THE INFLUENCE OF CONTEXTUAL FACTORS ON TRAINING EFFECTIVENESS OF TECHNICAL EMPLOYEES AT SILTERRA MALAYSIA SDN. BHD.

By

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Thesis submitted to the
Othman Yeop Abdullah Graduate School of Business,
Universiti Utara Malaysia,
in Fulfillment of the Requirement for the Degree of Doctor of Philosophy,

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ABSTRACT

One of the key issues for Malaysian companies is the training and development of their employees. Training plays an important role in providing the necessary skills and knowledge to employees so that their competencies can be improved. Therefore, the training provided should be effective so that the knowledge and skills learnt can be applied to the job. The purpose of this study was to identify the contextual factors that affect the Yield Management (YM) training program for technical staff of Silterra Malaysia Sdn. Bhd. (Silterra). In addition, this study investigated the relationship between the contextual factors and the training effectiveness of YM training program. The research framework was designed based on the Kirkpatrick training model although the research had used quantitative measures. The Kirkpatrick training evaluation model outlines four levels of training effectiveness which are Reaction (Level 1), Learning (Level 2), Behavior (Level 3), and Result (Level 4). The research instrument employed in this study was a questionnaire with 90 items designed to answer 28 hypotheses. The questionnaires were distributed to the respondents by the Human Resources staff of Silterra between November 2010 and February 2011. The study found that the contextual factors such as participant, trainer, training material and organization were the only factors that affect the training effectiveness of YM training program at Silterra while other contextual factors such as training program, working environment and technology were immaterial. The results also indicated that participant, trainer, training material and organization had a positive relationship with training effectiveness at different levels of the Kirkpatrick model. However, factors such as training program, working environment and technology did not show any significant relationship with training effectiveness. This study has made some important contributions to the training literature on the semiconductor industry in Malaysia.

Keywords: training effectiveness, Kirkpatrick's Training Model, semiconductor industry

ABSTRAK

Salah satu isu utama bagi sesebuah syarikat di Malaysia ialah melatih dan membangunkan pekerjanya. Memberikan latihan amat penting kerana melatih pekerja dapat menambah kemahiran dan pengetahuan serta taraf kompetensi pekerja tersebut. Oleh itu, latihan yang diberikan haruslah berkesan supaya pengetahuan dan kemahiran yang diperoleh boleh digunakan semasa bekerja. Kajian ini bertujuan untuk mengenalpasti faktor-faktor yang menyumbang kepada keberkesanan program *Yield Management* (YM) di Silterra Malaysia Sdn. Bhd. (Silterra). Kajian ini juga dibuat untuk menyiasat hubungan antara faktor-faktor penyebab dengan keberkesanan latihan YM dengan keberkesanan latihan. Rangka kajian ini berasaskan model yang dibina oleh Kirkpatrick tetapi cara kajian telah diubahsuai kepada cara kuantitatif. Model Kirkpatrick menilai keberkesanan sesuatu latihan berasaskan kepada empat(4) aras iaitu Reaksi (Aras 1), Belajar (Aras 2), Kelakuan(Aras 3), dan Keputusan (Aras 4). Instrumen kajian merupakan 90 soalan yang digunakan untuk menjawab 28 Hipotesis. Soalan-soalan kajian telah diberikan kepada pekerja Silterra melalui staf dari Jabatan Sumber Manusia pada bulan November, 2010 sehingga bulan Februari, 2011. Hasil kajian telah mendapati bahawa pekerja, pelatih, bahan latihan dan organisasi merupakan faktor penyebab kepada keberkesanan latihan YM di Silterra. Manakala faktor-faktor lain seperti program latihan, situasi berkerja dan teknologi bukanlah faktor penyebab kepada keberkesanan latihan tersebut. Keputusan kajian juga mendapati bahawa faktor-faktor seperti pekerja, pelatih, bahan latihan dan organisasi mempunyai hubungan yang positif dengan keberkesanan latihan pada aras-aras yang tertentu mengikut Model Kirkpatrick. Walaubagaimanapun, kajian juga menunjukkan faktor-faktor seperti program latihan, situasi bekerja dan teknologi tidak mempunyai hubungan positif dengan keberkesanan latihan. Kajian telah menyumbang kepada penambahan literatur terutama dalam industri semikonduktor di Malaysia.

Katakunci: keberkesanan latihan, Model Kirkpatrick, industri semikonduktor.

ACKNOWLEDGEMENT

In the name of Allah, the Most Merciful and Most Compassionate – Praise to Allah S.W.T. for granted me the strength, courage, passion and inspiration in completing this work.

There are several people that I like to thank especially my PhD supervisor, Prof Dr Mohmad Yazam bin Sharif who is coaching and providing me with all the support whenever needed. I would like to special thank few other experts such as Dr Aminul Islam of UniMAPand Dr Syazwan of UUM who were assisting in my research as well as guiding me in writing this report. Special thanks to Silterra training and development team especially Syed Sagaf, Suria, Nor Asmahan and Rudy Musnandar who are helping in distributing the questionnaires to technical staff at Silterra Malaysia Sdn Bhd. Also, thank to my previous supporters, consist of training providers (Mr Ganeson, Wan Zurina, and Ms Ang) and my previous training executive (Rotipah and Mohd Nasir Johari) that helping me in distributing the survey questionnaires to the participants for the previous studies. Without you guys, I may have difficulties to reach the desired participants. I realize that all of you keen to implement the full training system but you have resources problem. Anyway, we have a good time sharing our knowledge and experience during, HR conferences and seminars. I will never forget all the wonderful time we had during those events.

Lastly, my special thank and sincere gratitude to my family who has supported me during the study. The moral support you all had given me had provided me the needed drive to complete the program.

Thank You.

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GLOSSARY OF TERMS

CAIPO	Context, Administration, Input, Process and Operation
CIPP	Context, Input, Process and Product
CIRO	Context, Input, Reaction and Outcome
C&B	Compensation & Benefits
CSM-HR	Competitive Semiconductor Manufacturing-Human Resources
DOE	Design of Experiments
DV	Dependent Variables
Fab	Fabrication Plant
HPWI	High Performance Work Index
HPWS	High Performance Work System
HR	Human Resource
HRD	Human Resource Development
HRDC	Human Resource Development Council
HRDF	Human Resource Development Fund
HRM	Human Resource Management
ICT	Information and Communication Technology
IPO	Input, Process and Outcome
IV	Independent Variables
IMD	International Management Development
IMP	Industrial Master Plan
JTK	Jabatan Tenaga Kerja

KPI	Key Performance Indicator
KRA	Key Result Area
KUKUM	Kolej Universiti Kejuruteraan Utara Malaysia
MAE	Malaysia American Electronics
MIDA	Malaysian Investment Development Authority
OJT	On-the-job
OSH	Occupational Safety and Health
QCT	Quality Circle Team
PDSC	Penang Skills Development Centre
PSMB	Pembangunan Sumber Manusia Berhad
ROI	Return on Investment
SHRDC	Selangor Human Resource Development Centre
SHRM	Society of Human Resource Management
SPC	Statistical Process Control
T&D	Training and Development
TNA	Training Need Analysis
TVA	Training Value Analysis
UniMAP	Universiti Malaysia Perlis
UniMAS	Universiti Malaysia Sabah
UniTEN	Universiti Tenaga Nasional
UTP	Universiti Teknologi Petronas
WCY	World Competitive Yearbook
YM	Yield Management

CHAPTER 1

INTRODUCTION

1.1 Introduction

Competitive advantage in the marketplace is driven by the people in the organization. In order to remain competitive, organizations must include employee's education and development as part of their corporate strategy. Given the dynamics of today's business environment, employees will be required to learn throughout their careers (widely called as 'lifelong learning'). This need for lifelong learning will require organizations to accept that investments in Human Resource Development (HRD) programs are wise and strategic choice. Organizations that elect to establish and invest in a formal HRD function are making a commitment to provide their employees with the skills necessary to meet current and future job demands. Ideally, HRD activities should be planned for all employees, regardless of their positions, from the time they are hired through to the conclusion of their career with the organization. Organizations provide HRD activities in order to support the organization's mission and strategy. The organizational mission and strategy will be cascaded down to strategic planning in order to improve the productivity and quality of the products or services. In addition, HRD will assist the organization in enhancing competency of the workforce so that they are become more skillful and flexible in doing the job. Therefore, the

organization can see the reduction in tardiness and performance deficiencies issues. Hence, lower turnover and absenteeism rate, improve workplace safety as well as meeting the regulatory requirements.

To keep up with the accelerated technological advancement and intense global competition, the workforce has to be competent and flexible in order to adapt to rapid changes. Workplace performance constantly requires new knowledge, skills, and attitude (KSA). Historically, most reading materials pointed out that training and development play an important role in organizations in molding the employees to meet the requirements of current and future job performance needs (Dessler, 1994; Ivancevich, 1995; Mondy, 2008; Noe & Hollenback, 1994). For instance, most of leading American companies view training as a key to organizational survival and success (Bernadin & Russel, 1998; Westover, Westover & Westover, 2010).

In Malaysia, the Government in the Third Industrial Master Plan (3IMP) had emphasized on projects based on human resource development. For instance, as announced in Budget 2008, once established, the Knowledge Workers Development Institute that would help to improve the supply of knowledge-based workers to meet the current demands of knowledge economy (Foo, 2007). Vince Leusner, the President of the American Malaysian Chamber of Commerce (AMCC) pointed out that the expansion in value chain had resulted in the need for more knowledge-based human resources. This trend had shown

the importance of the Malaysian Government's investment in education as the money invested in education today could well result in more foreign direct investments (FDIs). He also added that Malaysia could build up the full semiconductor industry cluster, and there is still room for growth in the front-end process of the electronics industry, including wafer fabrication. Malaysia American Electronics (MAE) Industry's chairman Datuk Wong Siew Hai had commented that Malaysia needs more talent as it seeks to diversify into other industries. One of the critical things is to develop the future leaders who have relevant skill sets. KPMG Business Advisory Sdn Bhd's executive director, advisory Woon Tai Hai, also agrees that Malaysia needs to focus on developing the right human capital in the knowledge-based sector (Foo, 2007).

Human Resource Management (HRM) is dealing with resources especially people. Hence, HRM gets things done through or with people (Flippo, 1976; Follet, 1995). HRM is about the practices and policies which an organization needs to manage its people throughout their working lives and to ensure that they are provided with a safe and healthy environment. HRM has been presented as a new and unitary approach where values and policies are developed with an emphasis on making full use of the talents of all people in the organization (Guest, 1990; Sheehan, 2005). It is an essential part of every manager's responsibilities, but many organizations find it advantageous to establish a specialist division to provide an expert service dedicated to ensuring that the human resource function is performed efficiently.

"People are our most valuable asset" has become a cliché which most of top management team would subscribe to. But in reality, some organizations think that their people will remain undervalued or undertrained or underutilized. Because of this, the employees will be less motivated resulting for poor performance. Therefore, the HRD department is set to train and develop these employees so that the above issues can be reduced.

