers. Therefore, the results in correlation have two indications: a) workers with higher skills (at work skill proficiency level 3) might feel less able to

utilize all their skills while working in an environment where supervision assistance and peer co-operation were significantly related with work efficiency; and b) most of the peers had lower skills (82% of the sampled workers were at work skill proficiency 2).

There also appeared a significant, but negative correlation between peer support and work skill level. This implied that workers with higher skill proficiency needed less peer interaction while workers with less skill proficiency needed more peer support. These results appear congruent with the finding in the study by Min and Tsang (1990) that education and skill background of the workers became less important in a work environment which was more co-operative. Further, underutilization of education and skill may cause the lower efforts of workers on the job (Tsang, 1987, Tsang & Levin, 1985).

Other worker characteristic variables did not show significant correlation with the perceived work efficiency. This may be due to the reality that workers in these electronic companies all had similar background, regarding their age, education attainment, work experience (See Table in chapter 4, 5, 6), therefore, the homogeneous background didn't explain much of the variance in the transfer of training.

5.3 The Equations of Transfer of Training

The impact of organizational factors on the transfer of training in the workplace was estimated by a set of regression models presented in Section 5.1. In the following tables, the statistical results are presented and discussed.

Dependent Variable:	Perceived work efficiency gained by utilizing KSA on the job						
	EQUATION 1 Stepwise Method	EQUATION 1 Enter All Variables	EQUATION 2 Enter All Variables				
Independent Variables K ₁ Training Orientation	: .087 (0.88) ¹	.065 (0.63)	.068 (0.53)				
Katch of KSA with Work Design	.169 (3.30)*	.143 (1.39)	.160 (1.68)*				
Supervisor Assistance	.281 (7.71)***	.268 (2.38)**	.290(2.79)***				
L Peer Support	.190 (4.08)**	.187 (1.91)**	.187 (2.00)**				
K Reward Policy and Practices	047 (0.28) ¹	017 (17)	035 (40)				
G Training Achievement	.297 (11.44)***	.296 (3.26)**	* .293 (3.40)***				
47 Age	.021 (0.06) ¹	.043 (0.44)					
Education Attainments	066 (0.57) ¹	075 (80)					
و Work Skill Proficiency	023 (0.06) ¹	067 (68)					
(₁₀ Work Experience	.099 (1.31) ¹	.104 (1.03)					
Constant	.113	.221	037				
R Square:	.337 11.32 .0000	.361 4.67 .0000	.352 12.24 .0000				

 Table 8
 REGRESSION STATISTICS OF THE TRANSFER OF TRAINING (1)

The variable is dropped out of the equation by stepwise method because its coefficient is not significant in the equation. The coefficient and t value are the estimation for the variables if they were in the equation.

*** significant at .01 level. ** significant at .05 level.

* significant at .10 level.

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In Table 8, one can see that in Equation (1) based on the stepwise method, four independent variables -- the match of KSA with work design, supervisory assistance, peer support, and training achievement--were significantly and positively related to perceived work efficiency gained by utilizing KSA, showing that these four organization factors possessed the predictive power of trainees work efficiency on the job. Among the four variables, supervisory assistance had a regression coefficient of .281 (T = 7.71, p < 0.01); and training achievement had a regression coefficient of .297 (T = 11.44, p < 0.01). The regression coefficient for peer support was .190 (T = 4.08, p < 0.05) and the coefficient for the match of KSA with work design was .169 (T = 3.30, p < 0.1). These regression coefficients indicated that on the average, the supervisory assistance, training and peer support had more statistically significant prediction of the work efficiency gained by utilizing KSA while the match of KSA work design had less. The R square for the equation was .337 (F = 11.32, p < 0.0000), indicating that the work efficiency gained by utilizing KSA on the job had been significantly explained by the equation with the predictors of match of KSA with work-design, supervisory assistance, peers support, and training achievement. The rest of the independent variables were automatically dropped out of the equation because they did not appear as significant predictors of the workers' utilization of KSA on the job.

The regression coefficient of training orientation would be 0.087 (T = 0.88, p > 0.1); and the regression coefficient of reward practices would be -.047 (T = 0.28, p > 0.1). The coefficients were not significant, showing that these two variables would not be significantly related to work efficiency gained by utilizing KSA on the job, if they had been in the equation.

Among worker characteristics, the regression coefficients of age and work experience in the company would be positively, but not significantly related to the work efficiency gained by utilizing KSA on the job. The regression coefficients for education and work skill proficiency level would be negative, but not significant. Most of the workers in the four electronic companies had similar background--in the age group 18 to 25, working on the 2-to-3 year contract condition, having 12 year education, and about level 2 work skill efficiency. On the average, the similarity of background did not account for the variance in work efficiency gained by utilizing KSA on the job.

In the middle column, one can see that there are some changes in the regression coefficients of the independent variables when all the variable were entered in the equation. Compared with the results by using stepwise method, the regression coefficient for supervisory dropped from 0.281 (T = 7.71, p < 0.01) to 0.268 (T = 2.38, p < 0.5). The coefficient for the match of KSA with job design dropped from 0.169 (T = 3.30, p < 0.1) to 0.143 (T = 1.39, p > 0.1) and turned to be not significant. The coefficient for peer support remained no much change. The coefficients for training orientation and reward practices, though not significant, also decreased little. This indicated that there was collinearity among these organizational independent variables. In this case, one can find (See Table 7) that supervisory assistance was significantly correlated with training orientation, the match of KSA with work design, peer support and reward practices; and that the match

of KSA with work design was significantly correlated with reward practices, supervisory assistance, training orientation, and peer support. When regression model included all the variables, the multicorrelations overlapped the effects of the match of KSA with work design and supervisory assistance. Therefore, the magnitude of the regression coefficients for the match of KSA with work design and supervisory assistance decreased. The worker characteristic variables remained without much change in magnitude. This indicates, again, that statistically, worker characteristic variables did not explain much of the variation in the transfer of training. The reason could be that there was limited variation in the worker characteristic variables; or the measurement of these variables need an improvement.

The R square of the equation using stepwise method was 0.337 (F = 11.32, p <.0000) while the equation with all the variables in was 0.361 (F = 4.67, P <.0000), with an unnoticeable increase in R square, 0.024. This shows that when all the variables were in the equation, the other six variables (training orientation, reward practices, age, education, work skill proficiency, and work experience) had no significant impact on the work efficiency gained by utilizing KSA on the job, and their being in the equation contributes no further to the regression equation explanatory power.

EQUATION (2) estimates the impact of organizational factors on the transfer of training without taking account of worker characteristics. In Table 8, the results of Equation (2) show the similar regression coefficient patterns to those in the Equation (1) using stepwise method and Equation (1) with all the variables entered in the equation. When

work characteristic variables were excluded from the equation, the coefficient of match of KSA with work-design became significant (Beta -.160, T = 1.68, p < 0.1). This indicates that the match of KSA with work-design had correlation with some worker characteristics. In this cases, it was correlated with worker education attainment (See Table 7). With the worker characteristic variables present in the equation, the multicorrelation overlapped the match of KSA with work design and its coefficient became not significant.

The R square for Equation (2) is 0.352 (F -12.24, p < 0.0000), which is close to the R squares for Equation (1). Compared with Equation (1) using stepwise method, R square for Equation (2) increased only by .015 with training orientation and reward practices in the equation, showing that on the average these two variables had no significant impact on the work efficiency gained by utilizing KSA on the job. The R square for Equation (1) with all the variables was .361, only .009 higher than that for Equation 2, showing that the worker characteristic variables contributed little to the work efficiency after the organizational factors had been taken into account.

Based on the statistical results, one can find by the T tests for regression coefficients that the association of match of KSA with work design, supervisor assistance and peer support with the transfer of training was positive and significant. Therefore, the hypothesis that such relevant organizational factors as match of KSA with work-design, supervisory assistance, and peer support present in the workplace tend to further the work efficiency gained by utilizing acquired KSA on the job was supported; and the hypothesis for training orientation and

reward practices was rejected.

To estimate the impact of organizational variables and training on the workers' utilizing KSA on the job respectively, Equation (3), (4), and (5) were also employed. Equation (3) was used to estimate the transfer of training without taking account of training achievement. Equation (4) was employed to estimate the transfer of training by only taking account of the organizational variables. In Equation (5), the transfer of training was estimated by regressing it only on the training achievement.

In Table 9, first, one can see that when training achievement variable was taken away from the equation, the magnitude of regression coefficients of supervisor assistance in both Equation (3) and (4) increased by 0.11 (T = 3.19, P < 0.01) and 0.126 (T = 17.35, P < 0.01) respectively, compared with coefficient in Equation (1). The T values remain at 0.01 significant level. This result indicates that supervisory assistance in the workplace had the most significant prediction of the transfer of training.

Second, compared with Equation (1), the magnitude of peer support coefficient in Equation (3) dropped by 0.018 (T = 1.72, p < 0.1) while the regression coefficient in Equation (4) dropped by 0.026 (T = 2.82, p < 0.1). The match of KSA with work design was dropped out of the equations. This indicates the multicollinearity among the match of KSA with work-design, supervisory assistance, and peer support. Among these variables, supervisory assistance explained most of the variation in work efficiency.

Then, one can find that in Equation (5), the regression coefficient

StepwiseStepwiseStepwiseStepwiseMethodMethodMethodMethodIndependent Variables: $Method$ MethodMethodX1 Training orientation $N37$ (0.88) ¹ .112 (1.16) ¹ .092 (0.96) ¹ X2Match of KSA with work design.169 (3.30)*.141 (1.44) ¹ .145 (2.3) ¹ X3Supervisor assistance.281 (7.71)***.391 (3.91)***.007 (17.35)***X4Feer support.297 (1.44)***.172 (1.72)*.164 (2.82)*X5Reward practices.047 (0.28) ¹ 002 (0.02) ¹ X5Reward practices.097 (1.44)***007 (0.33) ¹ X5Recation attainment.002 (0.02) ¹ X6Bducation attainmentX6Work skill proficiencyX6Work skill proficiencyX6Work skill proficiencyX6Work skill proficiencyX7Work skill proficiencyX7Work skill proficiencyX6Work skill proficiencyX6Work skill proficiencyX6Work skill proficiency </th <th>StepwiseStepwi</th> <th></th> <th>EQUATION 1</th> <th>EQUATION 3</th> <th>EQUATION 4</th> <th>EQUATION 5</th>	StepwiseStepwi		EQUATION 1	EQUATION 3	EQUATION 4	EQUATION 5
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Xi Peer support.190 (4.08)**.172 (1.72)*.164 (2.82)*X5 Reward practices $.047 (0.28)^1$ $.030 (32)^1$ $.017 (0.33)^1$ X6 Training achievement $.297(11.44)$ *** $$ $017 (0.33)^1$ X74(2.65)*** $030 (32)^1$ $.002 (0.02)^1$ $074 (2.65)$ ***X7 Age $$ $$ $.021 (0.06)^1$ $002 (0.02)^1$ $$ X74(2.65)*** $$ $$ $$ $$ X6Education attainment $$ $$ $$ $$ X10Work skill proficiency $$ $$ $$ $$ X10Work experience $$ $$ $$ $$ X11 $$ $$ $$ $$ $$ X10Work experience $$ $$ $$ $$ X11 $$ $$ $$ $$ $$ X12 $$ $$ $$ $$ $$ X11 $$ $$ $$ $$ $$ X12 $$ $$ $$ $$ <	X4Fer support.190 (4.08)**.172 (1.72)*.164 (2X5Reward practices $.047 (0.28)^1$ $.0030 (32)^1$ $.017 (0$ X6Training achievement $.297(11.44)***$ $017 (0$ X5Reward practices $.021 (0.06)^1$ $.002 (0.02)^1$ $017 (0$ X9Work skill proficiency $.023 (0.06)^1$ $.002 (0.02)^1$ $017 (0$ X10Work skill proficiency $.023 (0.06)^1$ $.002 (0.02)^1$ $029 (31)^1$ X10Work skill proficiency $.099 (1.31)^1$ $.097 (1.06)^1$ $020 (112)^1$ Constant $.113$ 1.371 1.371 1.33 RSquare: $.1132$ $.1337$ $.235$ $.246$ P $.0000$ $.0000$ $.0000$ $.0000$ $.0000$	3 Supervisor assistance	.281 (7.71)***	.391 (3.91)***	.407 (17.35)*	t.**
X, Reward practices $047 (0.28)^1030 (32)^1017 (0.33)^1 .274(2.65)^{***} X, Age .297(11.44)^{***} .274(2.65)^{***} X, Age .0021 (0.06)^1002 (0.02)^1 .274(2.65)^{***} X, Age .0021 (0.06)^1002 (0.02)^1 .274(2.65)^{***} X, Age .0021 (0.06)^1002 (0.02)^1 X, B Education attainment 066 (0.57)^1023 (0.06)^1103 (-1.12)^1 X, Work skill proficiency 023 (0.06)^1103 (-1.12)^1 X, Work experience .097 (1.06)^1 Constant X, Work experience Constant K, Work experience Constant K, Work experience Constant $	X5Reward practices $047 (0.28)^1030 (32)^1017 (0.26)^1 \\ X6 Training achievement.297(11.44) * * * & \\$	Peer support	.190 (4.08)**	.172 (1.72)*	.164 (2.82)*	:
X ₀ Training achievement $.297(11.44) \star \star \star$ $$ $.274(2.65) \star \star \star$ X ₀ Age $.021(0.06)^1$ $.002(0.22)^1$ $$ $.274(2.65) \star \star \star$ X ₀ Education attainment $.021(0.06)^1$ $.002(0.22)^1$ $$ $$ X ₀ Work skill proficiency $.066(0.57)^1$ $.0029(.31)^1$ $$ $$ $$ X ₁₀ Work experience $009(1.31)^1$ $.097(1.06)^1$ $$ $$ $$ Constant $$ $$ $$ $$ $$ $$ K ₁₀ Work experience $$ $$ $$ $$ $$ $$ $$ $$ Constant $$	Xe Training achievement.297(11.44)***X, Age S, Age.021 (0.06)^1.002 (0.02)^1Xe B Education attainment.002 (0.57)^1 $.002 (0.02)^1$ Xe Work skill proficiency $.006 (0.57)^1$ $.029 (31)^1$ Xe Work experience $.009 (1.31)^1$ $.007 (1.06)^1$ Xe Donstant $.113$ 1.371 1.33 R F P $.137$ $.1371$ 1.33 R F P $.11.32$ $.1371$ 1.33 R P $.0000$ $.0000$ $.0000$ N99.0000.0000 $.0000$	s Reward practices	$047 (0.28)^{1}$	$030(32)^{1}$	$017 (0.33)^{1}$	8 9 8
X_{7} Age.021 (0.06)^{1} .002 (0.02)^{1} X_{9} Education attainment $.066 (0.57)^{1} .002 (0.02)^{1}029 (31)^{1}X_{9} Work skill proficiency.0099 (1.31)^{1}097 (1.06)^{1}097 (1.06)^{1}X_{10} Work skill proficiency.0099 (1.31)^{1}097 (1.06)^{1}097 (1.06)^{1}X_{10} Work skill proficiency.0099 (1.31)^{1}097 (1.06)^{1}097 (1.06)^{1}X_{10} Work experience033 (0.06)^{1}097 (1.06)^{1}097 (1.06)^{1}Constant113 1131$	X, Age.021 (0.06) ¹ .002 (0.02) ¹ X_6 Education attainment.023 (0.06) ¹ 029 (31) ¹ X_0 Work skill proficiency023 (0.06) ¹ 103 (-1.12) ¹ X_10 Work experience.099 (1.31) ¹ ConstantR Square:R Square:N99NNNNNNNNNNNNNNNNNNNNNNNNNNNN <td>a Training achievement</td> <td>.297(11.44)***</td> <td></td> <td></td> <td>.274(2.65)***</td>	a Training achievement	.297(11.44)***			.274(2.65)***
X_0 Education attainment 066 $(0.57)^1$ 029 $(31)^1$ 101 X_0 Work skill proficiency 023 $(0.06)^1$ 103 $(-1.12)^1$ X_10 Work skill proficiency 023 $(0.06)^1$ 103 $(-1.12)^1$ X_{10} Work experience .099 $(1.31)^1$.097 $(1.06)^1$ Constant	Xe b Education attainment X_{10} Work skill proficiency N_{10} Work skill proficiency $.066 (0.57)^1 \\103 (-1.12)^1 \\ .097 (1.06)^1 \\ .097 (1.06)^1 \\ .097 (1.06)^1 \\ .097 (1.06)^1 \\ .007 (1.06)^1 \\ .007 (1.06)^1 \\ .007 (1.06)^1 \\ .007 (1.06)^1 \\ .007 (1.06)^1 \\ .007 (1.06)^1 \\ .000 \\ .000 \\ .0000 $, Age	$.021(0.06)^{1}$.002 (0.02) ¹		
X ₀ Work skill proficiency $023 (0.06)^1103 (-1.12)^1$ $$ <td>X₀ Work skill proficiency 023 (0.06)¹ 103 (-1.12)¹ X₁₀ Work experience .099 (1.31)¹ .097 (1.06)¹ Constant .113 1.371 1.33 R Square: .337 .235 .246 F 11.32 11.32 15.36 .0000 N 99 99 99 99 99</td> <td>a Education attainment</td> <td>$066(0.57)^{1}$</td> <td>029 $(31)^{1}$</td> <td>8 8 8</td> <td></td>	X ₀ Work skill proficiency 023 (0.06) ¹ 103 (-1.12) ¹ X ₁₀ Work experience .099 (1.31) ¹ .097 (1.06) ¹ Constant .113 1.371 1.33 R Square: .337 .235 .246 F 11.32 11.32 15.36 .0000 N 99 99 99 99 99	a Education attainment	$066(0.57)^{1}$	029 $(31)^{1}$	8 8 8	
X ₁₀ Work experience .099 (1.31) ¹ .097 (1.06) ¹ Constant .113 1.371 1.33 3.358 Constant .113 1.371 1.33 3.358 R Square: .113 1.371 1.33 3.358 R Square: .11.32 13.96 15.36 8.12 P 0000 .0000 .0000 .001 Note 1 The variable is dropped out of the equation by stepwise method because the coefficient was not significant in the equation. The coefficient and t value are the estimation for	X ₁₀ Work experience .099 (1.31) ¹ .097 (1.06) ¹ Constant .113 1.371 1.33 R Square: .337 .235 .246 F 11.32 13.96 15.36 P .0000 .0000 .0000	g Work skill proficiency	$023(0.06)^{1}$	103 $(-1.12)^{1}$		
Constant	Constant .113 1.371 1.33 R Square: .337 .235 .246 F 11.32 13.96 15.36 P .0000 .0000 .0000 N 99 99 99	10 Work experience	.099 (1.31) ¹	.097 (1.06) ¹	6 6 1	0 9 9
R Square: .337 .235 .246 .075 F 11.32 11.32 13.96 15.36 8.12 P 0000 .0000 .001 N 99 99 102 Note ¹ The variable is dropped out of the equation by stepwise method because the coefficient was not significant in the equation. The coefficient and t value are the estimation for	R Square: .337 .235 .246 F 11.32 13.96 15.36 P .0000 .0000 .0000 .0000 N 99 99 99	onstant	.113	1.371	1.33	3.358
F 15.36 8.12 P 0000 0000 0000 000 001 N 99 99 99 99 102 Note ¹ The variable is dropped out of the equation by stepwise method because the coefficient was not significant in the equation. The coefficient and t value are the estimation for	F 11.32 13.96 15.36 P .0000 .0000 .0000 .0000 N 99 99 99	R Square:	.337	.235	.246	.075
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	P	Ба	11.32	13.96	15.36	8.12
N 99 99 102 Note ¹ The variable is dropped out of the equation by stepwise method because the coefficient was not significant in the equation. The coefficient and t value are the estimation for	N 99 99 99	Ċ4	.0000	.0000	0000.	.001
Note ¹ The variable is dropped out of the equation by stepwise method because the coefficient was not significant in the equation. The coefficient and t value are the estimation for		N	66	66	66	102
was not significant in the equation. The coefficient and t value are the estimation for	Note ¹ The variable is dropped out of the equation by stepwise method because	ote ¹ The variable is dropped o	ut of the equation	on by stepwise met	hod because the c	coefficient
	was not significant in the equation. The coefficient and t value are	was not significant in the	le equation. The	coefficient and t	: value are the e	stimation for

REGRESSION STATISTICS OF THE TRANSFER OF TRAINING (2) 6 Table

•

* *

significant at .01 level significant at .05 level significant at .10 level

for training achievement (Beta - .274, T - 2.65, P < 0.01) was significantly related with work efficiency gained by utilizing KSA on the job. The R square for Equation (5) was .075 (F - 8.12, p < 0.001), indicating that training achievement alone could explain the training significantly. However, R square was reduced substantially.

Finally, one also finds that the R square for Equation (1) was .337 (F = 11.32, p < 0.0000) and the R square for Equation (3) was .235 (F = 13.96, p < 0.0000), R square for Equation (4) was .246 (F = 15.36, P < .0000), implying that these equations possess significant explanatory power to work efficiency gained by utilizing KSA on the job, or the transfer of training.

By comparing the R square of Equation (1) with R squares of Equation (3), (4), and (5), one can see a drop of R square for Equation (3) by 0.102; and the drop of R square for Equation (4) by 0.091. The R square for Equation (5) was 0.075 (F=8.12, p < .001). The R square of Equation (3) and (4) show that the organizational variables in the workplace accounted for about 24% of the transfer of training on the job. Training achievement, though significantly associated with the transfer of training on the job, accounts for only 7.5% of the transfer of training. Addition of organizational variables substantially raised the explanatory power of the equation.

Considering the above statistical results discussed, one could conclude interesting findings on the transfer of training in the workplace. First, the statistical results implied that training in the first place was a necessary, or pre-condition in improving work efficiency by acquiring job required KSA, but not sufficient.

Organizational factors in the workplace contribute to much furthering the transfer of training on the job. Among these organizational variables studied, supervisory assistance, peer support, and match of KSA with work design showed prediction with statistical significance of the transfer of training on the job. These organizational variables had an interaction with training in a way that training and organizational variables could mutually reinforce the effect on the transfer of training one another in the workplace. Such interaction contributed to the transfer of training to a degree that neither training achievement, nor organizational factors alone could reach. Second, among the organizational variables, one finds that the human factor variables, supervisory assistance and peer support, counted for the most significant statistical prediction of the transfer of training. This indicates that human factor is an important variable to increase the transfer of training. Assistance by supervisors and support by peers can promote the transfer of training as the basic technical production condition is satisfied.

5.4 Difference in the Organizational Factors in Two Types of Companies

The difference in the organization factors between the state-owned and joint-venture companies in this study was tested by using t-tests. The statistical results are presented in Table 10.

In this table, one can see that supervisory assistance was the only organizational variable that the state-owned companies showed

Variable	State-owned Mean	Joint-venture Mean	t Value	Degrees of Freedom
raining achievement test score	79.88	80.43	15	104
Training orientation	2.65	2.71	53	100
fatch of KSA with the work-design	2.93	2.82	1.01	102
Supervisory assistance	2.58	2.83	-2.38**	101
Peer support	2.83	2.89	54	66
Reward practices	1.99	2.00	07	101
Perceived work efficiency gained by utilizing KSA on the job	3.15	3.15	.02	100

Table 10 T-TESTS FOR STATE-OWNED AND JOINT-VENTURE COMPANIES

** significant at 0.05 level.

significant difference from the joint-venture companies (t = -2.38), p < 0.05. It implied the supervisors in the joint-venture companies provided more support or assistance to their employees than that of the state-owned companies. Therefore, the hypotheses that there was significant difference in supervisory assistance between the state-owned and joint-venture companies was accepted. For other variables in this study, the t-tests didn't show statistically significant difference and therefore the hypothesis for other variables was not supported.

The statistical implication is that in the state-owned companies and joint-venture companies, there exited a difference in supervisory assistance provided for trained workers in the workplace. This difference could be due to the different practice and concept of supervisory assistance.

In interviews, it was known that supervision in the joint-venture was considered by the management as a very critical factor to bring about the potential of the workers. It was believed by supervisors in the joint-venture that the capacity of workers was a constant in work efficiency. Supervisors were assumed to have the responsibility to bring about employees' full capacity by providing assistance and working closely with them. Therefore, the direct contact with the workers, close supervision, and provision of assistance on the production line were accepted as important tasks of the supervision.

While in the state-owned companies, cooperation among peer was often encouraged by supervision. The supervisors acted more as a mentor and kept an intimate relationship with workers. The supervisors thought it important for the workers to provide support among themselves, and

help each other when there were problems. In observation, case analysis and problem-solving were promoted among peers by the supervision. Moreover, workers tried to solve problems by themselves before turning to superiors for help. The concept of supervision and practice may have made the difference significant between the two types of companies.

The statistical results didn't show difference in other variables, training orientation, the match of KSA with work-design, peer support, reward practice, work efficiency, and training achievement score. Upon the visitations to factory floors and by interviews with the management and supervisors in the two types of companies, it was observed that the production equipment in the four companies were much the same. They were all introduced from a foreign country. The training content was also largely consistent with the production technical requirement, and training achievement tests were very similar. The observation and interview were consistent with the t-tests for the match of KSA with work-design, training orientation, and training.

Regarding peer support, difference in practice was observed on the factory floor though no statistical difference was shown. Workers in the state-owned companies could talk and exchanged ideas on the production line, while workers in the joint-venture could not talk on the production line (by regulation and in practice) and worked very much independently (this difference is discussed in detail in the next section). However, back in the dormitory, workers in both types of companies behaved much the same way as the researcher observed. They cooked together, talked about work and their supervisors and entertained in the similar way. Workers of the both type of companies care about

each other, but in a different way on the factory floor. Due to that ttest was based on the means, the different pattern of peer support and co-operation may not be detected. For future study, this variable should specify detailed range of peer support.

Considering reward practice, workers interviewed and 26 workers (about 25%) surveyed indicated in the open questions of the organizational practices that they had worked very hard to achieve the company goals of productivity, but did not feel rewarded enough to what they thought they should be. This may indicate that on the average, workers in both joint-venture and state-owned companies felt reward practice in a same way.

The t-test didn't show significant difference in perceived work efficiency gained by utilizing KSA between the state-owned and jointventure companies, either. In Table 5 and Table 6, one can find that the means for perceived work efficiency gained by utilizing KSA were the same. Moreover, the means for perceived work efficiency gained in both state-owned and joint-venture are higher than the means for all other organizational variables, especially the mean of reward practice. It appears that the workers tended to think themselves doing better. This subjective perception of workers may conceal the difference in the perceived work efficiency gained by utilizing KSA between the stateowned and joint-venture companies.

5.5 The Transfer of Training in the Two Types of Companies

In addition to the t-test, the patterns of transfer of training in the state-owned and joint-venture companies were compared by Equation (1) to (5). Each equation was applied to the state-owned and jointventure subsample groups separately. In Table 11, 12, and 13, the statistical results are presented and discussed.

In Table 11, one can find that in the state-owned group, peer support, supervisory assistance and work experience were positively and significantly related to the perceived work efficiency gained by utilizing KSA on the job. The regression coefficient for peer support is .399 (T = 7.89, p < 0.01); .304 (T = 6.75, p < 0.01) for work experience; and .296 (T = 4.32, p < 0.5) for supervisory assistance. The significant regression coefficients of the three variables indicate that in the state-owned companies, peer support, supervisory assistance and work experience were significantly related to the perceived work efficiency gained by utilizing KSA.

In the joint-venture companies, there appeared a different pattern of variables associated with the transfer of training. Training orientation, supervisor assistance, and training achievement were significantly and positively related with the perceived work efficiency gained by utilizing KSA on the job. Training achievement showed a regression coefficient of .429 (T = 13.67, p < 0.01); the coefficient for supervisory assistance is .274 (T = 4.69, p < 0.5); and .231 (T = 3.37, p < 0.1) for training orientation. This indicates that in the joint-venture group, training achievement, training orientation, and

Variable : Perc	eived work efficiency ga	lined by utilizing KSA		
	State-Owned	Joint-Venture		
	EQUATION 1 Stepwise Method	EQUATION 1 Stepwise Method		
ant Variables: ng tation	111 (.80) ¹	.231 (3.37) *		
of KSA Work Design	.145 (1.23) ¹	.091 (.51) ¹		
risor Cance	.296 (4.32) **	.274 (4.69)**		
rt .	.399 (7.89) ***	.049 (.176) ¹		
Policy cactices	.029 (.05) ¹	171 (2.11) ¹		
ng 7ement	.090 (.51) ¹	.429 (12.67) ***		
	4.487E-04(000) ¹	008 (.01) ¹		
ion ments	.014 (.01) ¹	192 (2.76) ¹		
kill Liency	105 (.69) ¹	115 (.962) ¹		
Experience	.304 (6.75) ***	053 (.183) ¹		
	.462	.147		
»:	.467 11.38 .0000 46	.383 9.71 .0000 53		
	ent Variables: ng cation of KSA Nork Design disor cance ct Policy cactices ng rement dion ments kill ciency Experience	State-Owned EQUATION 1 Stepwise Method ant Variables: ng 111 (.80) ¹ cation of KSA .145 (1.23) ¹ Nork Design .296 (4.32) ** cance .399 (7.89) *** ct .399 (7.89) *** ct .029 (.05) ¹ rement .090 (.51) ¹ vement .090 (.51) ¹ still .105 (.69) ¹ ctency .304 (6.75) *** .462 .467 11.38 .0000 .46 .0000		

Table 11COMPARISON OF REGRESSION RESULTS OF STATE-OWNED AND
JOINT-VENTURE COMPANIES (1)

Notes: ¹ The coefficient and T value are the estimation only if the variable were in the equation. *** significant at .01 level ** significant at .05 level * significant at .10 level

UATION 3 tepwise Method 11 (.80) ¹ 46 (1.23) ¹ 96 (4.32) ** 99 (7.89) *** 29 (.047) ¹ 87E-04(.000) ¹	EQUATION 3 Stepwise Method .184 (1.72) ¹ .098 (.38) ¹ .417 (10.35) **** .044 (.11) ¹ 144 (1.18) ¹ .036 (.07) ¹
11 (.80) ¹ 46 (1.23) ¹ 96 (4.32) ** 99 (7.89) *** 29 (.047) ¹ 87E-04(.000) ¹	.184 (1.72) ¹ .098 (.38) ¹ .417 (10.35) *** .044 (.11) ¹ 144 (1.18) ¹ .036 (.07) ¹
11 (.80) ¹ 46 (1.23) ¹ 96 (4.32) ** 99 (7.89) *** 29 (.047) ¹ 87E-04(.000) ¹	.184 (1.72) ¹ .098 (.38) ¹ .417 (10.35) *** .044 (.11) ¹ 144 (1.18) ¹ .036 (.07) ¹
46 (1.23) ¹ 96 (4.32) ** 99 (7.89) *** 29 (.047) ¹ 87E-04(.000) ¹	.134 (1.72) .098 (.38) ¹ .417 (10.35) *** .044 (.11) ¹ 144 (1.18) ¹ .036 (.07) ¹
46 (1.23) ¹ 96 (4.32) ** 99 (7.89) *** 29 (.047) ¹ 87E-04(.000) ¹ 14 (.012) ¹	.098 (.38) ¹ .417 (10.35) *** .044 (.11) ¹ 144 (1.18) ¹ .036 (.07) ¹
96 (4.32) ** 99 (7.89) *** 29 (.047) ¹ 87E-04(.000) ¹	.417 (10.35) *** .044 (.11) ¹ 144 (1.18) ¹ .036 (.07) ¹
96 (4.32) ** 99 (7.89) *** 29 (.047) ¹ 87E-04(.000) ¹	.417 (10.35) *** .044 (.11) ¹ 144 (1.18) ¹ .036 (.07) ¹
99 (7.89) *** 29 (.047) ¹ 87E-04(.000) ¹	.044 (.11) ¹ 144 (1.18) ¹ .036 (.07) ¹
99 (7.89) *** 29 (.047) ¹ 87E-04(.000) ¹	.044 (.11) ¹ 144 (1.18) ¹ .036 (.07) ¹
29 (.047) ¹ B7E-04(.000) ¹	144 (1.18) ¹ .036 (.07) ¹
29 (.047) ¹ B7E-04(.000) ¹	144 (1.18) ¹ .036 (.07) ¹
 87E-04(.000) ¹	.036 (.07) ¹
B7E-04(.000) ¹	.036 (.07) ¹
87E-04(.000) ¹	.036 (.07) ¹
14 4 012)1	.000 (.07)
14 4 01211	
14 (.UI3) ⁻	$104 (.63)^{1}$
06 (.694) ¹	155 (1.42) ¹
)4 (6.75) ***	$018 (.020)^{1}$
62	1.63
67	.174
8	10.35
000	.0023
	54
	04 (6.75) *** 662 667 08 0000 ue are the esti ution.

Table 12COMPARISON OF REGRESSION RESULTS OF STATE-OWNED
AND JOINT-VENTURE COMPANIES (2)

supervisory assistance could predict the work efficiency of the trained workers at a statistically significant level.

R square for the state-owned group was .467 (F = 11.38, p < 0.0000), and R square for joint-venture group was .383 (F = 9.705, p < 0.0000), indicating that both equations have significantly explained the transfer of training. The magnitude of R square for the state-owned group was about .084 higher than that of the joint-venture group, indicating that more work efficiency gained by utilizing KSA on the job were explained by the predictors.

In Table 12, one can see that when training achievement was excluded from the equation, R square for state-owned group remained the same while the magnitude of R square for joint-venture group dropped from .383 (F = 9.71, p < .0000) to .174 (F = 10.35, P < .0023).

In the joint-venture group, when training was out of the consideration, the coefficient of training orientation also became not significant and dropped out of the equation. This implies the multicollinearity between the match of KSA with word-design and supervisory assistance (See Appendix J). Supervisory assistance was correlated with the match of work design, and supervisory assistance explained most of the variation in work efficiency. The statistical results of Equation (3) applied to the state-owned and joint-venture companies indicated that training was an important predicting variable for the joint-venture group, but for the state-owned.

In Table 13, one obviously notices that training achievement of the workers in the state-owned companies accounted for little explanatory Power of the transfer of training; the training achievement of workers

Table 13	3	COMPARISON OF REGRESSION R	ESULTS	OF	STATE-OWNED
		AND JOINT-VENTURE COMPANIE	S (3)		

ependent Variable: Perc	ceived work efficiency ga	ined by utilizing KSA
	State-Owned EOUATION 5	Joint-Venture EQUATION 5
ndependent Variables:		
Training Orientation		
2 Match of KSA with Work Design		
3 Supervisor Assistance		
A Peer Support		
5 Reward Policy and Practices		
6 Training Achievement	021 (142)	.489 (4.05) ***
7 Age		•••
8 Education Attainments		
9 Work Skill Proficiency		
10 Work Experience	•••	
onstant	3.217	1.77
Square:	.0004 .0201 .8879	.239 16.42 .0002
l	48	54

** significant at .01 level
** significant at .05 level
* significant at .10 level

in the joint-venture companies accounted 24% of the transfer of training.

The regression statistics discussed above have shown consistently varied patterns of transfer of training in the two types of companies. For the state-owned companies, supervisory assistance, peer support, and work experience were significantly associated with work efficiency of the trained workers on the job; for the joint-venture companies, training orientation, supervisory assistance, and training were significantly associated with work efficiency.

The interviews and observations on the factory floor were consistent with the statistical result of regress for the two types of companies. In observing the factory floor, some difference in the human factors were noticed. In the joint-venture companies, it was easy to notice the different patterns in human relationship on the production line. Workers on the production line were disciplined not to talk to each other and they worked independently. The whole floor was quiet with only the humming of the machinery. The supervisors were busy walking along the production line to inspect the line at every minute. If the workers had questions or wanted to use the restroom, she raised her hand. The supervisor then came to talk to her about the problems, or take her position on the line till the worker got back from the restroom. The interaction between peers on the line was not observed.

In interviews, both the supervisors and workers responded to questions about supervisory assistance and peer support, saying that the interaction between peers on the production line was discouraged because that could distract attention on the job. Individuals were encouraged

to develop their competency. Peer interaction was encouraged in the group meeting under supervision. Any worker having an innovative idea about work was supposed to talk at the group meeting. If the idea turned out to be good, the supervisor would instruct the workers to apply it on the job. The training orientation conducted managers with the supervisory involved was intended to discipline the workers on the job and align them to the goals of the company. Annual training was provided to train workers and update their KSA accordingly. Workers were required to write a paper in the annual training, discussing KSA utilization and production line management in the applications. Training, group meeting, and training orientation become important events of workers' learning. Therefore, in the joint-venture companies, worker performance was more influenced by such organized events as training orientation, training, and close supervision.