The fast-changing business environment and increasingly intense competitive environment require that the human resource (HR) professionals are able to adapt to this challenging environment. Specifically, the human resource management practice of organizations needs to develop the appropriate role behavior and yet be flexible enough to respond to change (Hiltrop, Despres & Sparrow, 1995; Sail & Alavi, 2010; Schuler, 1989). This poses a major challenge for HR professionals and it is pertinent that HR managers reflect and ponder on this issue. The rate of change facing organizations has never been greater and organizations must absorb and manage change at a much faster rate than in the past. In order to implement a successful business strategy to face this challenge, organizations, large and small, must ensure that they have the right people who are capable of delivering the strategy (Jong & Hartog, 2007; Krishnan, 2001). The market place for talented, skilled people is competitive and expensive. Taking on new staff can be disruptive to existing employees. Also, it takes time to develop cultural awareness for product and process,

organization knowledge and experience for new staff members (Knowdell, 1996; Langlois & Lapointe, 2010; Martins & Terblanche, 2003).

As organizations vary in size, goals, functions, complexity, construction, the physical nature of their product, and appeal as employers, so do the contributions of human resource management. But, in most organizations the ultimate goal of the HR function is to: "ensure that at all times the business is correctly staffed by the right number of people with the skills relevant to the business needs", that is, neither overstaffed nor understaffed in total or in respect of any one discipline or work grade (Hewitt Associates, 2005; Morton, 2004; Mucha, 2004). In other words, it is about getting the right people at the right time for the right job. Consequently, organizations begin to focus more and more on HR strategy (Ferguson & Reio, 2010). Failure in not having a carefully crafted human resources management strategy, can and probably will lead to failures in the business process itself. This set of resource is offered to promote thought, stimulate discussion, diagnose the organizational environment and develop a sound human resource management strategy to the organization.

1.2 Human Resource Management Functions

There are many human resource management (HRM) models in the academic literature (Mondy, 2008; Mondy & Noe, 2004; Schuler, 1989; Torrington

&Holden, 1992). Different authors had categorized HRM functions into several ways. However, Mondy and Noe's (2004) model is deemed to be very suitable as a basis to explain what HRM functions should be. Mondy and Noe (2004) had divided the HRM functions into five: staffing, compensation, human resource development, industrial/employee relations and occupational safety and health.

In brief, staffing department is to ensure the company is getting the right people at the right time for the right job. The penalties for not being correctly staffed are costly (Dooney & Smith, 2005). Secondly, compensation function is also known as compensation and benefit (C&B) function. The development of an attractive C&B package will help to improve job satisfaction as well as retain employees in the organization. Attention to the mental and physical well-being of employees is normal in many organizations as a means of keeping good staff and attracting others (Lawler, 2003; Risher, 2003).The function can take many forms. It can vary from loans to the needy to counselling in respect of personal problems. Thirdly, the HRD function is the backbone of the organization where it train and develop employees in order to improve employee's skills and knowledge. Forth, the Industrial and Employee Relation function to ensure the company practices good industrial relation, guided by internal policy and procedure as well as adherence with Government Law. In addition, this department will also responsible for employee's welfare and social activities. Lastly, the Occupational Safety and Health (OSH) is a

cross-disciplinary area concerned with protecting the safety, health and welfare of people engaged in work or employment (Mondy, 2008). The goal of all occupational safety and health programs is to foster a work free safe environment. It is to ensure a safe working environment and also maintain employer's good health. 'Safety' refers to protecting employees from injuries due to work-related accidents. 'Health' refers to the employees' freedom from physical or emotional illness (Mondy, 2008).

1.3 Human Resource and Organizational Performance

Human Resource Management (HRM) plays an important role in achieving company goals and objectives (Cherrington, 1991; 1995; Ferguson & Reio, 2010). HRM will be the centre of formulating overall strategy on how to utilize resources in the organization. As such, HRM must integrate with all divisions in formulating organization strategy so that all strategies will lead to achieving company goals and objectives. Schuler (1989) in his study proposed that to be effective, each organization needs to develop specific forms of HRM practice that fits with its competitive strategy. However, empirical evidence supporting the presence of such a relationship is mixed. While Schuler and Jackson (1989) have found some evidence supporting this relationship, others have not been able to make such a finding (Guest, 1990; Peck, 1994; Rozhan, 1996; Rozhan and Zakaria, 1996). Peck (1994) found that the influence of strategy is more

limited to staffing practices and found no relationship between strategy and the overall HRM philosophy of organization.

Human Resource Development (HRD) or Training and Development (T&D) and some organization called Human Capital Development (HCD) is one the main functions in HRM. Even though there is some distinction in the definition of HRD and HCD, the basic function remains the same as to development employees of the organization. Several models of HRD specify a range of practices which, if pursued, are likely to contribute to human capital accumulation on which organizations may build its competitive advantages (Currie, 1998; DeGeus, 1997; McCracken & Wallace, 2000; Mondy, 2008; Noe, 2008). These models basically advocate that investment in HRD by organizations and individuals is necessary for a number of reasons such as to build and retain that resource in the future and to retain that resource in the present. The HRD system is designed to support the organization in training, developing the retaining the workforce (Kirkpatrick, 1996, 2005; Noe, 2008, Mondy, 2008). Providing training without measuring the effectiveness is not good enough. The need for training evaluation is called to ensure the resources invested in training and development of employees is fruitful (Gilbert, 2005; Kirkpatrick, 2005). Hence, the training evaluation is used to measure the training effectiveness so that the amount of money and time invested are worthwhile. For technical based company such as semiconductor industry, the cost of training and development is quite expensive and sometimes it takes

more than two weeks to complete the basic training. Some semiconductor organizations will spend more than one month to train their employees on basic operation and internal system. Therefore, the evaluation of training effectiveness in the semiconductor industry is very important in order to determine the training programs given to the employees are useful (Kirkpatrick, 2005; Minbaeva, 2005). In addition, the result from training evaluation will be used to further improve the training effectiveness once the contextual factors are determined.

Results of a survey of London university graduates conducted by Prickett (1998) showed that 90 percent of them expect their employer to help their development. Holbeche (1998) found that one third of her sample of high-fliers would leave if they could not broaden their skills. Organizations likewise view investments in human resource development to be important. Losey (1999) reported that organizations increasingly seek, through sophisticated human resource development and workplace learning strategies to develop employee competencies to enable them to respond quickly and flexibly to business needs.

Emphasis on HRD results into several positive individual and organizational outcomes such as higher performance (Noe, 2008; Sandberg, 2000;); high quality individual and organizational problem solving (Mondy, 2008; Schroder, 1989); enhanced career plans and employability, sustainable competitive advantage, higher organizational commitment, and enhanced

organizational retention (Ferguson & Reio, 2010; Raider & Burt, 1996; Weick, 1996). The relationship between HR practices and business results is built on the premise that better deployment and use of HR practices should correlate with better business performance (Cranage, 2004; Ulrich, 1997). Pfeffer (1994) in his study concluded that employee participation and empowerment, job design including team-based production systems, extensive employee training and performance contingent reward system are widely believed to improve the performance of the firm. Research done in year 2005 by the Society of Human Resource Management (SHRM) found that 36% of organizations surveyed increase their training budget, 33% decrease and 31% no change in their training budget. (www. shrm.org). This report revealed that most organization still put high emphasis on employee's development as part of their organizational development. Therefore, the employee must take this opportunity to develop themselves as part of their career development. Moreover, an individual must also explore how capable they are in coping with diversity and adapting to colleagues in a diverse workplace so that he/she can easily adapt himself/herself to the working environment for future career growth (Kant, 2009).

Huslid (1995), on the basis of his study of 968 publicly traded firms, found that a one standard deviation increase (about 25 percent) in work performance reduces turnover by 7.05 percent on a per employee basis, increases productivity by 16 percent (measured by sales per employee) and yields a $

3,814 increase in profits. Based on a study of 74 firms, Huslid & Becker (1995) have created an index of each firm's HRM system reflecting the degree to which a firm has deployed the high-performance work system (HPWS) and consistently found that firms with higher values on this index, other things being equal, have economically and statistically higher levels of firm performance. Youndt, Snell, Dean and Lepak (1996) have found that a HR system focused on human capital management was directly related to multiple dimensions of operational performance like employee productivity, machine efficiency and customer alignment. Huslid, Jackson and Schuler (1997) found that firm effectiveness was associated with the capabilities and attributes of HR staff. Further, they concluded that relationship between HR management effectiveness and productivity, cash flow and market value were positive.

Becker, Huslid and Ulrich (2001) have ranked organizations on a High Performance Work Index (HPWI) and compared their HR system and practices. The HPWI included the organizations system of building and maintaining a stock of talented human capital through linking its selection and promotion decisions to validated competency models, developing strategies that provide timely and effective support for the skills demanded by the firms' strategy implementation and enacts compensation and performance management policies that attract, retain, and motivate talent employees.

Based on the HPWI ranking, Becker, Huselid and Ulrich (2001) have compared the top ten percent companies with the bottom ten percent on a number of measures. The results indicated that there were substantial differences between the two groups. The top HPWI group had adopted HR management practices which were very different from the bottom HPWI group of organizations. The former devoted more resources to recruiting and selection, employed more vigorous training regime, established better performance management and linked to the compensation system, used teams to much greater extent, had roughly double the number of HR professional per employee. The HR outcomes associated with this system demonstrated that compared to the poor, the best HPWI organizations developed a clear strategic intent and communicated it effectively to employees. Their HR professionals were rated more positively and developed a comprehensive measurement system for communicating non-financial information to employees. Finally, organizations with the most effective HR management system showed the most dramatically higher performance: employee turnover was closer to half, sales per employee were four times as great, and the ratio of organization's market value to the book value of assets – a key indicator of management quality, as it indicates the extent to which management has increased shareholders' initial investment – was more than three times as large in the high-performing organizations.

Singh (2003) conducted a survey of 84 Indian firms representing major domestic business sectors ranging from automobiles and auto components to, cement, engineering, iron and steel, financial services, info-tech, pharmaceuticals, paper and power. The main objectives were to examine how many HR practices had been implemented by the firms and the extent of links between the individual HR practices and firm performance. Each firm was asked to indicate the percentage of employees covered under the final HR practices. The results had indicated that there were large variations in the HR practices adopted by the organizations included in the sample. It was also found that the combined effects of HR performance index were significant in predicting firm's performance as well as employee turnover and productivity.

While most of the studies had examined the relationships between HRD and organizational outcomes where data such as productivity and turnover rate are used, very few had measured the effects on soft variables like employee well-being (Edgar, 2003; Jones, 2005; Jong & Hartog, 2007) and the training effectiveness (Kirkpatrick, 1998, 2005; Phillip, 1996a, 1996b). In addition, the training evaluation model used to measure the training effectiveness is still debatable (Giangreco, Carugati & Sebastiano, 2010). As such, the training effectiveness is chosen as a key study specifically in technical based industry.