In the joint-venture companies, the supervisors believed that the capacity of the workers was a constant in work efficiency, which could be developed through training. Since peer cooperation was not encouraged and workers engage in production in a more individual manner, training (acquiring knowledge and skills and attitude of work) became a very important factor for learning. The supervisors also believed that workers' potential capacity could be brought about to limit by organizing production properly and mobilizing workers to conscientiousness and willingness through such events as training orientation and group meetings. The supervisors interacted with workers constantly and took a full responsibility of their performance on the production line; directly contacting workers and providing assistance

were critical roles of the supervision and vital to realize workers' potential capacity.

In contrast, there was significant interaction among peers in the state-owned companies. On the factory floors, supervisors assigned the tasks. They only checked with the workers when there were problems and questions coming up, and then provided assistance accordingly. Workers in the state-owned were observed talking to each other on the production line, including exchanging ideas about accomplishing the tasks and chatting, as well.

In China, cooperation and support in the work group among peers have been emphasized in the workplace. In the traditional practice, KSA are learned through apprenticeship for two years, not through group training. Thus, the experience in the workplace, and interaction with peers, a mentee relation with supervisor contribute to most of the workers' learning and behavior in the organization. In the state-owned companies, though much advanced production technology and management have been introduced, orientation and training are practiced to prepare workers for jobs, people seem to habitually fall back into the conventional behaviors of learning and working in the workplace.

The supervisors were observed taking a mentor and intimate relationship with workers. Peers were encouraged by the supervisors to provide support among themselves and help each other in solving problems. Statistics also showed significant correlation between supervisory assistance and peer support (See Appendix J). The regression model applied to the state-owned group was significantly explained with the predictors in the equation. This indicated that in

such a co-operative environment as the state-owned companies, interaction among peers accounted for most of the learning and contributed to the transfer of training.

Comparing the patterns of the transfer of training in the two types of companies, there appeared interaction between training achievement and group dynamics in this study. That is, in the joint-venture companies where environment was less co-operative and workers work more independently, workers' training achievement became significant in the transfer of training; while in the state-owned companies where workers had significant interaction, training achievement appeared not significant in the transfer of training. As the regression model applied to the state-owned company group was significantly explained by the predictors in the equation, the statistical results indicated that the interaction of workers could make up the deficiency in learning in training, if there were any.

A comment must be made here on the relation of worker training achievement and group dynamics. This research did not intend to study the interaction between workers' KSA and group dynamics, particularly, but to examine the general patterns of transfer of training in the different types of companies. However, the findings were interesting and congruent with the finding in Min & Tsang's study of vocational education an productivity in workplace in China. In their study, significant interaction between education and the level of co-operation among group members was found (Min & Tsang, 1990, p.358). According to their study, in a work environment which is more co-operative, members of the group share knowledge and provide mutual assistance, but this

reduces the individual differences in skills, and the individual education and skill background become less important.

Before concluding the data analysis, there is a limitation of this study one has to realize. That is, the self-reported data was used to measure perceived work efficiency gained by utilizing KSA on the job. It was noticed in Section 5.4 that people tend to think of themselves as doing better than they actually might have done. To avoid the subjectivity of the surveyed data, an attempt was made by this researcher to gather the objective data of work efficiency and productivity. Due to the inconsistent filing system and incomplete data in the four companies, the complete data for the statistic analysis of the entire sample was impossible. However, three companies had scrap rate of the products over one year (See Appendix I for detail). The scrap rate was calculated in the percentage of the scrap out the total products per month in Company 1 (state-owned), Company 2 (state-owned), and Company 3 (joint-venture). Therefore, a t-test was used to estimated the difference in the scrap rate of products among the three companies (See Table 19 in Appendix I).

In Table 19-b, one can see that t-tests of scrap rate between Company 1 and 3, and between Company 2 and 3 show significant difference over 12 months. The t-test does not show significant difference between the two state-owned companies, Company 1 and 2. This provides obvious contrasts of work efficiency among production groups between state-owned companies and one joint-venture company, regarding the transfer of training on the job.

5.6 Summary of the Empirical Study

The primary concern of this case study has been to estimate the statistical parameters to examine the association of organizational factors with the transfer of training in the workplace in accordance with a conceptual framework. In this section, the empirical results presented and discussed above are summarized.

(1) For Hypothesis 1, the correlation coefficients of the match of KSA with work design, supervisory assistance, and peer support with the trained workers' utilization of KSA on the job were statistical significant. Thus the hypothesis for these variables was supported by the statistical results. The correlation coefficients of reward practices and training orientation with the worker's utilization of KSA

Table 14	SUMMARY	OF	CORRELATION	COEFFICIENT	STATISTICS
	(Entire	Sa	mple)		

Нурс	thes	is:										
•••	SUC	H FAC	TORS	IN THE	WORK	PLACE	AS TRAIN	NING O	RIENTATIO	N, THE	MATCH	OF
KSA	WITH	WORK	-DESI	GN, SU	PERVI	SORY A	SSISTAN	CE, PE	ER SUPPOR	Γ, AND	REWAR	D
PRAC	TICE	S ARE	CORR	ELATE	WITH	TRAIN	ED WORKI	ERS' U	TILIZATIO	N OF K	SA ON	THE
JOB.												

Variables Wo	efficient with rk Efficiency	2	Decision on H
	_	<u>₽</u>	Dectation on M1
Training Orientation	.1924	> 0.05	rejected
Match of KSA with Work Design	. 2770	< 0.01	accepted
Supervisory Assistance	.4664	< 0.01	accepted
Peer Support	. 3277	< 0.01	accepted
Reward Practice	.1046	> 0.05	rejected

on the job did not appear statistically significant. Therefore, hypothesis for these two variables was not supported by the statistical results (See Table 14).

(2) For Hypothesis 2, among the organizational variables studied, the match of KSA with work-design, supervisory assistance, and peer support showed prediction of the perceived work efficiency gained by utilizing KSA on the job at a statistically significant level (See Table 15). Thus, hypothesis for these three variables was supported by the statistic results of regression. The association of reward practice and training orientation with perceived work efficiency was not supported by the statistical results of regress, implying that reward practice and training orientation had little impact on the transfer of training. The

Hypothesis:

BY FACILITATING THE UTIL ACQUIRED IN TRAINING, SUCH OR ORIENTATION, THE MATCH OF WORJ PEER SUPPORT AND REWARD PRACT THE WORK EFFICIENCY.	IZATION OF K GANIZATIONAL K-DESIGN WIT ICE HAVE SIG	NOWLEDG FACTOR H KSA, NIFICAN	E, SKILLS, S AS TRAIN SUPERVISOR T AND POSI	AND ATTITUDE ING Y ASSISTANCE, TIVE IMPACT ON
Independent Variables	Regression Coefficient	t		Decision On H ₁
Training Orientation	.087	. 88	> 0.1	rejected
Match of KSA with Work Design	.169	3.30	< 0.1	accepted
Supervisory Assistance	.281	7.71	< 0.01	accepted
Peer Support	.190	4.08	< 0.05	accepted
Reward Practice	047	.28	> 0.1	rejected

Table 15 SUMMARY OF STATISTICS OF REGRESSION COEFFICIENTS (Entire Sample)

hypothesis for these two variable was not supported.

The statistical results implied that such organizational factors inthe workplace as supervisory assistance, peer support, and match of KSA with work-design contributed to furthering the transfer of training on the job. The statistical results also showed that these organizational variables had an interaction with training in a way that training and organizational variables could mutually reinforce the effect on the transfer of training one another in the workplace. Such mutual reinforcement contributed to the transfer of training to a degree that neither training achievement, nor organizational factors alone could reach. Second, among the organizational variables, the human factor variables, supervisory assistance and peer support, counted for the most prediction of the transfer of training. This indicated that human factor was an important to increase the transfer of training.

(3) For Hypothesis 3, the statistical results supported that there as a difference in supervisory assistance between the state-owned and joint-venture companies (See Table 16). The statistical implication was that in the state-owned companies and joint-venture companies, there exited a difference in supervisory assistance provided for trained workers in the workplace. The statistical results did not support the hypothesis that there was a difference in the variables of the match of KSA with work design, peer support, reward practices, training achievement, and the perceived work efficiency gained by utilizing KSA between the state-owned and joint-venture companies.

However, a difference in peer interaction was observed on the factory floor though no statistical difference was shown. Workers in

AND JOINT-VENTURE COMPANIES.	g kga on ini	E JUB BEIW	LEN THE STRIE-OWNED
Variables	T Value	p	Decision On H ₁
Training Orientation	. 53	> .1	rejected
Match of KSA with Work Design	1.01	> .1	rejected
Supervisory Assistance	-2.38	< .05	accepted
Peer Support	54	> .1	rejected
Reward Practice	07	> .1	rejected
Perceived Work Efficiency	.02	> .1	rejected

the state-owned companies were seen talking and exchanging ideas on the production line, while workers in the joint-venture companies did not talk on the production line and worked independently.

(4) For Hypothesis 4, among the organizational variables studied, supervisory assistance and peer support showed prediction of perceived work efficiency gained by workers' utilizing KSA on the job at a statistically significant level (See Table 17). Thus, hypothesis for supervisory assistance and peer support was supported by the statistical results of regression. The association of match of KSA with workdesign, reward practice, and training orientation with perceived work efficiency was not supported by the statistical results of regress, implying that these three variables in the state-owned companies had little impact on the transfer of training. The statistical results

THERE IS A DIFFERENCE IN THE ORGANIZATIONAL FACTORS AND WORK

Table 16 SUMMARY OF T-TESTS

Hypothesis:

Table 17 SUMMARY OF STATISTICS OF REGRESSION COEFFICIENTS (State-owned Companies)

Hypothesis:

IN THE STATE-OWNED COMPANIES, BY FACILITATING THE UTILIZATION OF KNOWLEDGE, SKILLS, AND ATTITUDE ACQUIRED IN TRAINING, SUCH ORGANIZATIONAL FACTORS AS TRAINING ORIENTATION, THE MATCH OF WORK-DESIGN WITH KSA, SUPERVISORY ASSISTANCE, PEER SUPPORT AND REWARD PRACTICE HAVE SIGNIFICANT AND POSITIVE IMPACT ON THE WORK EFFICIENCY.

Independent Variables	Regression Coefficient	t	p	Decision On H ₁
Training Orientation	111	.80	> 0.1	rejected
Match of KSA with Work Design	.145	1.23	> 0.1	rejected
Supervisory Assistance	. 296	4.32	< 0.05	accepted
Peer Support	. 399	7.89	< 0.01	accepted
Reward Practice	029	.05	> 0.1	rejected

indicated that in the state-owned companies peer interaction and supervisor assistance contributed to furthering the transfer of training.

(5) For Hypothesis 5, among the organizational variables studied, training orientation, and supervisor assistance showed prediction of the perceived work efficiency gained by utilizing KSA on the job at a statistically significant level (See Table 18). Thus, hypothesis for training orientation and supervisory assistance was supported by the statistical results of regression. The association of match of KSA with work design, peer support, and reward practice with perceived work efficiency was not supported by the statistical results of regress, implying that these three variable in the joint-venture companies had

Table 18 SUMMARY OF STATISTICS OF REGRESSION COEFFICIENTS (Joint-venture Companies)

Hypothesis:

IN THE JOINT-VENTURE COMPANIES, BY FACILITATING THE UTILIZATION OF KNOWLEDGE, SKILLS, AND ATTITUDE ACQUIRED IN TRAINING, SUCH ORGANIZATIONAL FACTORS AS TRAINING ORIENTATION, THE MATCH OF WORK-DESIGN WITH KSA, SUPERVISORY ASSISTANCE, PEER SUPPORT AND REWARD PRACTICE HAVE SIGNIFICANT AND POSITIVE IMPACT ON THE WORK EFFICIENCY.

Independent Variables	Regression Coefficient t		<u>p</u>	Decision <u>On H</u> 1
Training Orientation	.231	3.37	< 0.1	accepted
Match of KSA with Work Design	.091	. 51	> 0.1	rejected
Supervisory Assistance	. 274	4.69	< 0.05	accepted
Peer Support	. 049	.18	> 0.1	rejected
Reward Practice	171	2.11	> 0.1	rejected

little impact on the transfer of training. The statistical results indicated that in the joint-venture companies, training orientation and supervisory assistance on the factory floor contributed to the workers's utilization of KSA on the job while the other three organizational variables had little impact on the transfer of training.

Comparing the patterns of the transfer of training in the two types of companies, the statistical results of regressions also indicated an interaction between training achievement and group dynamics in this study. That is, in the joint-venture companies where environment was less co-operative and workers worked more independently, workers' training achievement was a significant factor in the transfer of training; while in the state-owned companies where workers had significant interaction, training achievement appeared not to be a significant factor in the transfer of training. As the regression model applied to the state-owned company group was significantly explained by the predictors in the equation, the results indicated that the interaction of workers could make up the deficiency in learning in training, if there is any.

In the next chapter, a brief summary of this study will be included. The interpretations of the statistical empirical results will be discussed; and policy implication will be drawn for the employee training in electronic industry. The limitations of this study and recommendations for future study will be suggested.

CHAPTER 6

SUMMARY AND CONCLUSION

Summary and conclusions are presented in this chapter. Policy implications on the transfer of training in the industry are discussed. Finally, recommendations for the further studies are made.

6.1 Summary

This researcher investigated the relationships between selected organizational factors and the transfer of training in four industrial organizations in SKIZ. The literature reviewed indicated that while investment in training had been enormous, the rate of return was less than expected. So far, most of the studies on the transfer of learning focused on such factors as learning process, learner characteristics, program design and development, and reinforcement of learning. All these factors were within the control of the training process. A limited number of studies indicated that organizational factors may contribute, or inhibit the transfer of training in the workplace. None of them investigated the association of the organizational factors on the transfer of training in the workplace. Therefore, the major effort of this study was to examine the association of the organizational factors in the work environment on the transfer of learning on the job.

Those potential organizational factors which affect employee behavior were reviewed carefully in the Chapter 2. These factors include training orientation, the match of employees' knowledge, skills

and attitude (KSA) with the work-design, supervisory assistance, peer relationship, and reward system. Literature on organizational behavior, economics of education, industrial psychology, and organizational training all suggest that these factors are important variables in studying employees' behavior in the workplace.

To study the association of organizational factors with the transfer of training, this researcher constructed a conceptual framework to reveal the relationship between organizational factors and the transfer of training in the workplace. The conceptual framework was presented in Chapter 3. The conceptual framework of transfer of training was developed by synthesizing the theories of organizational behavior, organizational training, industrial psychology, and economics of education.

In recent decades, developing the workforce has been a major effort to increase productivity. In this study, it is argued that training is a necessary, or pre-condition to improve work efficiency by acquiring KSA required by job tasks in the first place, but considered not sufficient for the transfer to learning to the job. Organizational factors in the workplace, which are out of the control of training, can be associated with the ultimate transfer of training. The conceptual framework suggests that workers with newly acquired KSA from training have only obtained potential capacity of required work proficiency. The consistent utilization of KSA on the job is not ensured yet. Such organizational factors in the work environment as training orientation, a match of KSA with work-design, supervisory assistance, peer support, and reward practices in the work environment may contribute to, or

inhibit the transfer of training on the job. This association could be in such that trainees determine the direction of behavior and degree of work effort, based on their assessing relevant organizational factors and the implied outcomes of applying KSA in the workplace.

Hypotheses for this study were made in accordance with the conceptual framework. The main hypothesis was: by facilitating the utilization of knowledge, skills and attitude acquired in training, such organizational factors as training orientation, the match of work-design with worker KSA, supervisory assistance, peer support and reward practice have significant and positive impact on the work efficiency.

This conceptual framework was applied to two state-owned and two joint-venture companies in the Shekou Industrial Zone, Shenzhen Special Economic Zone, China. In Chapter 5, statistical analysis models were constructed to estimate the association of the organizational factors with the transfer of training in the workplace, and the empirical results were carefully examined.

First, the Pearson correlation coefficients were used to estimate the correlation of organizational factors with the perceived work efficiency gained by utilizing KSA on the job. The results indicated that the match of KSA with work design, supervisory assistance, and peer support were positively and significantly correlated with the perceived work efficiency gained by utilizing KSA on the job.

Then, regression models were employed to estimate the impact of organizational factors on the transfer of training in the entire sample. The results indicated that on the average, the match of KSA with work design, supervisory assistance, and peer support were significantly and
positively related to the transfer of training. The association of these three organizational factors, the match of KSA with work-design, supervisory assistance and peer support, together with training achievement, accounted for about 34% of the transfer of training while training achievement along accounted for 7.5%. Among the organizational variables, human variables appeared to contribute the most to the transfer of training.

T-tests were then used to estimate the difference in the organizational factors and work efficiency gained by utilizing KSA on the job between the state-owned and joint-venture companies. The statistical results supported that there was a significant difference in supervisory assistance between the state-owned and joint-venture companies, but not for other organizational factors. Regardless of the statistical results, difference in peer interaction was observed on the factory floor in the two types of companies. Nor did t-tests showed significant difference in the perceived worker efficiency gained by utilizing KSA on the job. However, supplementary t-tests showed significant difference in scrap rate between one joint-venture company and both state-companies.

Finally, the regression models were applied to the state-owned and joint-venture companies separately, to compare the patterns of the transfer of training. The results showed different patterns in the transfer of training between the state-owned group and joint-venture group. For the state-owned companies, supervisory assistance and peer support showed prediction of the transfer of training with statistical significance while for the joint-venture, training orientation and

supervisor assistance showed predication of the transfer of training with statistical significance. The statistical results of regression also indicated an interaction between training achievement and peer support.

6.2 Conclusions

In conclusion, there are several major findings in this study. First, the empirical results generally indicated on the average, the match of KSA with work-design, supervisory assistance, and peer support were significantly related the perceived work efficiency gained by utilizing KSA on the job and tended to further the transfer of training in the workplace. The statistical results also indicated an interaction of the organizational factors with training achievement in a way that training achievement and organizational variables can mutually reinforce the effect on the transfer of training of one another. A plausible reason is that these three organizational variables can further the utilization of KSA by mobilizing employees with job opportunities and human support. Hence, the mutually reinforcement of organization and training increases the transfer of training. The findings tended to support the assumption of the conceptual framework that training was necessary and important in the first place for workers to acquire KSA, but not sufficient in realizing the potential KSA capacity obtained from training.

The study also found that the organizational factors contributing to the transfer of training varied in the state-owned and joint-venture companies. The difference is probably due to the different culture and

assumptions about the organizational practice in the workplace by the state-owned and joint-venture companies. For example, supervision assistance appeared significantly associated with the transfer of training consistently in both the state-owned sample and the jointventure sample, but was observed in different ways. In the jointventure companies, it was believed that supervision had the full responsibility of workers performance on the production line. There was little interaction among workers on the production line and a direct contact with workers and the provision of assistance by supervision appeared vital to realize workers' potential capacity. Training orientation and group meetings were organized by supervisors to align the group to the goals of the company. In contrast, supervisors in the state-owned companies kept a mentor and intimate relationship with workers. The supervisors believed it important for the workers to provide support among themselves. Therefore, peer interaction on the ling was encouraged by supervisors and appeared a significant factor in the process of the transfer of training.

Thirdly, comparing the patterns of the transfer of training in the two types of companies, the statistical results of regressions indicated an interaction between training achievement and group dynamics in this study. That is, in the joint-venture companies where environment was less co-operative and workers engaged in work more independently, workers' training achievement was a significant factor in the transfer of training; while in the state-owned companies where workers had significant interaction, training achievement appeared not to be a significant factor in the transfer of training. As the regression

models applied to the state-owned company group was significantly explained by the predictors in the equation, the results indicated that the interaction of workers could make up for deficiency in learning in training, if there is any.

The finding that peer interaction promotes learning was consistent with the principles of adult education. In andragogy, learner experiences are considered the resource of learning of high value, and experiential and participatory learning has been advocated (Lindeman, 1926; Knowles, 1973). Many training and education programs with learners involved were proved successful even in the international setting (Knowles, 1984).

Finally, the study also found among those organizational factors significantly associated with work efficiency (in the overall sample, and sub-samples of the state-owned and joint-venture companies), human factors (e.g. supervisory assistance and peers support) had larger statistical magnitude in predicting the transfer of training than other variables. This indicates that human factors in the workplace are important variables to promote the transfer of training when the technical conditions are satisfied. Therefore, this suggested that integrating the capacity and efforts of employees is vital to increase the work efficiency.

These findings have substantial implications in the training in electronic industry in SKIZ, given the fact that training has been a common practice for human resource development, and other industrial sectors, too.

Several limitations of this study should be recognized. The

researcher intended to estimate the impact by utilizing both the subjective self-reported data and the objective productivity data. Due to the inconsistent filing system in the four companies and lack of abundant productivity records, and due to the lack of (or impossibility of) recorded individual productivity in the group work environment, the major estimation of this study was based on the subjective data from the workers' survey questionnaires. Therefore, one should be cautious about the subjectivity of the perceived work efficiency gained by utilizing KSA on the job, given that t-tests for perceived work efficiency indicated no significant difference between the state-owned and jointventure companies, but t-tests for scrap rate indicated significant differences between two state-owned and one joint-venture companies. However, as individual psychological status is critical for employees to assess the environment and determine their efforts, we can say that both self-reported data and objective data are necessary in studying the transfer of training, and have revealed very meaningful information on the transfer of training in this study.

Second, in this case study, training was controlled by selecting companies which had similar training programs and by using training achievement scores obtained from similar training achievement tests. However, as training occurred individually in each company, there was always some variations, due to specific situations and trainers therein. For instance, in one extreme, 34.6% of the trainees in Company 1 indicated training more than two weeks long while no trainees in Company 4 indicated training longer than 2 weeks. Therefore, one has to be cautious about generalizing the findings to other situations.

Then, the study was applied to the electronic industry in a fast growing area which has a close linkage with the world market through Hong Kong. Relatively advanced production technology has introduced; productivity, standard of living, and wages are higher in this region. One variable in this study, reward practice, was expected to be related with the transfer, but turned not to be. In the interviews, some workers indicate that the production was high, but the pay was far less comparable. However, the wages of the workers on the average was 407 Yuan monthly (Xiao & Tsang, 1991), which was much higher than that of the workers in inland China. There could be several reasons that the reward showed no association with the transfer of training. First, workers were comparing their income with the productivity, and felt inequity and unsatisfied. Second, workers were comparing their pay with that of the other types of personnel (e.g., staff and managerial personnel) and felt unsatisfied. Thirdly, the pay was high enough to the extent that workers felt the human relationship were more meaningful in the work environment. Anyway, one might wonder what is the true interpretation behind the statistical results and if it would have impact on the transfer of training in other regions.

Finally, though the four electronic companies were selected as representing the typical industrial enterprises in SSEZ area, they could still be subject to uniqueness of their own. In addition, because of the small sample size in this exploratory study, one should be cautious about generalizing the findings to other industrial sectors and to other regions.

6.3 Policy Implications

In China, investment in human capital in the form of training at the stage of economic development is a common practice to improve the employees' productive capacity. It is expected that workers with acquired KSA can be more productive on the job. The findings of this study have shown that, some organizational factors in the work environment can promote the transfer of training on the job. If these findings can be generalized to other companies and industry sectors, there should be several implications for the training, the investment in human capital and the organization of production.

For the individual employee in the company, the concern is whether the company can provide the employee with an environment that can utilize her potential capacity to its limit so that she can have opportunities for individual development in her career. If the organizational factors in the work environment are operating to promote employee's utilization of KSA acquired in the training, she is able to increase her work efficiency to a higher extent. Both the employee and the company then can see the employee personal growth on the job and the employee as successful. The improved work efficiency, in turn, increases productivity. In other words, with the absence of the appropriate organizational factors, the employee is not able to work to the limit of her potential KSA acquired in the training.

Second, to a company which has invested in training, the increase in workers' work efficiency accounts in the first place for the expected return of the investment in training, the increased productivity.

Training itself can improve the worker's potential KSA and increase work efficiency only to a certain extent as the statistical results indicate. What is illustrated by this study is that the investment in training can bring about a higher rate of increase in work efficiency when appropriate organizational factors in the work environment are present, and the absence of relevant organizational variables in the workplace may curtail the potential higher rate of increase in work efficiency. This will then present, for the organization, the problem of a loss of the intangible value of potential capacity within the employees, which might otherwise have been extracted with the appropriate organizational factors in the work environment.

Third, the failure in exerting employees' potential KSA may mislead some leadership and human resources managers in making decisions on training. That is, the low return, or low work rate efficiency is due to the insufficient investment in training--employees have not learned well enough yet. This may cause the problem of continuously added investment in the necessary, yet satisfied, condition while ignoring the insufficient condition--promoting the transfer of training in the work environment. Therefore, the marginal return keeps minimal but there is a cost of training to bear.

Fourth, given that the organizational factors are associated with the transfer of training, a company implementing training for employees, should reconsider training, its function, and niche in human resource development. More specifically, training in a company is not a separate event from production, nor a panacea to cure all employee work efficiency problems. The findings indicated that organizational

variables in the workplace interact with training. Mutual reinforcement can promote the transfer of training on the job, thus realizing potential human resource value into a improved performance and increased work efficiency. Therefore, higher management and human resources management should integrate promoting the transfer of training on the job as part of the workforce development plan.

The integration of training transfer promotion into training development may include strategies of gaining employees' potential capacity and devising an organizational system in the workplace. The suggestions on promoting the transfer of training are made as follows.

Bringing the Awareness of the Process of the Transfer of Training

It is important to bring the awareness of training and the process of the transfer of training to the workplace. Managers, supervisors and trainers in the company should be aware that training is not a separate event in the company, nor a panacea to cure all the employee work efficiency problems. Training is necessary for employees to acquire KSA and improve their job required KSA, and certain relevant organizational factors in the work environment can promote the transfer of training further. Being aware of the specific variables contributing to the transfer of training can orientate the managerial personnel and help them seek to operate these variable in the relevant and positive way.

Orientations can be organized for managers, supervisors and trainers to understand the transfer of training in their workplace. The following strategy is suggested to bringing the awareness of training and the transfer of learning.

Evaluating Training Programs and Organizational Factors in the Work Environment. In a company, the leadership and the human resources managers should evaluate both the training program and the organizational factors in the work environment. Training is necessary for employees to acquire KSA and improve their job required KSA. If the training needs of the employees have been satisfied in terms of acquiring required KSA on the job, the company should shift the evaluation to the work environment. It should analyze what are those factors affecting the employees' behavior on the job, and evaluate if these factors in the present work environment are positive to promote the transfer of training. This can avoid falling into the trap of continuous by adding investment in training which might have been more than enough to acquire the required KSA. A close examination of both the training and the work environment will provide the leadership and management with information about where the problem of transfer of training exits.

Involving Supervisors in Training Program Development

Supervisory assistance showed the most magnitude in the transfer of training. Training programs in these electronic companies should involve technicians and managers, but not only the supervisors in the program development. Supervisors can be involved to share their knowledge and experience of production frontline with the trainers. Their knowledge and experience (e.g. production operation and employee interaction patterns) can help better prepare the planners and trainers

in program planning and implementation. On the other hand, learning the training process also helps supervisors to provide support and assistance for employees in training and in applying knowledge, skills and attitudes in the workplace. Specifically, supervisors should know how the training is planned and implemented. Knowing these, supervisors are in a better position to help the employees in the workplace and can provide assistance accordingly.

Creating an Environment for Peer Interaction

As peer interaction can promoting learning, managers should create an environment that allows the interaction among peer for promoting the transfer of training. Employees learn at training sessions as well as in their talks and on the job. In many situations, sharing similar experience among peers makes learning easier than by going to a lecture. Understanding some adult learning can give the management a new perspective for promoting the transfer of training.

While training is going on, special sessions should be scheduled for the interactive learning, especially for discussion, questions and answers among peers. Supervisors and trainers should encourage participatory learning, and also facilitate such sessions with their expertise. When trainees are back to the workplace, group meetings can be arranged for peers to share experience of applying KSA to the job. At such meetings, experience of application should be considered rich resources for learning on the job because even bad examples shared can be used to avoid mistakes. Problem-solving, hands-on teaching, and discussion should be advocated among employees.

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Developing Strategies to Promote the Transfer of Training

The findings of this study illustrate that in different work environments, the organizational factors associated with the transfer of training may vary. This indicates that the unique organizational culture in the company may induce different ways of operating the production. In evaluating the organizational factors relating to employee's work efficiency, the leadership and human resources managers should make a careful examination of the organizational factors in the work environment and the way that they are associated with the transfer of training. Based on the information about the organizational factors, the leadership and management can develop strategies to reinforce the practices that have positive and significant impact on the transfer of They should also improve some practices that could have training. potential impact on the transfer of training, and eliminate some practices which have negative impact on the transfer of training. Based on the findings of this study, management in practice should 1) ensure the match of work-design with KSA of the training workers; 2) promote supervisory assistance with the application of KSA by the workers on the job; and 3) encourage peer help in learning. Since supervisory assistance appears significantly associated with the transfer of training consistently in the entire sample, in the state-owned sample and the joint-venture subsamples, organization of production should emphasize nurturing the committed supervision on the factory floor. This committed supervisory assistance then could promote the transfer of training and increase the marginal return by realizing potential human value.

Again, in the state-owned companies, for example, peer support has an positive impact on the transfer of training. Management and supervision can encourage learning among the peers which could make up for the deficiency in training. The management and supervision can also reinforce the peer modelling among the employees. This may foster the positive support on the job, but avoid having employee chattering on the job. In the joint-venture company, training orientation shows positive, but marginal impact on the transfer of training. As training orientation is considered as an important part in training programs, the management may work on the improvement of training orientation (e.g., in its clarity and format), thus increasing the positive impact on the transfer of training.

In short, the efforts in human resource development should include promoting the transfer of training and integrating workers' potential capacity and efforts into the organization. The organization that keeps its organizational development efforts concurrent with AET programs are most likely to maximize benefit from potential capacities of the trained and educated employees.

6.4 Recommendations for Further Studies

This study was an exploratory case study in examining the issue of the transfer of training in the work environment. Based on the findings and limitations of this study, recommendations for future studies are suggested as follows.

This study included a small sample from four electronic companies

joint-venture, sole investment, or cooperation); 2) how the assumptions of the leadership and management philosophy affect the organizational practices; and 3) the way the organizational factors operate on promoting the transfer of training in different companies.

Third, this exploratory study took the individual employee as the level of analysis. In the field study, this research found that most of the modernized production nowadays was operated in a group manner, the productivity for the individual worker is usually incomplete or unavailable. If individual productivity data is not available, further research could consider taking the production group as the study units, enlarging the sample size and shifting the analysis to production group level. Or, the research can enlist the cooperation of companies in a similar industrial sector to objectively collect productivity data. This could provide access to the productivity records available for the study of transfer of training.

Fourth, this study showed interaction of group dynamics with individual training achievement. Further research also can take a study on the group level to examine such variables at group level as group dynamics, communication, and group skills proficiency.

in the fast growing area in China and revealed meaningful information about the transfer of training. Further research is needed to determine if the findings are generalizable to other companies in the same industry or to other industrial sectors. It would also be interesting and important to study the association of organizational factor in the industrial sector in other regions in China since training is a major strategy employed at the stage of economic development to increase productivity.

Second, this study has considered the culture differences in two types of companies, the state-owned companies which had the more established culture, and the joint-venture which had the newly introduced foreign culture blended with the native culture. If the findings can be generalized to other similar companies, or to other regions, one needs to examine carefully the culture in the work environment. For instance, some factors are related with the transfer of training in certain cultures, but may not necessarily be related with the transfer of training (e.g., peer support) in other organizational cultures. Some factors having impact on the transfer of training may operate in a different way in different types of companies (e.g., supervisory assistance in this study). How the organizational factors impact on job efficiency is far more complicated than this research can deal with and one has to be aware of the culture in the work environment. Hence, it would be interesting to do further study on how the organizational culture affects the transfer of training. The topics may include: 1) the relationship between ownership and the organizational practices in different types of companies (state-owned,

APPENDICES

APPENDIX A: Trained Worker Survey Questionnaire

This appendix contains survey instrument for trained workers in both English and Chinese. The questionnaire in Chinese version is the copy of original one used for the data collection. The measurement scales of each variables eliciting information on the transfer of training are also listed with the statements measuring them.

TRAINED WORKER SURVEY The Utilization of Knowledge, Skills and Attitude in the Workplace

I. Training Experience

This section intends to obtain information about the training programs you attended after you started working in the company. Please respond to each question by placing a check mark in the appropriate space provided.

1.	The last training I attended was in:(month)(year).
2.	The training was:(hours)(days)(weeks)(months)(years) long.
3.	The training was offered by: our plant other institution.
4.	The training was conducted in: our plant other institution.
5.	I was paid by: our plant/ my self/the training center.
6.	My attending the training was: required by the job voluntary for my own interest.
7.	The training was conducted in the mode of: on-the-job training off-the-job training evening/spare-time training.
8.	The purpose of the training was to: learn basic job skills update the skills required by job raise my education level others. Please identify:
9.	The content of the training program was (e.g. course title & what were taught):
10.	<pre>I received / not received certificate of training completion; my training achievement score is satisfactory / not satisfactory.</pre>
11.	I felt the training was : very satisfactory satisfactory somewhat satisfactory not satisfactory.

12. My training achievement score is _____.

The following elements are related to the utilization of acquired knowledge, skills and attitude through training in the workplace. Please rate the degree of the experience you have had in your situation in the plant. Your careful responses to the statements will be greatly appreciated.

Use the following scale for rat	ing each of the statement:
1 - To little extent	2 - To some extend
3 - To considerable extent	4 – To great extent

N - Not applicable

II. Trainees and Supervisors' Involvement in Training Orientation Activities

This section seeks to find out if you and your supervisors were involved in pretraining activities to gain the awareness of the purpose, objectives and contents of training programs.

1.	My supervisor informed me of the training.	1	2	3	4	N
2.	My supervisor discussed the content of training before I attended the training.	1	2	3	4	N
3.	I thought the training would be relevant to my job tasks.	1	2	3	4	N
4.	I had an idea about what I was going to learn.	1	2	3	4	N
5.	I knew how well I could accomplish my job tasks before training.	1	2	3	4	N
6.	I knew that I would be required to use new KSA to accomplish job tasks after the training.	1	2	3	4	N
7.	My supervisor talked about the benefits of applying new KSA on the job after the training.	1	2	3	4	N

III. Work Environment for Applying KSA on the Job

This section intends to find out if the group has provided an environment that you can apply the acquired knowledge, skills and attitude.

1.	New KSA is described as part of my work in the task description.	1	2	3	4	N
2.	My job requires training in finishing the tasks.	1	2	3	4	N
3.	New KSA is very important in accomplishing my job tasks.	1	2	3	4	N

	Use the following scale for rating each of the stat 1 - To little extent 2 - To some exten 3 - To considerable extent 4 - To great exter N - Not applicable	emen d nt	t:			
4.	I have used new KSA after the training on my job frequently. I use(d) it (check only one) everyday several times a w a few times a month a few times a yea not at all.	eek r				
5.	The first time I used KSA was: immediately 3 - 4 weeks 2 - 3 months 4 - 6 months after th	e tr	aini	ing.		
6.	The last time I used KSA was: today last week last month	last	yea	ar.		
7.	There is appropriate equipment for me to apply new KSA on my job.	1	2	3	4	N
8.	There is adequate information (e.g. manual, diagrams, etc.) for me to apply new KSA on my job.	1	2	3	4	N
9.	I have the discretion on selecting the most appropriate KSA in accomplishing my tasks.	1	2	3	4	N
10	. My supervisor helps me to set goals in applying new KSA to accomplishing my job tasks.	1	2	3	4	N
11	. My supervisor set criteria for applying new KSA in accomplishing my job tasks.	1	2	3	4	N
12	. My supervisor provided assistance when I had a problem in trying out new KSA.	1	2	3	4	N
13	. My supervisor discussed how to apply the new KSA in accomplishing my job tasks.	1	2	3	4	N
14	. My supervisor informed me how well my job tasks have been accomplished by using new KSA.	1	2	3	4	N
15	. My supervisor informs me of our group performances in accomplishing tasks.	1	2	3	4	N
16	. I discussed problems I encountered in using new KSA with my supervisor.	1	2	3	4	N
17	. I discussed problems with my peers in trying out new KSA.	1	2	3	4	N

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Use the following scale for rati	ing each of the statement:
1 - To little extent	2 - To some extend
3 = To considerable extent	4 = To great extent
N - Not applicable	-

18.	My peers helped me in applying the new KSA.	1	2	3	4	N
19.	My peers cared about my applying the new KSA on the job.	1	2	3	4	N

IV. Reward System

This section intends to find out what rewards the organization or group provide reward for improved performance by using new KSA.