1.4 Human Resource Development in Malaysia

Education and training are accorded high priority in national development under Malaysia's five-year development plans (MIDA, 2008). In lieu with that Ministry of Human Resource actively working and promoting training and development to all companies in Malaysia through Human Resource Development Council (HRDC). Human Resource Development is one of the key issues for Malaysian companies since the introduction of Human Resource Development Fund (HRDF) - (Human Resource Development Act, 1992). Any company that has 50 employees or more is required to contribute 1 percent of their monthly wages to HRDF (Malaysian Employers Federation, 1992). This is the fact that rapid changes in the organizations need to develop a more focused and coherent approach to develop and manage people. In just the same way a business requires a marketing or information technology strategy it also requires a human resource or people strategy.In developing such a strategy, there are two critical questions to be addressed whether the organization has the right number of staff and right people to manage the business, and whether the organization has the attractive activities and package to attract and retain talent?

In order to answer these questions four key dimensions of an organization should be in place which are culture, organizational structure, people and HR system.Frequently in managing the people element of their business senior

managers will only focus on one or two dimensions which are organizational structure and people (i.e. employees) and neglect to deal with the others. Typically, companies reorganize their structures to free managers from bureaucracy and drive for more entrepreneurial flair but then fail to adjust their training or reward systems (Carlos, 2005; Easterby, Araujo & Burgoyne, 1999; Kirkpatrick 1979; Senge, 1990).

A study of Malaysian firms provides some evidence of HR managers having an involvement in the strategy formulation process (Rozhan & Zakaria, 1996). However, Hazman (1998) found that HR managers tend to have a significant influence mainly in assisting the management assess the environment and in the implementation of strategy. He also found that HR managers tend to have little influence in the strategic decision making itself. When the desired entrepreneurial behavior does not emerge managers frequently look confused at the apparent failure of the changes to deliver results. The fact is that seldom Malaysian manager focus on only one area (Rozhan & Zakaria, 1996). What is required is a strategic perspective aimed at identifying the relationship between all four dimensions which are influencing capability, decision making, managing change and drive for result.

1.5 Semiconductor Industry

As the world enters the twenty-first century, technology is now more than ever the key factor in the promotion of industrial development and economic growth (Jackson, 2001; Loh, 2000). This presents an enormous but unavoidable challenge for developing countries; they must carry out their industrial technology development in such a way as to create strong high-tech industries that can successfully compete in the global market, while moving their national economies in the direction of prosperity. In light of these challenges, an overall technology development strategy has become the critical success factor for an industry in terms of technology acquisition, diffusion and application. In the microelectronics industry, a **foundry** (also called a ***fab*** for fabrication plant) is a factory where devices like integrated circuits are manufactured. Foundries require many expensive devices to function (www.silterra.com). Estimates put the cost of building a new foundry over one billion US Dollars. The central part of a foundry is the clean room, an area where the environment is controlled to eliminate all dust, since even a single speck can ruin a microcircuit, which has features much smaller than dust. The clean room must also be dampened against vibration. The clean room also contains the steppers for photolithography, etching, cleaning, doping and dicing machines. All these devices are extremely precise and thus extremely expensive.Today, fabs are pressurized with filtered air, to remove even the smallest particles which could come to rest on the wafers and contribute to

defects. The workers in a semiconductor fabrication facility are required to wear clean room suits to protect the devices from human contamination (www.lsi.com; www.silterra.com)

In an effort to increase profits, semiconductor device manufacture spread from Texas and California in the 1960s to the rest of the world, such as Ireland, Israel, Japan, Taiwan, Korea, Singapore and China, and is a global business today. Semiconductor manufacturing is in the spotlight of global manufacturing industries. A considerable number of new semiconductor wafer fabrication facilities are planned to be built in the USA, Europe and the Pacific Rim (Yang, Rajasekharan & Peter, 1999). In order to maintain a competitive edge, these new fabs must deliver good system performance in terms of high throughput and yield while producing wafers with smaller line widths and larger diameters at minimum cost. Over the course of the past few decades, world has regarded the semiconductor industry as one of the most strategically important of the high-tech industries.

The Competitive Semiconductor Manufacturing-Human Resources (CSM-HR) program, which is funded by the Sloan Foundation and is part of the CSM program jointly run by the Engineering School and the Institute of Industrial Relations, explores what determines long-run competitiveness in the semiconductor industry. This industry is characterized by rapid technological change and global competition that result in short product

cycles, declining prices, and volatile markets. The continual technological change and automation require a flexible and skilled work force. Although labor costs are of small proportion of the total cost, the management of human resources potentially has a significant impact on performance because of the role of labor in determining the life and productivity of the costly capital equipment.

The leading semiconductor manufacturers typically have facilities all over the world. Intel, the world's largest manufacturer, has facilities in Europe and Asia as well as the U.S. Other top manufacturers include Samsung (Korea), Texas Instruments (US), Advanced Micro Devices (AMD) (US), Toshiba (Japan), NEC Electronics (Japan), STMicroelectronics (Europe), Infineon (Europe), Renesas (Japan), Taiwan Semiconductor Manufacturing Company (Taiwan), Sony (Japan), and NXP Semiconductors (Europe). In 2009, there were approximately 5,000 semi-conductor and electronic components manufacturers in the United States, accounting for more than $167 billion (U.S. Industry & Market Outlook, Barnes Reports, 2009).

1.6 Semiconductor Industry in Malaysia

Semiconductor wafer fabrication is becoming one of the most demanding and challenging industry in Malaysia. It is not only requires huge investment of money but it is also needs special skills and knowledge to run the fabs. In other words, Malaysia has to develop a pull of resources to meet the wafer

fabrication requirements. Malaysia was chosen to be one of the locations for multi-national companies to invest in wafer fabrication manufacturing. Malaysia can offer investors a young, educated and productive workforce at costs competitive with other countries in Asia. Backed by the government's continued support of human resource development in all sectors, the quality of Malaysia's workforce is one of the best in the region (MIDA, 2010).Literacy levels are high at more than 94% and school leavers entering the job market have at least 11 years of basic education. In addition, Malaysia registered a significant 7.1% productivity growth in 2008, ranking third after China and India. The growth which was the highest since 2001, has translated to a rise in the productivity of the Malaysian economic (MIDA, 2010).

According to MIDA (2010), in year 2008, Malaysia 's total trade had reached RM1.19 trillion, an increase of 6.8 per cent from RM1.11 trillion in 2007. The exports was increased from RM605.1 billion in year 2007 to RM663.51 billion in year 2008. It is about 9.6 per cent growth from year 2007 to year 2008. As a result, Malaysia has recorded a trade surplus for eleven consecutive years for the valued of RM142.01 billion.

The semiconductor industry which is group under the manufacturing sector accounted for 29.9% of Malaysia's GDP during the first nine months of 2008. In addition, the exports of manufactured goods made up 70.0% of the country's total exports. Malaysia's electronics industry has developed significant capacities and skills in the manufacture of a wide range of semiconductor

devices, high-end consumer electronic goods and information and communication technology (ICT) products. The electrical and electronics manufacturers in the country continuously moved up the value chain to produce higher value-added products to remain competitive. These include intensification of research and development efforts and in-sourcing activities for their related companies worldwide. The Switzerland-based Institute for Management Development (IMD) in its World Competitiveness Yearbook (WCY) did a global competitiveness survey in 2009 for 57 countries and rank Malaysia at number 18. The year 2009 rating placed Malaysia ahead of China, United Kingdom, Belgium, Taiwan, Thailand, South Korea and India (MIDA, 2009).

Semiconductor device fabrication is the process used to create chips, the integrated circuits that are present in everyday electrical and electronic devices.The entire manufacturing process from start to packaged chips ready for shipment takes six to eight weeks (Silterra, 2010). Starting with a assembly plants, the semiconductor industry has developed into a comprehensive industrial system with vertical and horizontal division of labor. It has gone through various growth stages, involving foreign-capital-based assembly, manufacturing technology transfer, growth of local plants, industrial system expansion and upgrading by industrial cooperation. The corresponding strategies for technology development cover technology introduction,

technology transfer and cooperative R&D, with gradually escalating technological capabilities successfully encouraging industrial growth.

As for Malaysia, there are four wafer fabrication companies in Malaysia namely Silterra Malaysia Sdn Bhd., X-Fab Sarawak Sdn. Bhd. (previously known as 1st Silicon), Infineon Technology, Kulim, and MIMOS Berhad. Silterra is one of strategic national interest to promote front-end semiconductor manufacturing and a catalyst for high technology investments in Malaysia. It was founded in November 1995 as Wafer Technology (Malaysia) Sdn Bhd and was renamed to Silterra Malaysia Sdn Bhd in December 1999 (Silterra, 2010). Silterra Malaysia Sdn. Bhd., located at Kulim Hi-Tech Park, is a dedicated wafer foundry that is built from a green-field site.Silterra is Malaysia's premier wafer foundry service provider, offering leading edge process technology and complete turnkey solutions with advanced technology. Silterra's start-up team of more than 250 technical staff and professional consultants received initial guidance from technology partner LSI Logic, USA, which provided tactical advice on facilities, processes and qualification. Silterra Malaysia Sdn. Bhd. has purchased a total US800 million worth of technology from LSI Logic, USA, and the total investment is RM5.7 billion, which includes equipment and other facilities (Silterra, 2010).

Besides Silterra, another mega project in Malaysia that is riding on the wave of technology transfer is X-Fab Sarawak Sdn. Bhd (previously known as

1st Silicon) and Infineon Technology Sdn Bhd. The X-Fab located in Kucing, Sarawak received a loan exceeding US200 million to embark on a technology transfer agreement with Japan Sharp Corporation for the wafer processing. In 2006, 1st Silicon announced completion of the merger with X-FAB Semiconductor Foundries AG located at Erfurt, Germany. The contract became effective on Sept. 1, 2006. The extended X-FAB Group is organized under the umbrella of the Belgian holding X-FAB Silicon Foundries N.V., located in Tessenderlo, Belgium. The combined entity has a capacity of 700,000; 200mm-equivalent wafers per year, and offers customers production technologies ranging from 1.0 to 0.13 micrometers. For Germany's Infineon (Munich) has invested approximately US1 billion in the Kulim, Malaysia for power fab. At full capacity, the fab employs about 1700 people. Maximum capacity is about 100,000 wafer starts per month using 200-mm wafers. The new facility will produce power and logic chips used in industrial and automotive power applications.

Lastly, MIMOS came from of the idea of a group of Malaysia's academicians, discussed and realized that Malaysia was a leading country in exporting electrical and electronics products but none of the product's design, brand and marketing belong to Malaysian companies (MIMOS, 2010). This led to the realisation of Malaysia's need for an institute to conduct microelectronics research to support the industry and to develop indigenous products. MIMOS provides critical infrastructure for the advancement of local electronic industry

so that the nation can design, produce and market high quality electronic products that include 'small scale' wafer fabrication by indigenous capabilities due to the importance of industrial and economic growth.