1.	There has been an evaluation of my application of the new KSA.	1	2	3	4	N
2.	Our supervisor gives verbal praise for trained workers who have tried to apply the new KSA.	1	2	3	4	N
3.	Trained workers can get a bonus for improved performance by using new KSA.	1	2	3	4	N
4.	Trained workers can get a wage increase when they can use new KSA in accomplishing tasks effectively	1	2	3	4	N
5.	Trained workers can get a promotion when they use new KSA in accomplishing tasks distinctively.	1	2	3	4	N
6.	Other rewards are:			<u> </u>	<u></u>	_ ·
7.	I have been given verbal praise for trying to apply the new KSA.	1	2	3	4	N
8.	I have received a bonus for improved performances by using new KSA.	1	2	3	4	N
9.	I have got a wage increase for accomplishing tasks effectively by using new KSA.	1	2	3	4	N
10.	I have received a promotion as the results of using new KSA distinctively on the job.	1	2	3	4	N
11.	I have received other reward:					

	Use the following scale for rating each of the stat 1 - To little extent 2 - To some exter 3 - To considerable extent 4 - To great exter N - Not applicable	emen ad ant	nt:			
V.	Benefits of Applying New KSA on the Job This section intends to find out if the trained wo roved performance that may be related to training.	rkei	s ha	ive		
1.	I have used new KSA acquired from training in finishing my job tasks.	1	2	3	4	N
2.	I feel I achieved something when I am able to use the new KSA doing my job.	1	2	3	4	N
3.	Trying to use the new KSA is a pleasant work experience for me.	1	2	3	4	N
4.	Using the new KSA has improved my work.	1	2	3	4	N
5.	I have maintained low absenteeism in work after training.	1	2	3	4	N
6.	I can accomplish my job tasks faster than before the training.	1	2	3	4	N
7.	I have accomplished my job tasks faster than before training.	1	2	3	4	N
8.	I can accomplish job tasks better in using new KSA.	1	2	3	4	N
9.	The quality of my work has been improved after using the new KSA.	1	2	3	4	N
10.	I have made fewer mistakes in production by using new KSA.	1	2	3	4	N
11.	I intend to find another job in the coming years.	1	2	3	4	N
VI.	General Background					

This section intends to obtain information about yourself. Please respond to each question by filling the blank or placing a check mark in the appropriate space provided.

1. I have a total work experience of _____ years.

2. I have worked in this plant for _____ years.

3.	What I do in my job is
4.	My skill level is
5.	I have an education attainment of: 6 years 9 years 12 years more than 12 years.
6.	I am in the age group of: 18 to 25 26 to 30 31 to 35 over 35.

Please use the space below to identify additional elements that you believe are associated with workers' utilization of KSA acquired through training in the workplace. 受培训工人运用所学知识,技术,遵守规章制度调查问卷

一、参加培训经历

第一部份着重了解你到本厂后参加工厂组织的培训的情况。请选择适当的空填写,或在括 号内打勾(每题填写一项或勾一项)。 例:我于1987年⊇月来本厂工作。我参加过本厂的培训(` ~); 外单位办的培训()_ 1、我量后一次参加培训的时间是19 年 月。 天: 星期: 月; 年。 2、培训时间为 小时, 3、培训是由我厂举办();外单位承担举办();其它(),请说明: 4、培调是在我厂内举办();外单位举办()。 5、我的培训费是由我厂出();我自己出();培训中心出()。 6、我参加培训是由于工作需要();自己自愿()。 7、培训的方式是在职培训(); 脱产培训(); 业余/夜校培训())。 8、培训的目的是学习工作要求的基本知识技术(____)更新知识技术(_____)): 提高文化水平();其它(),请说明: 9、培训的内容是(请说明培训主要内容。例:识别电子元替代). 10、我在培训结束时获得结业证书 ();没有获得结业证书 ();成绩令人满意 (); 成绩不令人满意()。 11、我感到培训令人:很满意();满意();还可以();不满意()。 培训考试分散为 分。 以下几部分将了解受训人员工作中运用所学知识,技术和遵守规章制度的情况。请根据您的 经历,用"0"表示出下例问题的程度。以下数字和符号表示不同的程度: 1=程度很低或没有 2=某种程度 3=相当程度 4=很大程度 N=不适用 2(3)4N 例。培训的内容对完成任务很重要。 1 二、受训工人和班组长在培训前和培训中的活动 这一部分着重了解你和你的班姐长(或工长,线长)在培训前和培训中的有关活动,对培训 的亲旨,目的和内容的了解情况。 1、我的班长通知我有关培训的事宜。 1 2 N 3 4 2、我的班长在培训前与我讨论过培训的内容。 2 3 4 N 1 3、我认为培训与我工作任务有关。 1 2 3 4 Ν 2 N 4、我知道我参加培训时将要学习的内容。 1 3 2 1 N 5、我知道培训前我完成工作的情况。 ł 3 6、我知道培训后工厂将要求我使用所学知识,技术和遵守规章制度。1 2 3 4 N 7、我的班长曾和我讨论过在生产中运用所学知识, 技术和遵守

1

2

3 4

N

规章朝度的好处。

以下数字和符号表示不同的程度:

1=程度很低或没有 2=某种程度 3=相当程度 4=很大程度 N=不适用

三、使用所学知识,技术和遵守规章制度的工作环境

本部分着重了解你所在工作班组是否为受培训工人使用所学知识,技术,遵守规章制度提供 必要的环境。

- 1、我所学的知识,技术和遵守规章制度是我工作职责要求中的一部分。 1 2 3 4 N
- 2、我的工作要求我使用所学知识。技术和遵守规章制度。 1 2 3 4 N
- 3、新知识、技术和规章制度对于我完成工作很重要。 1 2 3 4 🕺
- 4、我在工作中常运用所学知识,技术和遵守规章制度(请勾一项)。
 我每天使用();每星期几次();一个月几次();一年几次();从不使用()。
- 5、我第一次使用所学知识,技术和遵守规章制度是在(请勾一项);
 培训后不久();三、四星期后();两个月后();四个月后();半年后()。
- 6、我最近一次使用所学知识,技术和遵守规章制度(请勾一项); 是今天();上星期();上个月();半年以前()。
- 7、我们小组具有运用新知识,技术和遵守规章制度的设备。 1 2 3 4 N

 8、我们组提供运用新知识,技术和遵守规章制度所需信息资料(包括 数据、图表、手册等)。
 1 2 3 4 N
 9、我有权选择完成工作所需的知识,技术。
 1 2 3 4 N
 10、我的班组长帮助我制定运用所学知识,技术和遵守规章制度的目标。

- 11、我的班望长制定了运用学知识,技术和遵守规章制度的标准。 1 2 3 4 N
- 12、我的班组长在我运用新知识,技术和遵守规章制度有困难时给予我帮助。1 2 3 4 N
- 13、我的班组长与我讨论如何运用所学知识,技术和遵守规章制度。 1 2 3 4 N 14、我找班组长讨论我在运用新知识,技术和遵守规章制度时遇到的困难。 1 2 3 4 N
- 15、我的班组长让我知道我运用所学知识,技术和遵守规章制度完成 工作的情况。 1 2 3 4 N
- 16、我的班组长让我们知道整个班完成工作的情况。
 1 2 3 4 N

 17、我与同事一起讨论运用所学知识,技术和遵守规章制度时所遇到的问题。1 2 3 4 N

 18、我的同事在我运用所学知识,技术和遵守规章制度时帮助我。
 1 2 3 4 N
- 19、我的同事关心我运用所学知识,技术和遵守规章制度的情况。 1 2 3 4 N

以下数字符号表示不同程度:

1=程度很低或没有 2=某些程度 3=相当程度 4=很大程度 N=不适用

四、奖励制度

第四部分着重了解工厂对运用所学知识,技术和遵守规章制度,提高工作效率工人的奖励情况。

1.	我组对运用所学知识,技术和遵守规章制度进行考核。	1	2	3	4	N
2、	我的班组长对运用所学知识,技术和遵守规章制度的工人给予 口头表 扬。	1	2	3	4	N
3、	运用新知识 , 技术遵守规章制度,工作完成有进步的工人可以得到奖金。	1	2	3	4	N
4.	运用所学知识,技术和遵守规章制度,工作完成有成效可获得工资提升。	1	2	3	4	N
5、	在运用所学知识,技术和遵守规章制度,工作完成有显著成绩者					
	可获级别晋升。	1	2	3	4	N
6.	其它奖励(请说明):					
7、	我运用所学知识,技术和遵守规章制度,曾受到口头表扬。	1	2	3	4	N
8.	我运用所学知识,技术和遵守规章割度,曾获得奖金。	1	2	3	4	N
9.	我在工作中运用所学知识,技术和遵守规章制度得到工资提升。	1	2	3	4	N
10.	我在工作中运用所学知识,技术和遵守规章制度曾获得级别晋升。	1	2	3	4	N
11、	我曾获得其它奖励。请说明:					

五、运用所学知识、技术和遵守规章制度对于工作中所收到的效益

常五部分着重了解受训工人在培后工作是否有改进提高。

1,	我 在工作中运用了所学知识,技术和遵守 规章制度 _。	1	2	3	4	N
2.	我感到工作中能运用所学知识,技术和遵守规章制度是我的一个成绩。	1	2	3	4	N
3.	运用所学知识,技术和遵守规章制度对我来说是很愉快的经历。	1	2	3	4	N
4.	运用所学知识,技术和遵守规章制度使我工作完成得更好。	1	2	3	4	N
5、	培训后,我的缺勤率降低了。	1	2	3	4	N
6.	培训后,我可以更快的完成工作。	1	2	3	4	N
7、	培训后, 我完成的工作量增 大了 。	1	2	3	4	N
3、	培训后,我可以更好地完成工作。	1	2	3	4	N
<u>q</u> .,	培训后,我完成工作的质量提高了。	1	2	3	4	N
10.	培训后,我工作中的失误减少了。	1	2	3	4	N
11.	我仍愿意继续在本厂工作。	1	2	3	4	N

以下数字和符号表示不同和程度:

1=程度很低或没有 2=某种程度 3=相当程度 4=很大程度 N=不适用

六、个人一般情况

这一部分主要了解您的一般情况。请在适当的空内打勾或填写。

- 1、我一共工作了 年。
- 2、我在本厂工作了 年。
- 3、我的具体工作是
- 4、我的工资级别是 级。
- 5、我的学历是6年();9年();12年();14年以上()。
- 6、我的年龄为18至25岁(); 26至30(); 31至35(); 36岁以上()。

七、个人看法和意见

您可以在下面空白处填写您个人对工厂专业知识技术培训,以及运用所学知识 技术的**看法和意见**。 100 C 100

Measurement Scales of Variables Included in the Data Analysis

The measurement scale of each variable is based on a set of items. Variables eliciting information on the transfer of training are listed below with the statements measuring them:

TRAINING ORIENTATION:

0	My supervisor informed me of the training event.	1	2	3	4	N
0	My supervisor discussed the content of training before I attended the training.	1	2	3	4	N
0	I thought the training would be relevant to my job tasks.	1	2	3	4	N
0	I knew that I would be required to use new KSA to accomplish job tasks after the training	1	2	3	4	N
0	My supervisor talked about the benefits of applying new KSA on the job after the training.	1	2	3	4	N
MAT	CH OF KSA WITH WORK DESIGN:					
0	My job requires training in finishing the tasks.	1	2	3	4	N
0	New KSA is very important in accomplishing	1	2	3	4	N
	my job tasks.					
0	After training I have used new KSA on my job					
	frequently. I use(d) it (check only one)					
	everyday severa	1 ti	lmes	a we	eek	
	a few times a month a few	time	s a	year	:	
	not at all.					
0	There is appropriate equipment for me to apply	1	2	3	4	N
	new KSA on my job.					
0	There is adequate information (e.g. flow chart,	1	2	3	4	N
	etc.) for me to apply new KSA on my job.					
0	I have discretion in selecting the most	1	2	3	4	N
	appropriate KSA in accomplishing my tasks.					
	Regarding the third item, KSA usage on the job,	"e	veryo	iay"	is	
cod	ed as 4, "several time a week" coded as 3, "a few	time	es a	mont	:h"	
cod	ed as 2, "a few times a year" coded as 1, and "not	at	all'	' cod	led a	AS

"Not Applicable".

SUPERVISOR ASSISTANCE ON THE JOB:

• My supervisor helps me to set goals in applying 1 2 3 4 N new KSA to accomplishing my job tasks.

1 2 3 4 N 0 My supervisor set criteria for applying new KSA in accomplishing my job tasks. 2 3 4 0 My supervisor provided assistance when I had a 1 N problem in trying out new KSA. My supervisor discussed how to apply the new KSA 2 3 1 4 N 0 in accomplishing my job tasks. My supervisor informed me how well my job tasks 1 2 3 4 0 N have been accomplished by using new KSA. 0 My supervisor informs me of our group 1 2 3 4 N performances in accomplishing tasks. PEER HELP: 0 My peers helped me in applying the new KSA. 1 2 3 4 N My peers cared about my applying the new 1 2 3 4 N 0 KSA on the job. **REWARD PRACTICE:** N Our supervisor gives verbal praise for trained 1 2 3 4 0 workers who have tried to apply the new KSA. Trained workers can get a bonus for improved 1 2 3 4 Ν 0 performances by using new KSA. 3 0 Trained workers can get a wage increase when they 1 2 4 N can use new KSA in accomplishing tasks effectively. 2 3 Trained workers can get a promotion when they 4 N 0 1 use new KSA in accomplishing tasks distinctively. 3 I have been given verbal praise for trying 1 2 4 N 0 to apply the new KSA. 1 2 3 4 N I have received a bonus for improved 0 performances by using new KSA. I have got a wage increase for accomplishing 2 3 4 N 0 1 tasks effectively by using new KSA. I have received a promotion as the result of 1 2 3 4 Ν 0 using new KSA distinctively on the job.

Notice that the first 4 reward-practice items measure the company reward policies; and latter 4 reward-practice items actually measure the workers' experiences of being rewarded. As the correlation of the two subsets of items are high (r = 0.6, p < 0.01) and the reliability (See Table 5) is also high enough ($\alpha = 0.84$), which means that the reward policy and workers' experiences of being rewarded are consistent. Therefore, for the convenience of data analysis, these eight items are 156

combined as one measurement scale.

PERCEIVED WORK EFFICIENCY BY UTILIZING KSA ON THE JOB:

0	Using the new KSA has improved my work.	1	2	3	4	N
0	I can accomplish my job tasks faster than before the training	1	2	3	4	N
0	These accomplished my job tasks faster than	1	2	2	4	N
•	before training.	-	L	5	-	14
0	I can accomplish job tasks better in using new KSA.	1	2	3	4	N
0	The quality of my work has been improved after using the new KSA.	1	2	3	4	N
0	I have been made fewer mistakes in production using new KSA.	1	2	3	4	N

TRAINING ACHIEVEMENT SCORE. The training achievement test score is an interval variable measured by the Chinese hundred-point scoring system, for which 60 is a pass point; 60 to 75 is considered intermediate achievement level; 76 to 89 is considered good achievement level; and above 90 is considered excellent achievement level. Appendix B: Supervisor Survey Questionnaire

This appendix contains survey instrument for supervisors both in English and Chinese. The questionnaire in Chinese version is the copy of original one used for the data collection.

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SUPERVISOR SURVEY The Workers' Utilization of Knowledge, Skills and Attitude in the Workplace

I. Training Programs

This section intends to obtain information about the training programs provided for workers in your group. Please respond to each question by placing a check mark in the appropriate space provided.

- 1. Attending training programs is usually required for new workers before starting work: ____ Yes ____ No.
- Training programs for my workers are usually conducted in:
 _____ our plant; _____ other institutions; _____ others.
- 3. The training is usually offered by: _____ our plant; _____ other institution; _____ others.
- 4. The training is paid by: _____ our plant _____ workers ____the Training Center.
- 5. The training on the average is about _____ hours ____ days _____ weeks _____ months _____ years long.
- 6. The training is in the categories of: ______ learning basic job skills ______ update the skills required by job ______ raise education level ______ others. Please identify:______
- 7. The training programs have been conducted in the mode of: ______ on-the-job training ______ off-the-job training ______ evening/spare-time training.

_____ others.

The following elements are related to the utilization of acquired knowledge, skills and attitude through training in the workplace. Please rate the degree of the experience you have had in your situation in the plant. Your careful responses to the statements will be greatly appreciated.

II. Training Orientation

This section seeks to find out if you and your workers were involved in pretraining activities to gain the awareness of the purpose, objectives and contents of training programs.

Use the following scale for ratio	ng each of the statement:
1 - To little extent	2 - To some degree
3 - To considerable extent	4 - To great extent
N - Not applicable	-

- 1. I inform the workers of the training which 1 2 3 4 N they are going to attend.
- 2. I always have an idea about what the workers are 1 2 3 4 N going to learn before the training.
- 3. I think that most of the training programs are 1 2 3 4 N relevant to the job tasks.
- 4. I discuss with workers about the contents of the 1 2 3 4 N training they are going to attend.
- 5. I discuss with workers about how well they could 1 2 3 4 N

accomplish job tasks before training.

- 6. Workers know that they would be required to use 1 2 3 4 N new KSA to accomplish job tasks after the training.
- 7. I talk with workers about the benefits of applying 1 2 3 4 N the new KSA on the job after the training.
- 8. I have opportunity to provide inputs to trainers 1 2 3 4 N about the contents of training programs.

III. Work Environment for Applying KSA on the Job

convenient for using new KSA on the job.

This section intends to find out if the group has provided an environment that you can apply the acquired knowledge, skills and attitude.

1. The new KSA are described as part of the work in 1 2 3 4 N the group task dimension. 2 3 2. New KSA are important in accomplishing the 1 4 N tasks in our group. 3. I try to organize work in a way that is 1 2 3 4 Ν

	Use the following scale for rating each of the sta 1 - To little extent 2 - To some degr 3 - To considerable extent 4 - To great ext N - Not applicable	teme cee cent	ent:			
4.	I require workers in my group to use new KSA in accomplishing work tasks.	1	2	3	4	N
5.	I have difficulty meeting production norms with trained workers using KSA.	1	2	3	4	N
6.	Most trainees have used new KSA after the training in the work frequently.	1	2	3	4	N
7.	Trained workers always have appropriate equipment for applying new KSA in accomplishing job tasks.	1	2	3	4	N
8.	Trained workers always have adequate information for applying new KSA in accomplishing job tasks.	1	2	3	4	N
9.	I always discuss how to apply new KSA in accomplishing job tasks with workers.	1	2	3	4	N
10.	I help trained workers set accepted goals in applying new KSA in accomplishing job tasks.	1	2	3	4	N
11.	I set criterion for workers to apply new KSA in accomplishing job tasks.	1	2	3	4	N
12.	I provide assistance when workers have problem in trying out new KSA.	1	2	3	4	N
13.	I inform workers how well their job tasks have been accomplished by using new KSA.	1	2	3	4	N
14.	I also inform workers of our group performances in accomplishing tasks.	1	2	3	4	N
15.	Our group members share their problems of doing work with one another.	1	2	3	4	N
16.	Our group members help one another in using new KSA when they have difficulties.	1	2	3	4	N
17.	Our group members care about others and their accomplishment of jobs with the new KSA on the job.	1	2	3	4	N

Use the following scale for rating each of the statement: 1 - To little extent 2 - To some degree 3 - To considerable extent 4 - To great extent N - Not applicable

VI. Reward System

This section intends to find out what rewards the organization or group provide for improved performance by using new KSA.

1.	I do evaluation of workers' application of the new KSA.	1	2	3	4	N
2.	I give verbal recognition for trained workers who have tried to apply new KSA.	1	2	3	4	N
3.	Workers can get bonus when they can do their work well by using new KSA.	1	2	3	4	N
4.	Workers can get wage increase when they can accomplish tasks by using KSA effectively.	1	2	3	4	N
5.	Workers can get a promotion when they make distinctive achievements by using KSA.	1	2	3	4	N
6.	Workers can get other rewards when they can do their work well by using new KSA.	1	2	3	4	N
7.	The other rewards are:				<u> </u>	
v .	Benefits of Applying New KSA on the Job					
imp	This section intends to find out if the trained wo roved performance that may be related to training.	rkei	s ha	ave		
1.	Trained workers are more capable of accomplishing job tasks than untrained workers.	1	2	3	4	N
2.	Trained workers are more responsible for accomplishing tasks than untrained workers.	1	2	3	4	N

- 3. Trained workers usually show more commitment to 1 2 3 4 N accomplishing tasks than untrained workers.
- 4. Trained workers have lower turnover than 1 2 3 4 N untrained workers.
- 5. Trained workers usually had lower rates of 1 2 3 4 N absenteeism in work.

Use the following scale for rating each of the statement: 1 - To little extent 2 - To some degree 3 - To considerable extent 4 - To great extent N - Not applicable

6.	Trained workers can finish more job tasks.	1	2	3	4	N
7.	Trained workers have been doing more job tasks.	1	2	3	4	N
8.	Trained workers produce less scrap in production.	1	2	3	4	N
9.	Most trained workers have been doing their job in satisfactory quality.	1	2	3	4	N

VI. General Background

This section intends to obtain information about yourself. Please respond to each question by filling in the blank or placing a check mark in the appropriate space provided.

1. I have a total work experience of _____ years.

2. I have worked in this plant since 19_____.

3. My job title is _____.

4. My skill level is _____ grade.

5. I education attainmentis: _____ primary school _____ junior high school

_____ senior high school _____ college.

6. I am _____ years old.
班组长问卷

受培训工人运用所学知识、技术、遵守规章制度调查问卷

一、培训课程

- 第一部分着重了解你工作小组工人所参加的培训课程。请选择适当的空填写,或在括号内打 勾(请勾出一项)。
- 1、新工人开始工作前必须参加培训。是的();不是()。
- 2、我组工人参加的培训是在本厂进行的();外单位进行的();两者皆有()。
- 3、培训通常是由我厂组织的();外单位组织的();两者皆有()。
- 4、培训费是由我厂付();工人自己付();培训中心付()。
- 5、培训期一般为 个小时长; 天长; 个星期长; 个月长; 年长。
- δ、培训的方式是在职培训(); 脱产培训(); 业余/夜枝培训(); 其它。
 请说明:
- 7、培训的目的是:学习工作要求的基本知识技术();更新知识技术();提文化水平
 ();其它。请说明:

以下几部分将了解受训人员在工作中运用所学知识,技术和遵守规章制度的情况。请根据您 所了解的情况,用"0"表示出下例问题的程度。

以下数字和符号表示不同的程度:

1=程度很低或没有 2=某种程度 3=相当程度 4=很大程度 N=不适用

二、受训工人和班组长在培训前的活动

这一部分着重了解你和你组工人在培训前和培训中的有关活动,对培训的宗旨,目的和内容 的了解情况。

1、	培训前,是由我通知工人有关培训的事宜。	1	2	3	4	N
2.	在我组工人参加培前,我就了解他们将要学习的大概内容。	1	2	3	4	N
3.	我 与工人讨 论他们的工作情况。	1	2	3	4	N
4、	我与工人讨论他们将要学习的课程内容。	1	2	3	4	N
5、	我与工人讨论培训后在工作中运用所学知识,技术和					
	遵守规章制度的益处与作用。	1	2	3	4	N
6.	我认为培训课程与工作是有关的。	1	2	3	4	N
7.	工人们知道在培训后工厂将要求他们运用所学知识,技术					
	和遵守規章制度。	1	2	3	4	N
8.	我有机会向培训教师提出有关培训内容的建议。	. 1	2	3	4	N
9.	我也参加培训工人的具体工作。	1	2	3	4	N

以下数字符号表示不同程度:

度的虚绩。

1=程度很低或没有 2=某种程度 3=相当程度 4=很大程度 N=不适用

三、使用所学知识,技术和遵守规章制度的工作环境 本部分考重了解工作班组是否为工人提供运用所学知识,技术和遵守规章制度的工作环境。 1、工人所学知识,技术和遵守规章制度是本组工作要求中。 Ν 1 2 3 4 的一部分。 2、工人所学知识,技术和遵守规章制度对于完成本组工作 1 2 3 4 N 很重要。 3、我尽力把工作组织得方便工人运用所学知识,技术和 1 2 3 4 N 湛守规章制度。 N 4、我要求工人运用所学知识,技术和遵守规章制度。 1 2 3 4 5、工人运用所学知识,技术和遵守规章制度使我难以应付 N 1 2 3 4 日常生产工作。 6、受训工人一般都具有运用所学知识,技术和遵守规章制 Χ 1 2 3 4 崖所需的设备。 1、受训工人一般都具有运用所学知识,技术和遵守规章制 N 1 2 3 4 度所需的信息和资料。 3、大部分工人在培训后都蒙在工作中运用所学知识,技术 1 2 3 4 N 和遵守规章制度。 9、我常与工人讨论如何在工作中运用所学知识,技术和遵 i 2 3 4 Ν 守规章制度。 10、我帮助受训工人制定可行的,运用所学知识,技术和遵 N 1 2 3 4 守规章制度的目标。 N 11、我为工人制定运用学知识,技术和遵守规章制度的标准。 1 2 3 4 1 2 3 4 N 12、当工人运用所学知识技术有困难时,我帮他们解决。 13、我让工人了解他们运用所学知识,技术和遵守规章制度 1 2 3 4 N 的情况。 1 2 3 4 N 14、 我同时也让工人了解小组完成工作的情况。 N 1 2 3 4 15、我们的组员相互讨论工作中的问题。 16、我们的组员在运用所学知识,技术和遵守规章制度相互 1 2 3 4 N 帮助。 17、我们的组员相互关心运用所学知识,技术和遵守规章制 1 2 3 4 N

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以下数字和符号表示不同的程度:

1=程度很低或没有 2=某种程度 3=相当程度 4=很大程度 3=不适用

四、奖励制度

第四部分者重了解工厂小组对运用所学知识,技术和遵守规章制度,提高工作效率的工人所 采取的奖励制度和方法。 1、我组对运用所学知识,技术和遵守规章制度进行评估。 1 2 3 4 N

2.	我对运用所学知识,	技术和進守規章制度工	人给予口头表扬。	1	2	3	4	N
3.	工人适用所学知识,	技术和道守规章制度,	工作完成有进步,					
	可得到类全。			1	2	3	4	N
4.	工人运用所学知识,	技术和遵守规章制度,	工作完成有成效,					
	可获得工资提升。			1	2	3	4	Ŋ
5.	工人运用所学知识,	技术和遵守规章制度,	工作完成有显著		_			.,
	成绩 可获级别誉升	•		:	2	3	-	N

3、工人运用所学知识,技术和遵守规章制度,还可获得其它类 动,清说明。

五.运用所学知识。技术和遵守规章制度。对于工作中所收到的效益 常五部分着重了解受训工人在培训后工作是否有改进提高。

1、受过培训的工人比没受过培训的工人工作完成情况更好。	1	2	3	4	N
2、受过培训的工人比没受过培训的工人对工作更负责任。	1	2	3	4	N
3、受过培训的工人比没受过培训的工人尽心尽力。	1	2	3	4	N
4、受过培训的工人比设受培训的工人装葺率低。	1	2	3	4	N
5、受过培训的工人比没受培训的工人尊取率低。	1	2	3	4	N
á、受过培训的工人 童等做 更多的工作。	1	2	3	4	N
7、受过培训的工人在生产中完成了更多的工作。	1	2	3	4	N
1、受过培训的工人生产的次品和运工件装少。	1	2	3	4	N
9、受过培训的工人的工作质量靠达到令人满意的标准。	1	2	3	4	'n
大"文江省美国上八的上行员里里之外"(《《三》)					

六、个人一兼情况

这部分主要了解意的一爱情况。请在适当的括号打勾或在空内填写。

- 1、我一共工作了 年。
- 年。 2、我在本厂工作了
- 3、我的学历是6年();9年();12年();14年以上()。
- **4、我的年龄为Ⅰ3至25岁()**;26至30岁();31至35岁();36岁以上()。

Appendix C: Top Management/Training Officer Interview Guide

This appendix contains interview guide for trained company managers or training officers both in English and Chinese. The Chinese version is the copy of original one used for the data collection. 167

Top Management/Training Officer Interview Guide

Name of Interviewer:_____ Date :_____

This guide will be used to check with the top management the organizational factors in categories identified for this study.

Comments/notes <u>Categories</u> yes no I. Training Programs How are decisions made that result in training programs? Is there any pretraining orientation activities? How are the following people involved? workers supervisors trainers Where is training done? within the plant? outside the plant? Where are the trainers from? from other institutions? your own people? What training programs have you conducted in the past years? What training programs do you plan to provide in the next 12 months? For whom? & Why?

Training conducted on-the-job length purpose content off-the-job length purpose content evening training length purpose content

II. Work Environment

a. Physical environment

Is there a job description for each worker or position?

Is training required for new workers?

Is there training plan developed prior to training?

Are job assignment and KSA of trained workers considered when workers go back to jobs?

Does plant provide necessary conditions for KSA application? equipment

information

safety equipment

other assistance

b. <u>Supervisory support</u>

Regarding new KSA application by trained workers, does supervisor provide the following support? diagnosis for applying KSA

setting meaningful goals

challenging criteria

counseling for difficulties

feedback on performance

encouraging peer support

c.Individual control

Do workers have opportunity to make suggestions?

Do workers have certain autonomy to try innovation on the job?

Is there any opportunity that the plant can share information about training and worker performance with workers? Such as: bulletin board group meeting conference others

III. Reward System

Is there any performance evaluation for trained workers?

What are the items? attitude efforts commitment absenteeism leave skill test innovation piece work quota (weights) quality of work (weights) scraps of work (weights) Is there any reward for trained workers' applying new KSA on the job? Such as verbal appraisal group recognition bonus (% of basic wage) fringe benefit wage increase promotion others IV. Productivity Do you keep records of workers performance? In what format? attitude efforts commitment skill test innovation absenteeism leave Do you keep records of group productivity? piece work quota quality of work scrap of work etc.

管理人员。培训人员面访提纲

面访者:_____ 日期:____

本提销适用于面访工厂管理和培训管理人员,向他们了解工厂的培训情况,了解工 人运用所学知识,技术和遵守规章制度,以及工厂对受训工人的管理情况。

问题	篟:	是	#	回答摘要:《备注
 I. 培训情况	-			
关于培训的决策是如何做出的?				
培训前是否有什么动员活动?				
下列人员是以什么形式参加的?				
二人				
斑组长				
培训管理人员				
培训是在哪里进行的自				
本厂				
外单位				
培训人员来自何处?				
本厂				
培训中心				
外单 位				
过去几年你厂进行过那些培训?				
对象?				
目的?				
明年准备进行那些培训 ?				
对象?				
目的?				
培训方式 :				
□ 岗位培训:				
期限				
目的				
内容				
説 产培训:				
期限				
目的				
内容				

业余/夜校: 期限 目的 内容 工厂每年培训多少工人? (人次) 自费 工厂组织 过去五年培训了多少? 占工人总数多少?

II. 工作环境

a. 物质条件

是否每个工作岗位都有工作职责说明? 新工人是否要培训后才能上岗位? 所进行的培训是否有任何计划? 当工人上岗时,工厂是否考虑工人牙学 知识,技术,谨守规定制度和工作任务的适用性? 生产小组能否提供运用所学知识,技术 的必要设备和信息资料?

b. 班组长支持

斑组长是否给与下列的支持:
帮助分析如何运用质学知识,
技术:
制定育意义的目标:
有挑战性的标准;
提供咨询;
提供反馈:
鼓励同事间的帮助。

c. 个人控制

工人是否有机会提建议? 工人是否有自主权在工作中搞革新? 工人与工厂之间是否有机会就培训和工人 的工作表现进行信息交流? 如: 公告栏

小组会议 交流大会 其已

III. 奖酬制度对受训工人是否有工作情况评估?评估项目包括那些?

态度

努力程度

事业心

出勤率

辞职率

技术考核

革新项目

工作定额

工作质量

次品率

工人运用技术是否有奖励;

如: 口头表扬 小组表扬

共全

优惠代遇 提工资 提级

1/E -: 4

- 其它,
- IV. 生产率

你厂是否记录工人生产表现?

有那些项目?

工作态度

努力程度

事业心

技术程度

革新项目

出勤率

你厂是否记录小组生产率?

如: 工作定额完成率 工作完成质量 次品率。 Appendix D: Trained Worker Interview Guide

This appendix contains interview guide for trained workers bother in English and Chinese. The interview guide in Chinese version is the copy of original one used for the data collection.

Data Collect Sheet

Trained Worker Interview guide

- 1. What pre-training orientation activities did you participate?
- 2. Who were also involved in the activities?
- 3. What did you perceive as the purpose of the training you were going to attend?
- 4. To what extend do you think KSA acquired from training program is important in accomplishing your job tasks everyday? Please give examples.
- 5. What equipment, information and resources do you think are needed in applying KSA you learned? Do you always have them?
- 6. How did your supervisor(s) help you in applying KSA in accomplishing your job tasks or trying innovative approaches?
- 7. Do you know whether you were doing better job by applying new KSA? And if yes, how do you know?
- 8. What kind of help or negative attitude did your peer members give to you in applying new KSA on the job?
- 9. Is there any evaluation of trained workers' performance? If yes, what items are included in the evaluation?
- 10. Can you think of any rewards (including verbal appraisal) connected with applying new KSA on the job? Name them, if yes.
- 11. Can you identify any ideas, skills, approaches or attitude you learned from the training programs, which you have since then applied in accomplishing your job tasks? If so, please describe. If no, explain why.
- 12. Can you identify any improved performance of yours by applying KSA on the job? And describe if yes.
- 13. What benefit do you think you have derived by applying KSA on the job?
- 14. What benefit do you think your group/department has derived from your applying KSA on the job?
- 15. What difficulties (other factors) do you think are barriers for you in applying KSA on the job?

受培训工人面话题别

- 1. 你参加过那些培训前的有关活动?
- 2. 还有谁参加了培训前的有关活动?
- 3. 你认为培训的意义是什么?
- 4. 你认为在多大程度上运用所学的知识,技术和工作态度对你完成每天的工作任务很重要? 请举例。
- 5. 运用所学知识, 技术和工作态度需要什么设备, 信息资料: 你工作时具有过些设备和信息资料吗?
- 6. 你的斑组长是如何帮助你运用所学知识,技术和工作态度或革新的方式完成任务的?
- 7. 你的同事对你运用新知识,技术和工作态度完成工作任务有什么消裂或获取反应?
- 8. 小组对工人完成工作是否有评估?如果有,包括那些评估项目?
- 9. 运用所学知识, 技术和工作态度有那些奖励?如有, 请说明。
- 10. 有那些知识,技术,方式和工作态度是从培训中学到的?你运用到生产中没有?如运用,请举例;如没有请案释。
- 11. 你认为你运用新学知识, 技术和工作态度完成工作任务是否有改进? 是如何改进的?
- 12. 你能举例证明运用所学知识,技术和工作态度使你工作提高改进了?
- 13. 运用所学知识,技术和工作态度使你得到什么好处?
- 14. 你运用所学知识,技术和态度使你们小组的生产得到什么益处?
- 15. 你运用所学知识,技术和态度遇到什么困难?请说明。

Appendix E: Supervisor Interview Guide

This appendix contains interview guide for trained workers bother in English and Chinese. The interview guide in Chinese version is the copy of original one used for the data collection.

Supervisor Interview guide

- 1. What pre-training activities were organized for workers?
- 2. How are you involved in any of the activities?
- 3. To what extend did you think your workers had perceived the purpose of training they were going to attend?
- 4. To what extend do you think KSA acquired from training program is important in accomplishing job tasks in your group? Please give examples.
- 5. Can you describe how your workers have applied KSA on the job?
- 6. What kind of equipment, information and resources did your workers need in applying KSA on the job? Can you help arrange them?
- 7. What are other ways you used to help your trained workers in applying KSA on the job?
- 8. What kind of attitude or assistance do you perceive that the peers have for each other regarding KSA application?
- 9. Can you identify any ideas, skills, approaches or attitude the trained workers learned from the training programs and have since then applied in accomplishing their job tasks? If so, please describe. If no, explain why.
- 10. Do/did you think trained workers have done better job by by applying new KSA on the job? If so please provide examples; if not please explain.
- 11. Is there any evaluation of trained workers' performance? If yes, what items are included in the evaluation?
- 12. Can you identify any rewards (including verbal appraisal) connected with applying new KSA on the job? Name them, if yes.
- 13. What benefit do you think your group/department has derived from trained workers' applying KSA on the job? Please provide examples.
- 14. Can you identify any benefits derived from the workers' applying new KSA on the job?
- 15. What difficulties (other factors) do you think are barriers for workers in applying KSA on the job?