1.7 Training Effectiveness in Semiconductor Industry in Malaysia

Jackson and Schuler (2003) have addressed the important of training and development in the Human Resource Management (HRM) of any organization. It helps to improve the knowledge, skills and attitudes of employees so that they can perform better in current and future job assignments. Jones and George (2003) have stated that training is basically focuses on teaching organizational members how to perform their current jobs and helping them to acquire the knowledge and skills needed to be effective. On the other hand, development refers to the building of knowledge and skills of the organizational members so that they are prepared to take on new responsibilities and challenges (John, 1999; Jones & George, 2003; Nadler & Nadler, 1990).

Some organizations, sending employees for training simply mean over enthusiastic host races through slides in a PowerPoint presentation. After a few days of training, employees back to work, satisfied that at least they gained a day away from the office work (Laff, 2006). Regardless, whether the organization gets any value from sending its employees for the training is another story. Most training and development experts believe that if the employees somehow resist the urge to fall asleep, the value of instructor-led

sessions is lost as soon as they return to the office. The question arises whether this is what the organization wants to see after spending a lot of money in training.

Basically, the same scenario also occurs at semiconductor wafer fabrication companies in Malaysia. The management has developed systematic training program for the employees but the effectiveness of training was given low consideration (Ooi, Lee & Lo; 2007). This situation happens because of lack of resources, lack of knowledge and skills on how to measure the effectiveness and lastly to co-up with high demand in supporting operation. Thus, low priority was given in measuring the effectiveness because the available resources will be needed to support operation as this is the first priority of the company. The senior management must also consider the important of providing training to the people by understanding and believing that training is one of the important factors in organizational development. For technological based industry such as in wafer fabrication, the technical training for technical staff is very crucial (Silterra, 2005). Hence, the HR manager must really outline the required training programs focus to the outcomes as well as measuring the effectiveness of the training. Effective training begins with a thorough needs analysis, evaluating before and after the training, and continues well after the course concludes.

Lately, some of the semiconductor wafer fabrication in Malaysia such as Silterra and Infineon try to explore the measurement of training effectiveness in term of skills and knowledge application and return on investment (ROI). However, the evaluation of training effectiveness were only been focus for some technical training program only. As mentioned above, the lack of resources and support system limit the scope of programs for the evaluation of training effectiveness. In the year of 2006, Silterra managed to embark on-line evaluation to measure the skills and knowledge application for external training program only. Other semiconductor companies in this study still have not successfully implemented the system (i.e. evaluating the skills and knowledge application). The recent follow-up (2009), Silterra still maintain the old system, Infineon already exploring until ROI level and others still maintain the status quo.

One important point to be addressed before designing the training evaluation system, are the contextual factors that contribute to the training effectiveness. Based on the literature in Chapter 2 of this report, the contextual factors or the determinants to training effectiveness are the participants themselves, the trainer, types of training program (technical or non-technical), the training content/ material, the organizational support, the environment and the equipment used for the training. All these contextual factors play important role in the success of training. These factors are directly related to training effectiveness which is reaction, learning, behavior and result (Kirkpatrick,

1996, 1998, 2005). The details relationship between the contextual factors and training effectiveness are discussed in Chapter 2 of this report.

The organization must be put into serious consideration on training effectiveness so that the amount invested into training is benefited. Lack of study or awareness of the above contextual factors will result in effective training where training manager may not aware what other factors may lead to training effectiveness. One aspect of this study will assist the training managers to properly design the evaluation system so that they know what to do and take correction actions to improve the current evaluation system.

1.8 Problem Statement

To build a wafer fabrication plant, a huge investment is required. The investment includes building, general facilities, purchase of very expensive machines, supply of gases and chemicals, set up clean room environment, getting experts/consultants for special works and train the workers. The organization believes that training is vital for the workers to do the job (Kirkpatrick, 2005; Kline & Sounders,1998; Noe, 2008; Senge, 1990). That is why, most of the wafer fab companies sent their workers for training locally or/and at machines supplier side, or/and at their technology partner. As such, a lot of money has been invested for training and development. An employee's work attitudes influence preparation for a particular training program, or that

an organization's reward system may affect the extent to which trainees use their newly acquired knowledge and skills (Asplund & Salverda, 2004; Harvey, Bolam, Gregory & Erdos, 2001; Jones, 2005; Tai, 2006). However, these and other variables have been given little attention in the training literature, and training researchers in particular have not focused much attention on factors outside the learning or training environment (Jones, 2005; Tai, 2006).

Most organizations fail to look at the factors that affect the effectiveness of the training. As such, many of the organisations have failed to treat the evaluation of training as a priority (Kirkpatrick, 2005; Mondy, 2008; Noe, 2008). At best, the evaluation of training has been perfunctory task with little analysis and usefulness (Goldstein, 1986; Hashim 2001; Laff, 2006; Mondy 2008; Giangreco, Carugati & Sebastiano, 2010). Yet, evaluating the effectiveness of costly efforts is paramount to the success of any training program (Giangreco et. al., 2010). In order to see the effectiveness of the training, we have to seriously consider the factors that affect the training effectiveness by evaluating them using suitable training evaluation model such as Kirkpatrick evaluation model (Kirkpatrick, 1975, 1998, 2005). This is to ensure the money invested for training is worth and bring good result in achieving company objectives.

In addition, evaluation is given a low priority (Kirkpatrick, 2005, Mondy, 2008) in the instructional process, a contention that is supported by the small number of articles in the literature that deal with it. In addition, in the current economic environment and in the light of the HR Development Council (HRDC), training personnel are going to be faced with hard economic decisions about the viability and value of the programs they offer. They are going to need evidence of the quality of their programs in order to make such decisions and to influence the decisions of organizational management (Noe, 2008). This evidence can only come about through evaluation. Thus, evaluation must be given a high priority and must be fully incorporated into the instructional development process. In order for this to happen the meaning of evaluation must be clarified and its purpose(s) must be clearly identified (Giangreco et. al., 2010).

This is what the research seeks to examine and address, the factors that affect the training programs so that the organization realizes the important of evaluating the training effectiveness and adapting the suitable method to evaluate the effectiveness of the program. It is also highlight the role of senior management is ensuring the training is effective and worth to invest rather than doing for the sake of training and part of ISO 9000 requirement.

1.9 Research Questions

Based on the problem statement, with regard to Kirkpatrick evaluation model, the research seeks to answer the following questions:

a) How do those the contextual factors (i.e. participant, trainer, training material, training program, company, working environment and technology) affect the level 1 of training effectiveness (reaction)?

b) How do those the contextual factors (i.e. participant, trainer, training material, training program, company, working environment and technology) affect the level 2 of training effectiveness (learning)?

c) How do those the contextual factors (i.e. participant, trainer, training material, training program, company, working environment and technology) affect the level 3 of training effectiveness (behaviour)?

d) How do those the contextual factors (i.e. participant, trainer, training material, training program, company, working environment and technology) affect the level 4 of training effectiveness (result)?

1.10 Research Objectives

From the research questions, the researcher developed the research objectives. There were not many literatures discussed on the factors that affect the training effectiveness especially in semiconductor wafer fabrication industry in Malaysia. There is also lack of study on the evaluation of training effectiveness and outcomes to semiconductor wafer fab industry especially in Malaysia. In addition, wafer fab companies in Malaysia failed to treat evaluation of training as priority.

As such, the objectives of this research are:

i) To determine the contextual factors that affect the training effectiveness of Yield Management training program at Silterra Malaysia Sdn. Bhd., the wafer fab company.

ii) To investigate the relationship between the training effectiveness and the contextual factors (participants, trainer, training material, training program, organization, working environment and technology).

1.11 Significance of the Study

Today, the Malaysian government is proud to deliver news on the success in acquiring the state-of-the-art technology in the silicon wafer fabrication

(Silterra, Infineon, X-Fab [previously was 1st Silicon] and Mimos) which encompasses very stringent technical specifications and a series of complex processes. In lieu with that, Malaysia government has invested billion of ringgit to bring this technology in Malaysia. Besides purchasing very expensive machines, Malaysia would also need to hire specialists from America, Japan, Korea, Taiwan and Singapore. This is not only to set-up the wafer fab but it is also to develop local people (i.e. Malaysian) so that Malaysia can be independent in the near future (MIDA, 2010).

This study is of significance to human resources practitioners who are responsible for training and recruiting the appropriate employees for their organizations. The finding of this study will indicate the attributes required for the training to be effective. This would lead to provide the answers to some of the questions in relation to employee training and recruitment which is a national concern currently.

While many factors are known to affect the success of learning, this research has undertaken to focus on the training effectiveness as the dependent variables of the study. It is also significant to training practitioners in obtaining relevant information regarding training effectiveness. By knowing the attributes which are related to training effectiveness, trainers can eradicate some of the assumptions on the learning ability of new employees. Conversely, they can

also focus more attention towards trainees who are likely to have difficulty in learning.

Learning is conservatively a realm only in the formal education and its remains as a scarce activity in the workplace in Malaysia (Ooi, Lee & Lo, 2007). This research will show the relationships between the contextual factors that affect the training effectiveness. The factors such as participant, trainer, training material, training program, organization, working environment and technology are classified as independent. Once the above factors have been identified from the research, the organization can take corrective actions to improve the training activities. Hence, to improve the training effectiveness as well as the skills and knowledge learnt that could be applied on the job. In addition, by understanding the impact of the differences in ways of learning, the management can cultivate an appropriate working environment that encourages particular ways of learning in the workplace.

The training evaluation model in this study was developed based on Kirkpatrick model but the methodology of evaluation the training effectiveness is challenged (Giangreco et.al. 2010). In addition, the research framework used in this study indicates the relationship of all contextual factors (independent variables) with all level of training effectiveness (dependent variables). The method and model used in this study can also be applied to evaluate the training effectiveness for other industries regardless private or public sector.

Going a step further, the training section could help develop several different training schedules to suit the different needs of new employees, based on the findings of this study.

Since there is no study on training effectiveness for semiconductor wafer fabrication in Malaysia, this study generates new knowledge for human resources and training practitioners. Moreover, the answers from the research questions outlined in the research objectives are also intended to enrich the existing literature It is also generates a new framework and hypotheses for further research on this topic.

1.12 Contribution to Knowledge

Evaluation of the training effectiveness is given less consideration in most of the semiconductor companies (Xiao, 1996).In fact, huge amount of money has been invested to training and development of the workers. There are few literatures on training and development in semiconductor wafer fabrication but there is no one research which emphasizes the factors that affect the training effectives, the outcomes and the important of evaluation of training. For semiconductor fabrication in Malaysia such as Silterra Malaysia Sdn. Bhd., there is no literature or study made to look at the factors to training effectiveness and the method to evaluate the training effectiveness on the wafer fab. It is found that no research was done to wafer fabrication companies in Malaysia pertaining to training effectiveness even though million of Ringgit

has been invested to people development. As much, the literatures lie within the semiconductor packaging that show the important of training and how it should be done. It is also mentioned on the return on investment but the real formulas were not shown in any study. As such, this research will enrich literature on semiconductor training program in Malaysia, Asia and the world by examine the factors that affect the training effectiveness and show how the evaluation of training is made and evaluated. This is to ensure the training attended is relevant and applicable at work. More importantly, it will be an eye opener to all semiconductor wafer fab.

The methodology and model used in this research can be used by other researchers as well as training managers/practitioners for reference and comparison. In addition, by changing one of the Independent Variable (IV) (i.e. the training program), the research model used in this research can be used as generic model for evaluating training effectiveness and training outcome of any industry. It is important for the company to put serious consideration of all factors that affect the training effectiveness. By taking extra consideration to those factors, company will ensure that the training is effective as well as determine whether the amount of money invested in training bring added value to the employees and the company.

1.13 Definition of the Terms Used in the Research

1.13.1 Measurement of Training

Training refers as the act of increasing the knowledge and skills of an employee for doing a particular job (Flippo, 1976). Broadly, training is defined training as instructional experiences provided by employers for employees, designed to develop skills and knowledge that are expected to be applied immediately upon (or within short time after) arrival on or return to the job. After any training is carried out, performance of employees is evaluated to determine its effectiveness (Broad & Newstrom, 1992). In this study, author defines training as process of learning and acquiring skills and knowledge as well as some changes in behaviour.

Development involves learning that goes beyond today's job and has more long-term focus (Mondy, 2008). It helps to prepare the employees to be ready to face the future job requirements.

Training process is defined as the systematic acquisition of skills, rules, concepts, or attitudes that result in improving performance in the work environment. According to Leslie (1991), training is the words that synonym to development and the word that is used widely and often closely.

Competency is about performance. It is the analysis of what behaviour, skills, knowledge, understanding and personal qualities go to make up a competent performance that is at the heart using a competency approach (Weightman, 1994).

Training Effectiveness refers to the extent to which an activity fulfils its intended purpose or function. It is also refers to the benefits that the company and the trainee receive from training. Benefits for trainees may include learning new skills or behaviour. Benefits for the company may include increment in sales and more customer-satisfaction (Kirkpatrick, 1959; 1975). It is also a measure of the match between stated goals and their achievement (Fraser, 1994). It is always possible to achieve 'easy', low-standard goals. As a short, effectiveness refers to the extent to which objectives are met -'doing the right things' (Erlendsson, 2002). In the context of this research, a broad definition from Kirkpatrick (1959; 1975; 1977; 1979) is used to define the training effectiveness.

Training Outcomes or criteria refer to **measures** that the trainer and the company use to evaluate training programs (Noe, 2000). The training evaluation is a tool to determine the effectiveness of the programs.

Training Evaluation refers to the process of collecting the outcomes needed to determine if training is effective (Noe, 2000, 2002). A training evaluation

includes measuring specific outcomes or criteria to determine the benefits of the programs (Noe, 2000, 2002). In semiconductor industry, outcomes include behavioural, skills and knowledge change and return on investment (ROI). It is also to include the process of collecting information to give the highest level of confidence possible that it could draw conclusions regarding the effectiveness of training programs based on the information collected.

1.13.2 Ways of Learning and Effectiveness of Learning

Learning in the workplace is termed as workplace learning. Sacchanand (2000) reviewed many definitions of workplace learning and has ultimately defined workplace learning means, processes, and activities by which the employees learn and apply the learning onto their jobs, duties and rules.

Informal learning is a learning process that is not determined by the organisation in contradiction to formal learning. The process or method of informal learning is not prescribed and the employees determine themselves how to go about learning. (McMeekin, 1998).

Organisational Effectiveness refers to which an organization operative goals have been achieved. Operative goals namely profit, growth and acceptable rate of return on investment, are the real objectives that effectiveness is best judged against. (Steers, Ungson, & Mowday, 1985).

1.13.3 Technology Transfer

Technology Transfer includes the body of a specific knowledge, the organisations and procedures, the machinery, tools or equipment, materials, and the human skills that are combined to produce socially desired place when the existing technique of production is moved from existing location to another location (Rath, 1994).

1.14 Structure of the Thesis

This thesis is divided into five chapters. Chapter one is the introduction of the research that consist of brief summary of human resources functions, training and development, semiconductor industry, problem statements, research questions, research objectives, significant of the study and contribution to knowledge. Chapter two will discuss the literature review pertaining to the research. Chapter three consists of research methodology which consists of research population, sample and sampling technique, instrument used, theoretical framework, data collection method, data analysis, and presentation of data. Chapter four will show the analysis and result of the research based on the statistical analysis of the questionnaire sent to participants. Chapter five will focus on discussion of overall conclusion, implication and proposal for future research.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The chapter contains discussion on the definition training, the factors that affect training effectiveness, approaches to training evaluation, evaluation models, different levels of training evaluation, and how to measure the training effectiveness.

For any organization, the greatest challenge is to keep competitive and sustain in the market. To stay competitive, companies must focus to cost leadership and product differentiation (Aras, Aybars & Kutlu, 2010; Porter, 2004). Companies are in the business to make the profit, as every department in the organization is under pressure to show how it contributes to business success or become a strategic partner to another business unit (Porter, 1996, 2008). To contribute to a company's success, training activities must take place to achieve its business strategy (Noe, 2008). The business strategy outlines each business function to use its resources effectively so that every single cent invested added value to the organizational success (Aras et.al., 2010, Porter, 1990,). Each business function such as production, finance, marketing, engineering and human resources play an important role towards achieving business goals (Noe, 2008; Porter, 2008). For human resources, the HR

effectiveness is measured by looking at the Key Performance Indicator (KPI) or Key Result Area (KRA) or HR Score Card (Kaplan & Norton, 1996; Mondy, 2008).

Nowadays, a lot of terminologies been used to recognize the function of training and development in the organization. For instance, Human Resource Development (HRD) is also known as Training and Development (T&D) or Learning and Development (L&D) or Human Capital Development (HCD). Regardless the terminology used, HR is becoming a strategic business partner that includes being able to measure the effectiveness of various HR tasks (Adhikari, 2010; Mondy, 2008).

2.2 Human Resource Development in Semiconductor Industry

Most of the semiconductor companies in the world emphasize training and development for their staff especially the technical staff (Minbaeva, 2005). This is because the success of any organization especially the semiconductor industry relies on the competent workforce to drive the company to achieve their desired goals (Kirkwood & Walton, 2010; Minbaeva, 2005). According to research conducted by Swanson and Dobbs (cited at Adam, 2007), the future of training (and all organizational learning) lies within systematic and systemic approaches. They say that the more training contributes to the core business, the more it is valued. Therefore, in light of lesser evidence of this combined

contribution, it is more likely that training will be reduced or eliminated (Gill, Fitzgerald, Bhutani, Mand & Sharma, 2010; Ingram, Teare, Scheuing & Armisted, 1997). Hence, the systematic and systemic approach is about survival of the organizational effectiveness goal and the organizations it serves.

2.2.1 Training in Semiconductor Wafer Industry

Edulbehram and Rascher (1996) in their study found that only about half the fabs provide their operators with training in basic skills and science and most of the fab provide both On-the-Job (OJT) and classroom training for Statistical Process Control (SPC). The employees are compulsory to take the Safety training (Wilson, 2000; Worsfold, Griffith & Worsfold, 2004) and cleanroom protocol. However, most fabs do not provide any training in the design of experiments (DOE) and Yield Management (Edulbehram &Rascher ,1996; Jones, 2005). The Yield Management is only made compulsory for Quality Engineer, Process Engineer and Manufacturing Superintendent (Hughes, O'Connell & William, 2004; Jones, 2005).

Appleyard (1996) and Brown and Raschel (1996) in their studies have found that for operators, OJT (especially for SPC and general computer skills) was positively associated with high performing fabs, while classroom training was negatively associated with fab performance. Some fabs have a separate training centre, which consists of conference rooms, a computer lab and an auditorium

(Millward, Asumeng & McDowall, 2010). They have a separate training department, which reports to corporate services. Appleyard (1996), Brown (1996), Hatch (1996) and Valnano (1996) have found that operators at some fabs pursue outside education at local schools for a degree in electronics, and are reimbursed for it. Through their research, they have found that one of the fabs, each employee receives an individual "training roadmap." Operators receive refresher training if they fail their periodic re-qualification tests. Operators attend two statistical process control training sessions. The first is training on the 7 Quality Control Tools: Pareto diagrams, histograms, cause and effect diagrams, control charts, scatter diagrams, graphs, and checksheets. The second is training on basic SPC, including topics on variation, probability, histograms, normal distribution, mean, range and standard deviation, X-bar R and P charts, and interpreting control charts. Operators also receive Quality Circle Team (QCT) training if they are members of QCTs. A lot of training programs given to the employees emphasize on quality related program but less consideration given to productivity related program (Ingram et. al., 1997; Westover et. al., 2010).

Study by Edulbehram and Rascher (1996) on technicians in semiconductor wafer fabrication have revealed that most fabs provide classroom training in basic science, while over one third provides it in basic skills. For SPC, only one fab in the sample does not provide any training to its technicians, while others provide it mostly either in the classroom, or combine it with OJT. They

also found that only some of the fabs provide DOE training and emphasize training on yield management to technician since it is inter-related SPC (Jones, 2005). The safety and cleanroom training are compulsory for all employees (Moore, Parahoo & Fleming, 2010). Heavy emphasis is placed on mentoring-type of training within groups and departments (Bowen, 1996; Perry, Cavage & Coote, 2002). That is, the head of a group takes a class and then teaches his direct reports. It is felt to be extremely important to learn from one's supervisor. Valnano (1996) found that some outstanding fabs require technicians to take the same written test. Each technician receives an individual "training roadmap." Technicians receive OJT for most areas related to machine operation and maintenance. They may also receive training on specific equipment by the equipment vendors. Like the operators, all technicians attend the 3 levels of SPC training sessions. Technicians also receive Quality Circle Team (QCT) training if they are members of QCTs.

Appleyard (1996) and Brown and Raschel (1996) have revealed that majority of fabs give technical staff 2 hours of training per month. Technical staff receives quality control and process training related to their work area (Jones, 2005; Minbaeva, 2005). They further state that some technical staff can also attend advanced engineering courses. These are offered every two weeks and last from 1 to 2 hours. The classes are conducted by senior engineers or engineering managers.

The above views indicated that most of the semiconductors wafer fabrications emphasize a lot of training with regard to quality such as SPC and yield management related. They also make it compulsory for their employees to attend safety and cleanroom protocol. Most companies encourage their staff to pursue their knowledge by taking advanced engineering courses.

2.2.2 Training at Malaysia's Semiconductor Industry

In Malaysia, Saiyaddin and Juhary (1995) have indicated that training and development had become a major investment for most Malaysian organizations. Yong (2005) further concurred by stating that as Malaysia's business organization are increasing going global, there was a need for more effective strategic development and training of human resources to build competitive advantage.