翹板調約

- 1. 工厂组织过那些培训前的有关活动?
- 2. 你参加了培训前的有关活动吗? 受训工人参加了什么培训前有关活动?
- 3. 你认为工人在多大程度上理解了培训的意义?
- 4. 你认为在多大程度上运用所学的知识,技术和工作态度对完成你组每天的工作任务很重要? 请举例。
- 5. 工人运用所学知识,技术和工作态度需要什么设备,信息资料?你组具有这些设备信息资料吗?
- 6. 你能举어说明你组工人在工作中是怎样运用所学知识,技术和工作态度的?
- 7. 你是如何帮助工人运用新学知识,技术和工作态度或革新的方式完成任务的?
- 8. 你认为小组的工人同事对运用新知识,这本和工作态度完成工作任务有什么消极或积积反应?
- 9. 工人有恶些知识, 技术, 方式和工作态度是从培训中学到的? 他们运用到生产中没有? 如运用, 请举例; 如没有, 请解释。
- 10. 你认为工人运用新学知识, 技术和工作态度完成工作任务是否有改进? 加有改进, 请举例; 如没有, 请解释。
- 11. 小组对工人运用所学知识,技术和工作态度是否有评估?包括那些项目?
- 12. 运用新学知识,技术和工作态度使工人得到什么好处?
- 13. 工人运用所学知识,技术和态度使你们小组的生产得到什么益处?请举例。
- 14. 工人运用所学知识,技术和态度是否有相应的奖励? 请举例。

Appendix F: Performance and Productivity File Checking Guide

This appendix contains guides for checking trained workers' performance and productivity both in English and Chinese. The interview guide in Chinese version is the copy used as data collection guide. Trained Worker Performance and Productivity Data Collection Guide

Name of File Reviewer:_____ Date:_____

A. General Information

1. Number of Workers: _____

2. Number of Trained Workers:_____

3. Products:_____

4. Production techniques:

B. File Checking

1. Identify and check the records of the trained workers' performance in terms of attitude and behavior. The data is supposed to be gathered from the performance appraisal by group members (about 5 items). The scale used to code the performance and attitude will be corresponding with the scale used in questionnaires. After the first scan of the performance appraisal, the researcher will arbitrarily use the following scale to code the performance appraisal items accordingly:

1	-	То	little extent		2	-	То	some	degree
3	-	То	considerable es	xtent	4	-	То	great	extent
N	-	No	applicable						

Performance appraisal items (for example):

- a. skill: how well the trained workers has played to his capable skill level?
- b. work attitude: to what extent the trained workers have an positive or negative manner or viewpoint toward the accomplishing the job tasks?
- c. efforts/commitment: to what extent the trained workers have given exertion to applying new KSA on the job or to accomplishing the job.
- d. cooperation with peer: do workers help and care each other in working?
- e. following with prodution instruction: how well do workers follow the instructions given by supervisors?
- f. age, educational level, etc.

Case	Year	SKIII	attitude	effort	etc.	
1	87					
	89					
2	87					
	89					

2. The indirect productivity: the data is supposed to be gathered from the group workers attendance/absence and employee turnover records (about 5 items). Meaurement such as hours, days of lateness and number of turnover will be used to gather the data.

Indirect Productivity Items (for example):

- a. Lateness: the munites or hours late for work.
- b. Early leave: the munites or hours leave earlier without permitted.
- c. Sick leave: permitted leave for sickness.
- d. Absenteeims: absence from work without permission.
- e. Private matter leave: permitted leave for private matters.

Case	Year	Late (min.)	Early (min.)	sick (day)	absenteeims (day)	P.M.Leave (day)
1	87	120	30	3	0	0
	88					
	89					

3. Direct productivity (if possible): the data is supposed to come from the group production records (about 4 items). Measurements used by the production group will be used to gather the data.

Direct Productivity Items (for examples):

- 1. Quantity: the number of pieces of products or work the worker has finished in a certain interval of time.
- 2. Quality: the degree of grade of satisfactory condition of the products or work as requires. The amount of or percentage of products satisfying the quality requirements will be used to record the quality of the workers.
- 3. Scrap rate: the waste of the work.
- 4. Etc.

Case	Year	season/month	quantity	quality	scraps	etc.
1	87	1	876	866	10	
		2	890	875	15	
		3	880	878	2	
		4	880	880	0	
		total	3526	3499	27	

小组生产情况和生产率数据

.

资料	收集者:	日期:				
A.	生产小组一般情况					
1.	工人数目:	2.	受训工人数目:			
3.	产品:	4.	生产技术:			

■. 工人工作表现

本部分根据小组工人的工作表现评估档案了解小组的工作情况。请用以下数字和符号表示工人工作表现的请况程度。 1=程度很低或没有 2=某种程度 3=相当程度 4=很大程度 N=不适用 工人个案 年份 技术 工作态度 责任感

c. 间接生产率

.

本部分主要根据小组出勤记录了解工人的生产出勤率。

工人个案年份季度/月份迟到早退病假事假缺席

▶. 直接生产率

本部分根据小组生产记录了解生产质量情况。

年季度 产品 单位 数量 达到质量标准 次品

Appendix G: Training Achievement Test

This appendix contains the typical training achievement test used by the electronical companies. After each training, a test is given to assess how much the worker has learned. The training achievement test, written by the management and technicians, is made up two parts: (1) job-related knowledge, skills, and expected work attitudes; and (2) the application of KSA on the job and problem solving. This is a copy of the original test used to measure learning achievement in one of the electronic companies. The test scores are also filed as the reference for decision of promotion on work skill proficiency level which is the wage base line.

		188					
$\alpha 9$							
	应	\$	<u>e</u> 2	试	爂		
						姓名:	
一、是注意。2		ॾॗॗॗॗॾॖॾॖॾॖॣॾॖॣॖॖॖ॔	- 広調り	A			
(人)(人))	也体周围不	[电力作用]	的范围。叫	发).		
A, 1	包压	🎐 电场	c, :	电流			
2 同时有	宇在着电子	和空大导	包,这是(Q).	导电的力	大特点 灵	F
(()和 <u>4</u> 1. 18 45	上居在导电》	原理的最大。	生别。			
		D. 44	κ ο.	绝缘体			
J. 1717-1	E管电体的	影响下发生	上电荷的现象	L. 称为	()略应。	
8. ¥		b、电场	<u>%</u> 1	争电			
4 电子泪	者金属导	线移动。 •	像().			
a. 12	动势	▶√ 电测	3				
5. 男姥妹	体隔开的	两个导体的	组合就叫()			
2、宅	阻器	b/ 电容	幕 c	、继电器	•		
6. 辛运电	阻电路的	等效电阻等	于各电阻(,			
=, Z:	R 1	b、之差	0、之	积			
7. 冬电阻	上的分压比	七与分电阻	成()			
8、反)	北 い	,正比					
΄δ. ΙΟ ³ Ε	、按用(ン)表え	ŧ				
and no	<u>بر</u>	KO					
0	······································		.				

9. 元这电产品组成部份的部件级别为() •、1级 b、2、3、4级 g、5、6级 E、7、8级
 /2 普通电阻的结一、二位色环表示()
 •、10²次方 b、有效数字 c、精反

二、结空起。

二 琼空起: (2分) / 同一种金属导级对电流的<u>但为</u>与导线的长度。<u>我们和</u>有关。 (2分) 2 在色标电图中从一2至9时阿拉伯数字分别表示的颜色为一2 <u>没</u> <u>\$</u>

- (2分) J. 填入电图 RT 11,433、直值 建建值 (對)碳度恆 1
- (3分) 《 工艺文件是用来 指导 生产和 组织 生产的。是工厂实行 科学管理 的依据。 是产品实行 经济 核算。对产品进行 度景 检验的依据。 5. 工艺流程是 2. 艺文件中的主要内容,是确定产品。操作程序。指导工人
- (3分) 进行 3/2 操作 的技术文件。
- (4分) 6 兼配前的技术准备内容包括熟悉部件。基机的二乙文件、技术条件设护 文件,对照装配图或实物研究深、部、整件的 经合 形式 菜配 程序 美配 原理、美配位置。光向特点 相互联接关系及电气连接的情况等。
- (3分) 7. 元器件予加工按照工艺文件规定的行入方式。装配两度管挡 距离进行 加工。
- (3分) 8. 多股导线在按规定剥去绝缘层后。要打紧上锅。沾锅时使用 无联 助焊剂。禁止使用 水泡 助焊剂。
- (3分) 9. 央景始--用于Ø1.5以下的 洞经 或截面积≤2℃的多股 洞范,导线的 纹合、专曲及元器件对位。
- (3分) ノロ、金属領子 --- 用于Ø0・15以下导线的烧菇、元器件内位、临时保护票 膜的清除 , 小面积 清洗 夹具等。
- (2分) //. 使用薄膜、树脂封装的电容器类。在予加工时防止引线根部 了爱___. 段 拍 。考出部位应与根部保持 / -3 四距离。
- (2分) ノス 時起印制设条或超过 ノの мм 時接距离的路接线套聚氯乙烯套管。
- (3分) / 3. 兼配前的准备包括 技术 准备。主子 准备。
- (3分) /从 生产准备包括了工業设备准备及 /夏0. 拚。
- (3分) / 5. 填写普通电阻 0·1 Q 精度为±5%及精密电阻 1·25 KQ 精度为±1%% 电阻色环。



三、同答题

1. 电子厂平时常用的焊料包括那几种? 分别属于什么性质? (4分) 焊漏丝 机避 竭杀 焊锅些有管状焊踢丝、抗氧化焊锅丝、金银金焊踢丝 淬, 焊锅些有管状焊踢丝、抗氧化焊锅丝、金银金焊踢丝 淬,

2 主要助焊积有那几个种类? 水溶性助焊积属于那个种类? (4分) 助烧剂有:有机烧拌剂, 应机烧拌剂, 粉香烧拌剂, 粉化松香的焊剂, 助剂, 助 水装吃烧拌度了有机烧拌剂, 记费的水拌剂有: 有机助烧拌剂, 和元机助煤剂,

3. 去商子水算不算溶剂? 在使用易燃溶剂时应注意那些事项? (4分) 考虑引水母算溶剂].

燃纸

在厨房燃磨到应住意安全、防火、防管腐、应保存在广境通风 的地方、保收地不易存放其它杂物,使用时应尽频带高度改要 尽易成少有对空气的污电源、严格控制、投始还要求夜用、 新风 采 第圆螺钉螺母时杂止使用那些工具? 为什么禁止使用这些工具? (4分) 答:在 禁止使用光理钳、 平钳、 无丝钳、

田为这些工具会破坏螺钉螺目的东覆层,力知也不希达当

5. 手工修板、焊接要求一共有那8条什么要求? (10分)

- 1.日检煤具有无虚料、雨灯、醋连煤、无错件、漏件、煤具状态有合本规以的 中第五万项第7,7 4,7条状态。
- 2. 印制井路被上所装配的全部礼器件在第23*第55环幕的浙红得到纠正.
- 3. 长焊麻件的(硬料店小方10°. 切想定图主)
- 4. 元田仲表面元業配設伤, 烫伤, 碰伤、林志可宫清楚。
- 5. 张轧体 可调件 塑料衬装件、元容件引线 应跃损 裂口 产门。
- 6 铜箔影张 焊盘无限表 起题翘
- 7. 即剧救正反向面清洗户净. 玩錢留錫 遺 雕塑剂 污垢 灰尘衣监对性数帆船. 保护有薄膜层无划伤 无万规则于多研记。
- 8.装配的礼田件标花值、规格 影行会受计长困望症
- **6 煤钉装配的六条规定是什么?** (10分)
 - 1. 可博却连接 不龙米用何祥诚,都要你保证起行了靠 拆卸行便 达到规定的 机械残磨
- · 煤钉果TE 所要螺从为得对以牙连接有效长春不力了:子。
- 3. 崇国課訂 課母时,质望千望国和弹簧望国,崇国祥建以弹整国
- 按平为准. 4. 在紧固螺钉螺纹时, 心须交叉对称的顺序紧固,这样可防止构件更 生变形和仔ௌ不定
- 5. 常国城打煤田应用过当的工具。如果上使用史业街、平时、主些部文部 -具尽易处。原打烧用动伤、砖材、陈霞房、加石比不过当 、等国天的烧打烧用西方无损伤、已锈污的煤制、银用在不寻数百已。 7.普通煤缸4×15、其"、16天不什么意义?(3分)
- 小表之成勝打的道径. 15 表文法编辑的长度

这各梁作人员过用考试题 站名____

- 一、选择题:(正确的在标号上打"√")(30分)
 - / 操作者对自己操作的设备负有保管责任。(1)只能自己操作。(2)只有会用的人才可以操作。(3) 经领导同意。有同类型号设备操作证的 其他人才可以操作。
 - 2 操作者应经常保持设备内外济洁, 做到(1)周末下运前一小时清扫干净。
 (2)交经运时济扫干净。 (3)/每天运中、班后及时济扫干净。
 - 3 设备开动后, 操作工人(1)一般不可以离开。(2) 计假后可以短时间 商元。(3) 有可可开必须停机关电。

 - 5. 操作者如果发现自己操作的设备上的电机冒烟了。应(1)立即停止工作。 (2)立即通知电工排除故障。 (3)/立即切断电源。
 - A 示担设备日常保养工作的应是(1) 症组长。(2) 经份工人。(3) 操作工人。
 - 7. 设备使用结护规程是(1)指导工人使用、结护、保养设备的技术法规。
 (2)保证产品质量买运守的技术规范。 (3) 修理设备的详细规定。
 - 乐工人操作设备必须严咨按(1)产品工艺规程。(2)设备操作规程。
 (3)设备使用维护规程。
 - 9. 某设备传送带正常的传送这层为1·5米/分。新工人未看操作规程对传送这度作了过意词正。实词5分钟传送带走了11米。
 - 9-(1) 实际传送运定 (1) <正常远度。

(2)/正常速度。

- 9-(2)如果设备是这译焊,并导致印制农产生焊接质量问题是(1)欠焊. (2)过焊,
- 9-(3)如果设备是流水线。装配工人将

(1) 操作时间有余可仔细地贷款本工序。

(2) 过速完成本工序容易出错。

- 二、判断题:(对的在题号窗打"V"。错的打"X")(30分)
 - 、1./每合设备买求藻作者杂志和学型共生能、结构、工艺范围和维护保养技术,

也云机器设备使用说明书和操作规程进行操作。

- 2/每个工人必须凭强作证使用设备,建宁安全操作规程。
- ₽ 丧子发生子效后, 强撑二人卫之即作现为处型。

- ★ 维护与保养部是输心管理设备的日营工作, 同者是一致的。
 ★ 操作工人不但会操作设备, 还应会检查设备状态是否正常, 这会排除一款 鼓降。
 ★ 御登操作工人的素质主要是看关操作设备的熟练程度。
- X. 设备开动时操作工人应协助综合工人。这时对设备的运转情况进行观察检查。以仅发现异常。
- √8. 每合设备的运符合时记录是正确统计设备利用容的原始依据。操作工人应如实记载。
- √9 为使设备安全、经济地运行,並保证它的使用寿命,为此设备割运厂对设备都规定了规定值(如规定电压、规定功率、规定转速等),要求设备在规定值下运行。
- X/Q 设备传动机构零件之间的路容是约理现象。它们的路损是穿热所产生的结果。为此、操作工人经常注意词正传动机构、零件之间的间隙是降低路缘、减少密损的措施。
- 三 其充冠:(40分)
 - 操作工人在操作使用设备过程中,必须发到"三好、四会",四项要求, 遵守五项纪律。
 - 三好是:月 好。管好。修好。
 - 四会是:会使用 会保养 ,会检查 ,会排除-股收障
 - 四项要求:清范、整齐、 避润滑 安方金
 - 五項紀律: (1) 焦疫症还使同次备 遵守安全操作 規程。
 - (2)经常保持没备清洁, 推規定加油
 - (3) 手裕遵守唆存机制度:
 - (4)登好2月、附件、不得读失
 - (5)发现故障文部管理后了了能处理的方面对在我们是处理。
 - 2 设备的三级保养制就是指日常 保养 一级 保养和 >级 保养。
 - ·王 操作者要应时注意观察设备有元四清现象。即清 油 满 电 满 汽 、清 水_。
 - 《 操作者应保证设备油路扬通。润滑良好。加油要做到四定。即定______预 定______、定_____、定___
 - よ 设备常用的交流电源电压为单符<u>220</u> 代或三相<u>360</u> 代。频率为 <u>50</u>周/秒。

APPENDIX H: Cronbach's Alpha and Standardized Alpha

Both Cronbach's alpha and standardized alpha were employed to estimate the reliability of the scales measuring the theoretic framework variables. The equations are listed below:

Cronbach's
$$e = \frac{k \text{ cov/var}}{1 + (k-1) \text{ cov/var}}$$

k = the number of items in the

k - the number of items in the scale
cov - the average covariance between items
var - the average variance of the items

Standardized
$$e = \frac{kr}{1 + (k-1)r}$$

k - the number of items in the scaler - the average correlation between items.

Appendix I: Scrap Rate of the Production Line

In this case study, to avoid the subjectivity of using the selfperceived work efficiency to estimate the transfer of training, an attempt was made by this researcher to gather the objective data of work efficiency and productivity which included performance appraisal done by supervisors, worker's attendance/absence on the job, and monthly quantity and scrap rate. However, only part of the monthly quantity and scrap rate were available.

It has to be realized that SKIZ is a newly developed industrial zone and has a history of 10 only years. Each industrial company has autonomy to organize and manage the production in its own sake. These companies are still experimenting the effective organization and management of production. Due to the inconsistent filing system and incomplete data in the four companies, the complete subjective data for the statistic analysis of the entire sample was impossible.

For instance, the production with the more advanced equipment and technology was operated on the conveyer line and workers were engaged in processing products at the same time. All of the four companies found that recording work efficiency of individual workers, which was the common practice in industry in inland China, was impossible and finally gave it up. The supervisor only check on certain workers whose flaws were inspected too often on her position. No individual records were carried.

However, among the four companies, three companies had some group productivity data, quantity, value, and scrap rate of the products

processed by the production line. For Company 1, scrap rate was recorded in the first few years. Later, it was believed that after the scrap was fixed, 100% of the products were flawless and ready to get through the quality control requirements. It was also assumed that scrap recording took more time of the management. Therefore, scrap recording was eliminated late 1990. Moreover, due to the managerial personnel change, production files before 1989 could not be found. Company 2 had kept complete production records. In Company 3, records of product quantity of 1988 and then on were available, but the scrap records were only available of 1989 and 1990. The value of products was not available either. Company 4 had no scrap data available, but the quantity of the products.

As the scrap data for Company 1, 2, and 3 was available from September, 1989 to August, 1990, the researcher decided to make use of it to estimate the work efficiency of the production line group in the three companies, instead of product quantity and value of the product. There are several reasons for doing so. First, orders of clients and seasons of the year may fluctuate the production quantity. Second, the value of products were decided by the model and the demand of the market. Third, the scrap can demonstrate the production skill proficiency of the group which relies on the competency of every worker in the group. Scrap rate was calculated in the percentage of the scrap out of the total products processed on the production line per month. Even if the models of products and quantity of orders might vary, the scrap, to great extent, can objectively and consistently indicate the production capacity in term of quality related to employee skill

proficiency. Besides, the scrap data of September, 1989 to August, 1990 appears appropriate because training for workers is required annually. The last training for the workers had occurred during the period of August 1989 to August 1990¹, usually in the first, or early second quarter of the year when production is not very busy. Therefore, data over 12 month period is long enough to give an adequate idea of workers group skill proficiency and the production capacity in terms of quality.