Management of human resources and the restructuring of work in the wafer fabrication industry hold important lessons for the future (Minbaeva, 2005; Sheehan, 2005). This industry is already experiencing the competitive forces and technological innovation that most industries are expected to face in the 21stcentury (Sharma, Kumar & Kumar, 2007; Sheehan, 2005). Noori and Radford (1993) have noted some structural preconditions in order for firms to compete effectively in the global market. Firm must be strategically dynamic to face the competitive environment, innovative to ensure continuous

development and capable of handling uncertainties as they work with imperfectly understood and often- undeveloped technologies (Minbaeva, 2005; Sheehan, 2005).

This structural precondition results in potential confusion and thus requires learning and knowledge development as fundamentals. This implies a marked strategic shift where sustainable competitive advantage in gained through the development of knowledge (Stringam & Gerdes, 2010). Training and development all have significant implications for global organizations. And as the global talent pool continues to tighten, optimizing learning for stronger performance is coming to the forefront as a key factor for competitive advantage (Dovey & Singhota, 2005; Ferguson & Reio, 2010). Increasingly, HR is tasked with the challenge of finding strategic pathways to better use of human capital in wafer fabrication company (anonymous, 2007). Creating a learning environment helps address skills shortfalls, encourages ideas, develops skills and knowledge, and ultimately leads to higher retention. Thus, building a learning environment will become a strategic factor for competitive advantage (Cagnazzo, Taticchi & Brun, 2010). Hence, is common business sense.

Human resource managers have the “duty of care,” such as in areas of health and safety or training and development. Research shows that organizations that do not invest in training and development of their human capital lose valuable

employees to their competition (Araujo, Burgoyne, Easterby,1999; Groves, 2006; Jackson, 2001; Kline & Sounders, 1998; Lin & Hsu, 2010; Senge, 1990). Thus, in today's competitive marketplace, HR's role increasingly extends to the "duty" to create a learning environment for employees where they can maintain skills and gain new competencies. Within the learning umbrella are programs such as mentor-mentee, coaching skill, e-learning, executive coaching, organizational training, higher education courses such as Master and PhD. For example, international assignments can be one of the most efficient, effective and in-depth learning experiences to gain valuable global skills, knowledge and abilities.

Wafer fabrication companies in Malaysia invested a huge sum to get its workforce ready with the required skills to operate the foundry (MIDA, 2010). To effectively start-up this wafer fabrication plant, a technology transfer training structure was established. This structure is able to receive any technical qualification and background of new hires and quickly turn them into semiconductor processing or equipment engineers. All newly hired personnel, after successfully completing their orientation must attend certain hours of mandatory classroom (Silterra, 2010). This will provide them with the basic knowledge of company systems to effectively begin their on-the-job training.

Human Resource Development is one of the key issues for Malaysian companies since the introduction of Human Resource Development Fund

(HRDF)- (Human Resource Development Act, 1992). Any company that has 50 employees or more is required to contribute 1 percent of their monthly wages to HRDF (Malaysian Employers Federation, 1992). This is the fact that rapid changes in the organizations need to develop a more focused and coherent approach to develop and manage people (Martin, 2007). In just the same way a business requires a marketing or information technology strategy it also requires a human resource or people strategy (Martin, 2007; Millward et. al., 2010). In developing the above strategy two critical questions must be addressed.

1. What kinds of people do we need to manage and run our business to meet our strategic business objectives?

2. What people programs and initiatives must be designed and implemented to attract, develop and retain staff to compete effectively?

In order to answer these questions four key dimensions of an organization must be addressed. Firstly, the culture - the beliefs, values, norms and management style of the organization (Langlois & Lapointe, 2010; Martin & Terblanche, 2003). Secondly, the organization - the structure, job roles and reporting lines of the organization (Cranage, 2004). Third, the people - the skill levels, staff potential and management capability (Krishnan, 2001) and lastly the HR system - the people focused mechanisms which deliver the strategy - employee

selection, communications, training, rewards, career development (Ferguson & Reio, 2010).

A study of Malaysian firms provides some evidence of HR managers having an involvement in the strategy formulation process (Rozhan & Zakaria, 1996, Hazman, 1998). However, Hazman (1998) found that HR managers tend to have a significant influence mainly in assisting the management assess the environment and in the implementation of strategy. He also found that HR managers tend to have little influence in the strategic decision making itself. When the desired entrepreneurial behavior does not emerge managers frequently look confused at the apparent failure of the changes to deliver results. The fact is that seldom Malaysian manager's focus on only one area (Rozhan & Zakaria, 1996). What is required is a strategic perspective aimed at identifying the relationship between all four dimensions.

On the other hand, Cherniss, Grimm and Liautaud (2010) and Krey (2003) have mentioned that an organization can provide the most advanced education and training to its workers and make them highly qualified to deal with the most challenging situations in the future. In addition, most companies prefer continuous and gradual improvements, as these are easier to manage. However, radical changes need not cause disruption in an organization, as training can help the organization constantly infuse ideas and innovations to keep pace with industry changes. Based on the studies, any improvement due to training

eventually is beneficial for the company (Ferguson et. al., 2010; Kirkpatrick, 2005). An increased market share and better customer relationship measures, and fewer reworks can help increase the revenues and the profits in the long run.

Semiconductor wafer fabrication industry is still new in Malaysia. They are not many players in this industry since the investment in this project requires a lot of money. In Malaysia, the wafer fab companies still receiving some incentives and sponsors from Malaysian Government in order to survive (MIDA, 2010). Otherwise, these companies will close their operation. Silterra Malaysia Sdn. Bhd.is one of the Government projects fully funded under Khazanah Malaysia Bhd. It is very important for Malaysia to ensure the money invested in this mega project bring value to the country and the people of Malaysia. Therefore, Silterra Malaysia has put so much of effort to ensure their business will survive forever and competitive. To do so, all employees of Silterra must be competence to perform their jobs. HRD is given the mandate to provide technical and softskills training programs for the employees for the development of their skills and knowledge. For technical based company, Silterra emphasizes a lot of technical programs such as SPC, Semiconductor Processing, and Yield Management.

2.2.3 Technical Training Programs at Silterra Malaysia Sdn. Bhd.

Silterra Malaysia has divided the training programs into three main categories which are Core Training, Elective Training and External Training. Core Training programs are compulsory for all employees and the number of programs in Core Training is different depending on job category. Job category refers to Technician or Engineer or Engineering Manager, etc. Core Training programs for engineer includes Semiconductor Wafer Processing, Yield Management, DOE, Learning to Learn, Safety and Health, and Cleanroom Protocol. Elective program is not compulsory but the modules in the elective program are designed to support the individual in improving their skills and knowledge. For engineer, the elective program includes the Decision Making, Document Control, and Technical Coaching Skills. Lastly, the external training program is an ad-hoc programs offer by external training providers. The external training program will help the employee to gain specific knowledge and skills. For example, most of IT related training programs fall under external training program. In Silterra, seminar and conference is fall under external training. Yield Management is one of the Core Training program for all technical staff regardless their job level. The Yield Management program is very important to Silterra Malaysia since this program greatly emphasize on quality and specifically addresses how the employees can contribute in improving the quality of the product (i.e. wafer).

2.3 Definition of Training

Hamblin (1974) defines training as ‘any activity that deliberately attempts to improve a person’s skill in a job. Flippo (1976) defines training as the act of increasing the knowledge and skills of an employee for doing a particular job. He further states that “no firm has a choice of whether to train or not; the only choice is that of method’. His statement means that the company has to train their employees whether in formal classroom or on-the-job training. There is no such thing for not training because employees need to be trained before they can perform any job. Bramley (1991) defines training as any organizationally initiated procedures, which are intended to foster learning among organizational members in a direction contributing for organizational effectiveness. He summarizes training as systematic process with some planning and control rather than learning from experience, being concerned with concepts, skills, and attitudes of people treated both as individual and as a member of the various groups, and being intended to improve performance in the present and the following job and through this should enhance the effectiveness on the part of the organization in which the individual or group works.Training is the effective methods for enhancing the productivity of individual and communicating the aims of organizational to new personnel (Wilfred, Pamela, Suzanne & Winston, 2003).

The definition of training does not change so much from one researcher to another. Noe (2008) defines training as planned effort by a company to facilitate employees' learning of job competencies. These competencies include knowledge, skills and attitude (behavior) that are critical for organizational success. The goal for giving training to employees is to ensure that new skills and knowledge obtained can be applied to day-to-day activities. Upon completion of the training, the participants either applied what they have learnt or just gained knowledge for future job requirements. This definition of training by Noe (2008) is used to report the work in this thesis.

2.3.1 Training Evaluation

Hamblin (1974) defines evaluation of training as "any attempt to obtain information (feedback) on the effects of a training program and to assess the value of training in the light of the information". He further stated that one cannot assess training effects unless one know something about the before and after the training situation. Productivity level before training programs were implemented can be used as a control for comparison. Many studies have revealed that evaluation is often neglected by the training providers since there is lack of demand for evaluation (Asplund & Salverda, 2004; Giangreco et. al., 2010; Hashim, 2001; Smith & Piper, 1990). Belasco and Trice (1975) have found that less than 1% of the ongoing training programs are systematically evaluated. Randall (1975) identified a group of negativist who claim that

evaluation of formal training is either impossible or unnecessary. He felt that a dilemma exist between evaluating for refining purposes or just as a matter of survival (Baron & Morin, 2010).

Goldstein and Ford (2002) define training evaluation as a systematic process of collecting data and information to determine whether the training was effective. One of the most overlooked aspects in training is the evaluation phase (McClelland, 1994). McClelland mentioned that budgetary and other constraints have caused many trainers and instructional designers to employ standardized, commercially available evaluation instruments that pose many disadvantages. Among the disadvantages mentioned by McClelland is that standardized instruments are neither comprehensive nor focused on critical content areas that would be either necessary or desirable.Training evaluation should be considered before the actual training occurs (Gilbert, 2005; Grove & Ostroff, 1990; Kirkpatrick, 2005). The evaluation process should begin with the determination of training needs. Needs assessment helps to identify what knowledge, skills, behavior, or other learned capabilities are needed. Once the learned capabilities are identified, the next step in the process is to identify specific, measurable training objectives to guide the program (Gilbert, 2005; Halopainen & Bjorkman, 2005).

Wigley (1988) defines evaluation as "a data reduction process that involves the collection of large amounts of data which are analyzed and synthesized into an

overall judgment of worth or merit". The implication here is that the judgment of worth can be supported by the data. In her review, Foxon (1989) found similar definitions referring to judgments of "value or worth". What is not clear in any of the definitions offered is what is entailed in the criteria of worth. It has been suggested that a major problem in arriving at a definition of evaluation is confusion with related terms such as measurement, assessment and validation (Foxon, 1989; Giangreco et. al., 2010).

Tony (1996) defines evaluation as the systematic collection of descriptive and judgmental information necessary to make effective decision related to the selection, adoption, value and modification on various instrumentation activities. On the other hand, Leslie (1997) defines evaluation as the assessment of the total value of a training system training course or program in social as well as financial terms.

In summary, the definition of evaluations by Tony (1996) and Leslie (1997) are used in this research work. This is because evaluation involves analytical process of collection of data. It is also involved the evaluation of cost-benefit analysis after the training program been conducted. The overall aim of evaluation is to influence decisions about the need for the program in the future; the need for modifications to the program; and the need to provide cost/benefit data about the program.

2.3.2 Training Evaluation Models

To identify whether the objectives of the training is achieved by evaluation, the contemporary model calls for evaluation at various stages and thus allows for feedback throughout the training process and not just at the end. Since the introduction of Tyler's (1942) evaluation model many other models have emerged, each reflecting the evaluation requirements of its time. McCoy and Hargie (2001) list some existing models: goal-free evaluation (Scriven, 1967); Campbell's (1969) scientific approach; illuminative evaluation (Parlett & Hamilton, 1977); utilization-focused evaluation (Patton, 1986); the responsive mode that takes into account environmental and stakeholders' needs (Cronbach, Ambron, Dornbusch, Hess, Hornik, Phillips, Walker & Weiner,1980); fourth generation evaluation (Guba & Lincoln, 1989); and realistic evaluation (Pawson & Tilley, 1997).

Brinkerhoff's (1997) approach advanced an integrated evaluation model which involves evaluation before the delivery of training as well as in respect of its outcomes. It is a strategic approach to evaluate the comment at the initial stage by identifying and prioritize the needs of training. Tony (1996) commented on the performance knowledge on training principle and practice should be added. He also measured the transfer of learning effectiveness to the workplace. He also indicated the training policy must be practiced to meet the organizational objective.

Training models that are more inclined towards the "endless belt" include CIRO (Context, Input, Reaction and Outcome) model introduced by Warr, Bird and Rackman (1970) and the CIPP model (Worthen & Sanders, 1987). CIRO looks for what needs to be changed? What is likely to bring about the desired changes? And what suggests that a change has actually taken place? There are four levels of CIRO: *Context* – obtaining training needs and objectives; *Input* – analyzing the resource available; *Reaction* – same like Kirkpatrick; and lastly *Outcomes* – last 3 of Kirkpatrick model (Learning, Behavior and Result). The details of the CIRO evaluation model are as below:

Context evaluation involves obtaining and using information about current operational situation (or context) to determine training needs and objectives. This evaluation determines if training is needed.

Input evaluation consists of obtaining and using information about possible training resources to choose between alternative inputs to Human Resource Development. This type of evaluation involves analyzing the resources available and determining how can be deployed so that there is a maximum chance of achieving the desired objectives.

Reaction evaluation involves obtaining and using information about participants' reaction to improve the human resource development. The

distinguish feature of this type of evaluation is that it relies on the subjective reports of the participants, and their views can prove extremely helpful if they are collected is a systematic manner.

Outcome evaluation involves obtaining and using information about the results of human resource development to improve future programs. This is the most important part of evaluation. If outcome evaluation is to be successful, it requires careful preparation before the training program begins.

Under the systems approach, the most influential models include: Context, Input, Process, Product (CIPP) Model (Worthen & Sanders, 1987); Training Validation System (TVS) Approach (Fitz-Enz, 1994); and Input, Process, Output, Outcome (IPO) Model (Bushnell, 1990).

CIPP Model introduced by educators on the National Study Committee on Evaluation of Phi Delta Kappa (Worthen & Sanders, 1987). It received better attention compare to Kirkpatrick model. Four levels of CIPP model are, *Context* evaluation, similar to CIRO model, *Input* evaluation, similar to CIRO model, *Process* evaluation, which guide implementation of a training program through monitoring and data collection of what actually occurs during the implementation, against the plan and lastly, *Product* evaluation, to measure the attainment of objective, intended as well as unintended outcomes. Any traditional evaluation procedure may be used at this level. CIPP comprises of

CIRO and Kirkpatrick's model. The details of the CIPP evaluation model are as below;

Context evaluation is useful for providing a rational for determined executives, context evaluation defines a relevant environment, identifies needs and opportunities and diagnoses specific problems. A need analysis is common example of context evaluation.

Input evaluation provides information to determine how to use resources to best meet program goals. It is used to decide if outside assistance is necessary and help to determine general strategy for planning and designing the program. The results of input evaluation are often sees as policies, budgets, schedules, proposals, and procedures.

Process evaluation provides feedback to individuals responsible for implementation. It is accomplished through monitoring potential sources for failure, providing information for pre-planned decisions during implementation and describing what actually occurs. Both informal approaches are used in data collection. These include reaction sheets, rating scales, and analysis of existing records.

Product evaluation measures and interprets the attainment of objectives. It should measure intended as well as unintended outcomes. Evaluation at this

level can take place both during and after the program. Parker (1973) suggested different way of evaluating training program by dividing the evaluation process into four groupings. Firstly, the job performance of individual – evaluates the extent to which an individual improved on the job. Secondly, the group performance – evaluates the impact of the training program on a group within the participants function or the effect of the program on the whole organization. Thirdly, the participation satisfaction – the satisfaction covers the content of the program, method of training and their attitude toward what has been learnt. Lastly, the participant knowledge gained – facts, techniques, and skills absorbed by the participant. The above evaluation process seems to be an amended version of Kirkpatrick's model.

Jackson and Kulp (1979) also proposed similar model to Kirkpatrick's model by using different terminologies. According to them, there are four evaluation levels; *Level 1* – Reaction outcomes; *Level 2* – Capability outcomes*; Level 3* – Application outcomes; *Level 4* – Worth outcomes. The level 1 and 2 represents the immediate goals of training and the level 3 and 4 represent the long-term results. Leslie (1997) in his study applied three evaluation models developed by Kirkpatrick (1959), Hamblin (1974), and Warr, Bird and Rackham (1970). Hamblin's model is very similar to Kirkpatrick's in general terms and suggests five levels: Reaction, Learning, Job Behavior, Functioning and Ultimate Value. Besides, according to Warr, Bird and Rackham's model, it is contain four

levels such as context evaluation, input evaluation, reaction evaluation and outcomes evaluation.

Philips (1996a, 1996b) further contributes to the understanding of training evaluation by exploring into the possibility of measuring training by converting to monetary values. He linked monetary value to training performance and divided training result into hard data and soft data. Hard data represents the objectives, easy to measure and easy to convert to monetary value such as output, quality and cycle time. On the other hand, soft data is subjective and difficult to measure into dollar sign such as knowledge acquired, skills learnt and change of attitude. He further improved Kirkpatrick's model from four levels to five levels. *Level 1* - Reaction and Planned action - What are participants' reaction to the training? And What do they plan to do with the material?; Level 2 – Learning- What skills, knowledge, or attitudes have changed? By how much?; Level 3 - On-the-job application - Did participants apply on the job what they learned in training?; Level 4 - Business Result - Did on the job application produce measurable results?; and lastly Level 5 - Return-on-Investment - Did the monetary value of the results exceed the cost of training?.

Goal-based and systems-based approaches are predominantly used in the evaluation of training (Philips, 1991). Various frameworks for evaluation of training programs have been proposed under the influence of these two approaches. The most influential framework has come from Kirkpatrick (1959;

1975; 1979; 1994; 1998). Kirkpatrick's work generated a great deal of subsequent. Training evaluation has been an important subject in management studies and research as it is related to the issues of efficiency, effectiveness and impact (Giangreco et. al., 2010; Kirkpatrick, 2005; Rossi & Freeman, 1989). McCoy and Hargie (2001) have argued that no one model of evaluation is complete and suitable for all situations. Each type has strengths and weaknesses. To evaluate effectively, there is a need for a better understanding of the nature of evaluation, its purpose, and other important relevant aspects such as organizational and participants' needs.

Therefore, **"*There is no right answer to what is the 'best' model.*"**

What is best for one organization may be inappropriate for another (Anonymous, 2007). The most important is to look at model around which the organization will focus its evaluation. In view to the above, the four levels of evaluation of Kirkpatrick Training Evaluation Model are used as the based for this research work. However, the approach or methodology of the evaluation is slightly different from Kirkpatrick approach. The details discussion of Kirkpatrick's training evaluation is reviewed in Section 2.3.2.1 of this Chapter.

2.3.2.1 Kirkpatrick 4-level of Training Evaluation

Kirkpatrick's model follows the goal-based evaluation approach and is based on four simple questions that translate into four levels of evaluation. These four levels are widely known as reaction, learning, behavior, and results. Even though there are many evaluation models available, Kirkpatrick's model is more popular and easy to follow.

Level 1: Reaction Evaluation

Reaction - is the term that Kirkpatrick used to refer to how well the participants liked a particular training program. Participants give their assessment of a training course or learning event and generally give their level of satisfaction with the training/learning, typically at the end of the course or event. Evaluation of participants' reactions consists of measuring their feelings; it does not include a measure of actual learning. Kirkpatrick contended that although the evaluation of reactions is an easy measurement, many trainers do not follow these five essential steps for accurate measurement:

1. Determine what information is desired.
2. Devise a written "comment sheet" that includes items determined in the previous step.
3. Design the sheet so that reactions can be easily tabulated and manipulated

by statistical means.

4. Make the sheets anonymous.

5. Encourage the participants to make additional comments not elicited by questions on the sheet.

Although Kirkpatrick suggested that participants should feel free and be encouraged to make additional comments, he also contended that this type of qualitative data is extremely difficult to analyze. Thus, it is difficult to discern any patterns or trends in order to revise the training program. This evaluation uses a ‘Happy’ or ‘Smiling’ Sheet.

Level 2: Learning Evaluation

According to Kirkpatrick (1979), the second level of analysis in the evaluation process is that of learning. Participants demonstrate what knowledge or skills they have acquired through achievement or performance tests or exercises. Kirkpatrick defines **learning** as the "principles, facts and techniques that were understood and absorbed by the participants" and identifies the following guidelines or standards for evaluation in terms of learning:

a) Each participant's learning should be measured by quantitative means.

b) A pre-test and post-test should be administered so that any learning can be attributed to the training program.

c) The learning should be measured by objective means.

d) When feasible, a control group should be used so that comparisons can be made with the actual training group.

e) When feasible, the evaluation results should undergo statistical analysis so that learning can be viewed in terms of correlation and/or levels of confidence.

Obviously, evaluation of learning is much more difficult to measure than reaction. According to Kirkpatrick's guidelines, knowledge of statistical procedures is essential for accurate and meaningful measurement. When feasible, the evaluation results undergo statistical analysis so that learning can be viewed in terms of correlation and/or levels of confidence.

Level 3: Transfer-of-Learning Evaluation – The Behavior

Kirkpatrick's third level in the evaluation model is **transfer of learning**. The transfer of knowledge or skills to the participants' behavior on the job is assessed. In the HRD literatures there are relatively few examples of studies that have specifically attempted to assess the transfer of training skills or knowledge to the job. Even Kirkpatrick (1979) warned that "evaluation of training programs in terms of on job behaviors is more difficult than the reaction and learning evaluations..... As a result, much training is delivered without a plan for measuring the transfer of training. Kirkpatrick went on to suggest a framework for evaluating training programs in terms of behavioral changes:

a) A systematic appraisal should be made of on-the-job performance on a before-and-after basis.

b) The appraisal of performance should be made by one or more of the following parties (the more the better):

- the participant
- the participant's superior(s);
- the participant's subordinates; and/or
- the participant's peers or other people who are familiar with the participant's performance.

b) A statistical analysis should be made to compare before-and-after performance and to relate changes to the training program.

c) The post-training appraisal should be made three months or more after the training so that the participants have an opportunity to practice what they have learned. Subsequent appraisals may add validity to the study.

d) A control group (of people who did not receive the training) should be used.