Scrap rate was calculated by the company in the percentage of the scrap out of the total products processed on the production line per month. To estimate difference in work efficiency of the production line group, descriptive statistics and t-tests were applied to data from Company 1, 2, and 3.

One can fine in Table 19-a, the average monthly scrap rate for Company 1 was 6.53, ranking the highest among the three companies. The average monthly scrap rate for company 3 was the lowest, 0.06. For Company 1, the standard deviation was 10.65 with the maximum scrap rate as high as 30.56 and the minimum as low as 0. This indicated that competency of the workers on the production line may not be adequate enough or stable enough. Company 2 seemed to have much lower scrap rate than Company 1, 2.55. The standard deviation was much smaller and the range of scrape rate was 5.35. Workers in Company 2 appeared more competent than Company 1. Company 3 showed the lowest scrap rate. The standard deviation was very low, 0.05 with the scrap range of 0.13 over

¹ The field research started from late August 1990, and data was collected in September and October 1990.

Variable	Mean	Std Dev	Variance	Minimum	Maximum	Month
Company 1 (State-owned)	6.53	10.65	113.45	.00	30.56	12
Company 2 (State-owned)	2.55	1.71	2.92	. 24	5.59	12
Company 3 (Joint-venture)	.06	.05	.00	.01	.14	12

Table 19-a DESCRIPTIVES OF SCRAP (% of products per month, 9/89 -- 8/90)

Table 19-b T-TESTS OF SCRAP RATE (% of products monthly, 9/89 -- 8/90)

Variable			Mean		Mean	t Degrees o	
		Company 1	Company 2	Company 3	Difference	Value	Freedom
Scrap R	late	••	2.55	.06	2.490	5.04***	11
Scrap R	late	6.53		.06	6.470	-2.02*	11
Scrap F	late	6.53	2.55		1.980	-1.30	11

Notes: Company 1 and 2 are state-owned companies; Company 3 is a joint-venture company. *** significant at 0.01 level ** significant at 0.05 level * significant at 0.1 level
12 month period. This indicated that workers in Company 3 had higher competency and more stabilized skill proficiency.

In Table 19-b, it is, then, not surprised to find out that t-tests of scrap rate between Company 1 and 3, and between Company 2 and 3 showed significant difference over 12 months, while t-test did not show significant difference between the two state-owned companies. This provided obvious contrasts of work efficiency among production groups between two state-owned companies and one joint-venture company, regarding the transfer of training on the job by using the objective data. It appears that workers in Company 3 possessed more competency by utilizing KSA while workers in Company 2 and 3 had no difference regarding the competency of KSA on the job.

The patterns of the transfer of training in two types of companies varied (See Section 5.4, and Section 5.5), and the statistic analysis of scrap also indicated difference in scrap rate. Therefore, it could be suggested that the such variation in organizational variables and in scrap rate was not a coincidence. Further study should attempt to make efforts to obtain data on organizational variables as well as complete productivity. Needless to say, there is need to study the relationship between the patterns of the transfer of training and the productivity.

Appendix J: Matrices of Correlation Coefficients

This appendix contains matrixes of correlation coefficients of variables estimated from the subsamples of state-owned and joint-venture companies.

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	i										
Variable Name (Training Orientation	KSA-Work Match	Supervisor Assistance	Peer Support	Reward Practice	Work Efficien	Train: cv Scol	ing ce Age	Education Attainment	Skill Level 1	Work Exper
Training	1.0000										
Orientatio	c										
KSA-Work	.3741**	1.0000									
Match	0,00	TT /3/1	0000								
Supervisor Assistance	7077.	**0004.	1.0000								
Pees	.1048	.3980**	.6031**]	1.0000							
Support											
Reward	.0548	.1358	.3415*	.1947	1.0000						
Fractice Work	.0262	**010**	.5375**	.5910**	.3342*	1.0000					20
Efficiency											
Training	.2688	0192	.1377	0689	.0535	0209	1.0000				
Test Score Age	0777	0264	0837	.1306	.3233*	1246	.0835	1.0000			
Education	1910	.0370	1437	0777	.0918	.0083	2616	1577	1.0000		
Accalnmenc Work Skill	1257	1983	1103	0445	6620.	.000	2602	.3737*	5131** 1	1.0000	
Levei Work Exnerience	.2065	.0088	0344	0540	.3045*	.1941	.1369	.3285*	0915	.4021*+	+ 1.0000

(2-tailed) Signif. LE .05 Signif. LE .01

* *

Variable	Trainin	g KSA-Work	Supervisor	Peer	Reward	Work	Trainiı	gu	Education	Skill	Work
Name (Drientati	on Match	Assistance	Support	Practice	Efficien	cy Score	e Age	Attainmen	t Level	Exper.
Trainign	1.0000				- - - -)			
Orientation	ſ										
KSA-Work	.2658*	1.0000									
Match											
Supervisor	v .3543*	* .3845**	1.0000								
Assistance											
Peer	.0028	.0701	.2235 1	.0000							
Support											
Reward	.1583	.3264*	.2642*	.0856	1.0000						
Practice											
Work	.3034*	.1953	.4438**	.1096	0656 1	.0000					
Effiency											
Training	0500	1013	.1886	.0560	0701	**6687.	1.0000				
Test Score											
Age	0853	.1161	0703	.1218	0317	.0578	0542	1.0000			
	0071	100	000	0000	40710	1016	0.000	0707			
Education Atteinment	. 1488	CKCI.	.0693	7950.		• TZT4	.0842	40.	** T.UUUU		
Work Skill	0047	2250	1303	. 2625	1468 -	.2194	0745	.1017	.1244	1.0000	
Level	3556	+ 0310	0120	1050	2001++	70.76	a 1 1 0	7276	0500	1205	
MOLK	vorre.	6TCO 4		7011.		0740.	0110	1007.	£CN3	1017.	7.0000
* Signif	. LE .05		;								
** Signit	. EE	(2-tail(ed)								

MATRIX OF CORRELATION COEFFICIENTS (Joint-venture Companies)

Table 21

⁽²⁻tailed) Signif. LE .05 Signif. LE .01

Appendix K: Comparison of Regression Results of State-owned and Joint-venture Companies

This appendix contains statistical results of regression Equation (2) and (4) applied to the state-owned companies and joint-venture companies separately. The statistical results are tabulated in Tables 22 and 23.

Dep	endent Variable:	Perceived work efficiency gai	ned by utilizing KSA
		State-Owned	Joint-Venture
<u> </u>		EQUATION 2 Stepwise	EQUATION 2 Stepwise
Ind X ₁	lependent Variabl Training Orientation	.es: 037 (.09) ¹	.208 (2.87)*
х ₂	Match of KSA with Work Design	.151 (1.21) ¹	.099 (.64) ¹
x3	Supervisor Assistance	.327 (4.79)**	.291 (5.54)**
x ₄	Peer Support	.385 (6.65)***	.039 (.11) ¹
Х ₅	Reward Policy and Practices	.164 (1.73) ¹	161 (1.94) ¹
х ₆	Training Achievement	.099 (.59) ¹	.427 (14.04)***
X ₇	Age		
х ₈	Education Attainments		
X9	Work Skill Proficiency		
×10	Work Experience		
Cor	stant	1.101	.90
R F	Square:	.404 13.87 .0000	.380 10.03 .0000
r			

Table 22COMPARISON OF REGRESSION RESULTS OF STATE-OWED AND
JOINT-VENTURE COMPANIES (3)

-	Perceived work efficiency gai	ned by utilizing KSA
	State-Owned	Joint-Venture
	EQUATION 4 Stepwise	EQUATION 4 Stepwise
[ndependent Variabl K ₁ Training Orientation	es: 037 (.09) ¹	.161 (1.37) ¹
⁽ 2 Match of KSA with Work Design	.151 (1.205) ¹	.090 (.43) ¹
3 Supervisor Assistance	.327 (4.79)**	.426 (11.28)***
4 Peer Support	.385 (6.65)***	.034 (0.7) ¹
A5 Reward Policy and Practices	.164 (1.73) ¹	139 (1.13) ¹
6 Training Achievement		
^I 7 Age		
8 Education Attainments		
9 Work Skill Proficiency		
K ₁₀ Work Experience		
Constant	1.102	1,566
	13.87 .0000	11.28 .0015

Table 23COMPARISON OF REGRESSION RESULTS OF STATE-OWED AND
JOINT-VENTURE COMPANIES (4)

Appendix L: The Distribution of Residuals

This appendix contains histograms, normal probability plots, and scatterplots of residuals of equation 1 using stepwise method, and equation 6 using stepwise method for the state-owned and joint-venture companies separately.

Figure 2	Histogram of Standardized Residual of Equation	1
	(Entire sample)	

N	Exp N	ſ	
0	.08	Out	
0	.15	3.00	
0	. 39	2.67	
1	.88	2.33	:
2	1.81	2.00	*:
2	3.31	1.67	**.
5	5.43	1.33	****:
9	7.98	1.00	******:*
14	10.51	.67	********
14	12.40	. 33	**********
9	13.10	.00	*******
9	12.40	33	*******
13	10.51	67	********
8	7.98	-1.00	*****
7	5.43	-1.33	****:**
3	3.31	-1.67	**:
3	1.81	-2.00	*:*
0	. 88	-2.33	•
0	. 39	-2.67	
0	.15	-3.00	
Ō	.08	Out	

* - 1 Cases
. : - Normal Curve



Figure 3 Normal Probability Plot of Equation 1 (Entire sample)



Figure 4 Scatterplot of Standardized Residuals of Equation 1 (Entire sample)

Figure 5 Histogram of Standardized Residual of Equation 1 (State-owned Companies)

N Exp N

0	.03	Out	
1	.07	3.00	*
0	.17	2.67	
0	. 39	2.33	
0	. 80	2.00	•
3	1.47	1.67	:**
0	2.41	1.33	•
4	3.55	1.00	***:
5	4.67	.67	****:
6	5.51	. 33	*****:
5	5.82	.00	*****
7	5.51	33	*****:*
5	4.67	67	****:
3	3.55	-1.00	***.
3	2.41	-1.33	*:*
2	1.47	-1.67	:*
0	. 80	-2.00	
0	. 39	-2.33	
0	.17	-2.67	
0	.07	-3.00	
0	.03	Out	

* = 1 Cases
. : = Normal Curve

1 Outlier found.



Figure 6 Normal Probability Plot of Equation 1 (State-owned Companies)



Figure 7 Scatterplot of Standardized Residuals of Equation 1 (State-owned Companies)

Across: Standardized Predicted Values Down: Standardized Residuals

Symbols:

•	1 0
•	2.0
*	4.0

N Exp N 0 .04 Out 0 .08 3.00 1 .21 2.67 * 0 .47 2.33 1 .97 2.00 : 1 1.77 1.67 *. 3 2.91 1.33 **: 5 4.27 1.00 ***:* 3 5.63 .67 *** . 8 6.64 .33 *****:* 6 7.02 .00 ******. 5 6.6433 *****. 9 5.6367 ****:*** 5 4.27 -1.00 ***:* 4 2.91 -1.33 **:* 2 1.77 -1.67 *: 0 .97 -2.00 . 0 .47 -2.33 0 .21 -2.67	-
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	N Fwn N
0 .04 002 0 .08 3.00 1 .21 2.67 * 0 .47 2.33 1 .97 2.00 : 1 1.77 1.67 *. 3 2.91 1.33 **: 5 4.27 1.00 ***:* 3 5.63 .67 *** . 8 6.64 .33 *****:* 6 7.02 .00 *****. 5 6.6433 ***** . 9 5.6367 ****:*** 5 4.27 -1.00 ***:* 4 2.91 -1.33 **:* 2 1.77 -1.67 *: 0 .97 -2.00 . 0 .47 -2.33 0 .21 -2.67	
0 .08 3.00 1 .21 2.67 $*$ 0 .47 2.33 1 .97 2.00 : 1 1.77 1.67 $*$. 3 2.91 1.33 $**$: 5 4.27 1.00 $***:*$ 3 5.63 .67 $***$. 8 6.64 .33 $*****:*$ 6 7.02 .00 $*****:*$. 5 6.6433 $*****:*$. 9 5.6367 $****:***$. 5 4.27 -1.00 $***:*$. 4 2.91 -1.33 $**:*$. 2 1.77 -1.67 $*:$. 0 .97 -2.00 . 0 .47 -2.33 0 .21 -2.67	0.04 Out
1 .21 2.67 * 0 .47 2.33 1 .97 2.00 : 1 1.77 1.67 *. 3 2.91 1.33 **: 5 4.27 1.00 ***:* 3 5.63 .67 *** . 8 6.64 .33 *****:* 6 7.02 .00 *****. 5 6.6433 ***** . 9 5.6367 ****:*** 5 4.27 -1.00 ***:* 4 2.91 -1.33 **:* 2 1.77 -1.67 *: 0 .97 -2.00 . 0 .47 -2.33 0 .21 -2.67	0.08 3.00
0 .47 2.33 1 .97 2.00 : 1 1.77 1.67 *. 3 2.91 1.33 **: 5 4.27 1.00 ***:* 3 5.63 .67 *** . 8 6.64 .33 *****:* 6 7.02 .00 *****. 5 6.6433 ***** . 9 5.6367 ****:*** 5 4.27 -1.00 ***:* 4 2.91 -1.33 **:* 2 1.77 -1.67 *: 0 .97 -2.00 . 0 .47 -2.33 0 .21 -2.67	1 .21 2.67 *
1 .97 2.00 : 1 1.77 1.67 *. 3 2.91 1.33 **: 5 4.27 1.00 ***:* 3 5.63 .67 *** . 8 6.64 .33 ******:* 6 7.02 .00 ******. 5 6.6433 ***** . 9 5.6367 *****:*** 5 4.27 -1.00 ***:* 4 2.91 -1.33 **:* 2 1.77 -1.67 *: 0 .97 -2.00 . 0 .47 -2.33 0 .21 -2.67	0 .47 2.33
1 1.77 1.67 *. 3 2.91 1.33 **: 5 4.27 1.00 ***:* 3 5.63 .67 *** . 8 6.64 .33 *****:* 6 7.02 .00 ******. 5 6.6433 ***** . 9 5.6367 *****:*** 5 4.27 -1.00 ***:* 4 2.91 -1.33 **:* 2 1.77 -1.67 *: 0 .97 -2.00 . 0 .47 -2.33 0 .21 -2.67	1 .97 2.00 :
3 2.91 1.33 **: 5 4.27 1.00 ***:* 3 5.63 .67 *** . 8 6.64 .33 *****:* 6 7.02 .00 ******. 5 6.6433 ***** 9 5.6367 *****:*** 5 4.27 -1.00 ***:* 4 2.91 -1.33 **:* 2 1.77 -1.67 *: 0 .97 -2.00 . 0 .47 -2.33 0 .21 -2.67	1 1.77 1.67 *.
5 4.27 1.00 ***:* $3 5.63 .67 *** .$ $8 6.64 .33 *****:*$ $6 7.02 .00 *****.$ $5 6.6433 ***** .$ $9 5.6367 ****:***$ $5 4.27 -1.00 ***:*$ $4 2.91 -1.33 **:*$ $2 1.77 -1.67 *:$ $0 .97 -2.00 .$ $0 .47 -2.33$ $0 .21 -2.67$	3 2.91 1.33 **:
3 5.6367 *** 8 6.6433 *****:* 6 7.0200 *****: 5 6.6433 ***** 9 5.6367 ****:*** 5 4.27 -1.00 ***:* 4 2.91 -1.33 **:* 2 1.77 -1.67 *: 097 -2.00 047 -2.33 0 .21 -2.67	5 4.27 1.00 ***:*
8 6.64 .33 *****:* 6 7.02 .00 ***** 5 6.6433 ***** 9 5.6367 ***** 5 4.27 -1.00 ***:* 4 2.91 -1.33 **:* 2 1.77 -1.67 *: 0 .97 -2.00 . 0 .47 -2.33 0 .21 -2.67	3 5.63 .67 ***
6 7.02 .00 ***** 5 6.6433 **** 9 5.6367 ***** 5 4.27 -1.00 ***:* 4 2.91 -1.33 **:* 2 1.77 -1.67 *: 0 .97 -2.00 . 0 .47 -2.33 0 .21 -2.67	8 6.64 .33 *****:*
5 6.6433 ***** 9 5.6367 *****:*** 5 4.27 -1.00 ***:* 4 2.91 -1.33 **:* 2 1.77 -1.67 *: 0 .97 -2.00 . 0 .47 -2.33 0 .21 -2.67	6 7.02 .00 *****
9 5.6367 ****:*** 5 4.27 -1.00 ***:* 4 2.91 -1.33 **:* 2 1.77 -1.67 *: 0 .97 -2.00 . 0 .47 -2.33 0 .21 -2.67	5 6.6433 ****
5 4.27 -1.00 ***:* 4 2.91 -1.33 **:* 2 1.77 -1.67 *: 0 .97 -2.00 . 0 .47 -2.33 0 .21 -2.67	9 5.6367 ****
4 2.91 -1.33 **:* 2 1.77 -1.67 *: 0 .97 -2.00 . 0 .47 -2.33 0 .21 -2.67	5 4.27 -1.00 ***:*
2 1.77 -1.67 *: 0 .97 -2.00 . 0 .47 -2.33 0 .21 -2.67	4 2.91 -1.33 **:*
0 .97 -2.00 . 0 .47 -2.33 0 .21 -2.67	2 1.77 -1.67 *:
0 .47 -2.33 0 .21 -2.67	0 .97 -2.00 .
0 .21 -2.67	0 .47 -2.33
	0 .21 -2.67
0.08-3.00	0 .08 -3.00
0 04 01t	0 04 01t

Figure 8	Histogram of Standardized Residual of Equation	1
	(Joint-venture Companies)	

* = 1 Cases
. : = Normal Curve

1 Outlier found.



Figure 9 Normal Probability Plot of Equation 1 (Joint-venture Companies)



Figure 10 Scatterplot of Standardized Residuals of Equation 1 (Joint-venture Companies)

Across: Standardized Predicted Values Down: Standardized Residuals

Symbols:

	1.0
:	2.0
*	4.0

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