Level 4: Results Evaluation

Kirkpatrick's fourth level of evaluation is results or impact on the organization. The impact of the on- the- job changes on business or corporate objectives are assessed. Attempting to measure results is not for the fainthearted! Although measuring training programs in terms of results may be the best way to measure effectiveness, Kirkpatrick himself (1979) pointed out "there are ... so many complicating factors that it is extremely difficult if not impossible to

evaluate certain kinds of programs in terms of results." The separation of variables to measure how much of the improvement is due to training is extremely difficult. Instead of offering a specific formula, Kirkpatrick simply reported anecdotal efforts to measure results. He did applaud attempts by researchers such as Likert (1967) to use qualitative data in measuring results, but he lamented the fact that current research techniques are essentially inadequate and that progress in this area is slow.

2.3.2.2 Limitation of Kirkpatrick's Training Evaluation Methods

The first training evaluation model developed has been modified by few peoples, in which mobility is both a skill and a requirement when the time system is more characterized. New terms also characterize the economy, such as the e-lance economy (Freyens, 2008; Malone & Laubacher, 1998), the knowledge economy, or the post-industrial economy (Comacchio & Scapolan, 2004; Sculley & Byrne,1987). In this emerging world, the knowledge worker is the centre of productivity and economic life and must be nurtured, challenged and constantly pleased to remain with an organization (Alvesson, 2000; Carlos, 2005; Gill et. al., 2010). In this world, the individual also must constantly learn, just as organizations must become learning organizations (Senge, 1990).

The Kirkpatrick model has been the focal point of discussions about why and how training should be evaluated, and research has tried to extend it in different directions. On the other hand, modern society and the economic infrastructure in which we move today are much different during Kirkpatrick developed his model. Today, the principal agent of the economy is not the corporation, as it was 50 years ago (Giangreco, et. al., 2010). New technologies and social unrestraint give the individual a much more dominant role in the economic playing field (Friedman, 2005; Hansemark & Albinsson, 2004). In a similar way, it has prompted a certain amount of criticism (Alliger and Janak, 1989; Brown, 2005; Clement, 1982; Sitzmann, Brown, Casper, Ely & Zimmerman, 2008; Tannenbaum & Woods, 1992). Holton (1996) criticized Kirkpatrick's model and Kirkpatrick's (1996) responded that "my model (or taxonomy) shows the relationship among the four levels." The debate remains open, and the results are quite contradictory. According to Tan, Hall and Boyce (2003), negative reactions have predicted a higher degree of learning, but Russ-Eft, Dickinson and Levine (2005) have found that negative reactions predict lower learning. According to Kirkpatrick (1996, 1998, 2005), evaluation becomes more difficult, complicated and expensive as it progress from one level to another level – Kirkpatrick four levels of evaluation: *Level 1 -Reaction* (how the participants feel about the training; *Level 2 -Learning* (what the participants acquired from the training), *Level 3 - Behavior* (how much participants applied what they have learnt) and lastly, *Level 4 -Result* (how much company gain/benefits from this exercise).

To further challenge the Kirkpatrick Model, the author would like to revisit the above criticism and classic criticism in light of recent societal changes. Bates (2004) and Giangreco et. al. (2010) done very extensive analysis emphasize on three major limitation of Kirkpatrick Model. The Kirkpatrick Model or 'taxonomy' use to oversimplify and incomplete, untested presence of a cause and effect relationship among the levels, and lastly unproven progressive importance information moving from the first level to another level.

The model is oversimplified and incomplete

In relation to the first limitation, the model rather than being oversimplified and perhaps too complex (Alliger,Tannenbaum, Bennett, Traver & Shotland, 1997). Abundant literature follows the lines drawn by the Kirkpatrick model and converges on one main conclusion which is companies are not keen to evaluate training programs fully (Mann & Robertson, 1996; Wang & Wilcox, 2006), so they tend to remain at level 1 and only evaluate reactions. The poor usage of the full model appears confirmed by the relatively low rates of companies that undertake an evaluation that goes up to level 4. Previous studies done for the companies at Level 4 evaluation stated 15 per cent according to Dixon (1990), 20 per cent as stated by Shelton and Alliger (1993), 31 per cent as indicated by Olsen (1998), 2 per cent according to Pershing and Pershing (2001) and Lee and Pershing (2002), 7 per cent by Van Buren and Erskine (2002), 11 per cent for Sugrue (2003) and 13 per cent as indicated by

Sugrue and Rivera (2005). Generally, some companies do emphasize Level 4 evaluation.

Traditional literature cites several reasons that companies do not use the Level 4 based on in rationales typical of the industrial economy: lack of necessary knowledge or time and financial resource limitations ((Kraiger, McLinden &Casper , 2004; Plant & Ryan, 1992; Simms, 1993; Wang & Wilcox, 2006). Giangreco et. al. (2010) have stated we should not focus on the model and its development but rather on a rediscovery of the roots of the development of the model itself. The usage characterizes the validity of these tools, not just the mathematically validated correlations. By adopting this angle, we can highlight that the model may not be too simple but rather too complex; it may not be incomplete but rather too rich for the organizations of our times. With these apparently inconsistent statements, we attempt to find the roots of the debate about evaluation systems and thus reasons to further research on this topic.

Cause-effect relationships among different levels were not tested

Alliger and Janak (1989) have stated the lack of a proven cause-effect relationship among the outputs of the four different levels. Furthermore, the Kirkpatrick model has been the subject of harsh criticism with regard to the possibility of identifying a correlation between trainees' satisfaction with training and the level of knowledge, and then the modification of behaviors, leading to the production of results (Holton, 1996). On this point, Kirkpatrick

has been a little contradictory. In an early version of the model, he noted some intrinsic limitations and gaps, pointing out that readers would need to consider the four dimensions as isolated and manage them one by one (Giangreco et. al.,2010). Based on McEvoy (1997) study, trainees often tend to complete their training in a state of excitement, such that their immediate favorable reaction is much higher than feedback reactions measured later. Dixon (1990) also concluded that good reactions do not necessarily ensure good learning. Analyzing the same relationship cited in Cannon-Bowers ,Tannenbaum and Mathieu (1995) model of training effectiveness, Rowold (2007) reached the same conclusion. Finally, in an extensive and more recent logical analysis of trainee reactions, Sitzmann et. al. (2008) have stated that "it is inaccurate to claim that reactions do not matter with regard to learning", which again underlines the complexity and ambivalence of the cause-effect direction among the different levels (Hook & Bunce, 2001). In conclusion, though some connection might exist among the different levels, the issue remains controversial (Alliger & Janak, 1989). The author realizes that the causal link sought among them.

The progressive importance of information moving between levels were not proven

Based on the industrial economy way of thinking, if each level is capable of producing significant outputs, the level of importance should be increasingly more significant from one level to the next, implying that the level 4 results are

the best measure (Giangreco et. al.,2010; Lorenzet, Salas & Tannenbaum , 2005;). In the post-industrial economy though, the issue is not higher results but rather different natures. Training programs are not always designed to produce outputs and significant information for all four levels (Alliger & Janak, 1989). Some of the companies might organize training courses aimed at developing a good team spirit and reinforcing staff motivation (level 1: reactions). Training is the key to survival, yet the traditional ways of measuring the effectiveness still valid and relevant but can be challenged! (Giangreco et. al., 2010). Given the current strong emphasis on training, there is more than ever a need to evaluate our actions to training evaluation process (Giangreco et. al., 2010; Gilbert, 2005). The discussion should not be about the applicability or models created for the industrial society but rather look at difference approach or method in evaluating the training program. It is the right time for a different type of evaluation approach (Giangreco et. al., 2010).

2.4 Training Evaluation Approach

Belasco and Trice (1975) have suggested a different approach in evaluating the effectiveness of the training program. They proposed the individual should be selected in advance using the testing method to allocate suitable in individual into suitable training programs so that the different approach and focus for different group could be adapted. In this way, they anticipated the training would be more effective. In their study, they found that the Solomon-4

evaluation design was the most sensitive evaluation instruments. Group A was the experiment group, and Group B, C and D were the control group. Three variables were used as pre-test, during training and post-test. The outcome of using this model showed that the trained groups were more constructive and responsive towards knowledge and reaction, whereas the untrained group had less favorable attitude.

Easterby-Smith (1986) provided more significant insight on evaluation. According to him evaluation is a different and complex task because it is by no means easy to agree on the conceptual boundaries and what is to be investigated. There is enormous variation in practice of management and organization, and each contains a wide variety of philosophies, value systems, techniques, and structures.He introduces hard and soft data is the concept of scientific and naturalistic methods. The scientific methods refer to a specific occasion and involve measuring things (quantitative method), use of statistic a absolute criteria and are pre-ordinate, while the naturalistic method is seen as a continuing process where observation is made at difference point of time.

CAIPO (Context, Administration, Input, Process and Outcomes) practices this evaluation approach. The evaluation process covers three aspects that provides a narratives of what takes place, attempts to understand the experience of an event or activity from the viewpoint of participants, possibly based on some of the narrative data obtained from training and investigates specific aspects and

dimensions of what takes place, particularly in the area of interaction between people.

Lawrie (1988) and Phillips (1991) have recommended "a change of attitude" among practitioners in order to achieve a successful evaluation methodology. Fitz-Enz (1994) recommended the use of training value analysis (TVA) method to evaluate the effect of training. According to him, "... they must prove that people use skill, knowledge or attitude to upgrade the job performance". He also discussed extensively about training value to trainees in terms of new capability, attitude and new knowledge acquired. He listed non-monetary value as reduced stress, time save, better relationship and increased productivity. According to Nancy (1990) the purpose of evaluation is to improve the design or delivery of learning events, to increase the use of the learning on the job and to make decision about learning in the organization.

Bramley (1991;1996) outlined five basic types of strategies for education, which are particularly relevant to training events: the system approach that seek to improve efficiency by asking about expected effect; the goal based approach that seeks to establish accountability by asking question about objective being achieved; the goal-free approach that to discover all the effects of the program. He emphasized the opinion of the program, participants and thus the consumer utility aspects; professional review approach that lead to acceptance or rejection of a program based on the opinion of a group of peers;

and lastly, the quasi-legal approach that weigh the arguments for and against the program using a wide range of evidence from interested parties.

Bramley (1991) did not suggest that evaluator should select one strategy, use one or more. His strategies was supported and agreed by Lam and Kong (1994) in their project paper ‘A Study on the Effectiveness of the In-house Management Training and Development’. They have used strategies outlined by Bramley.

In a survey of Training and Development Journal, 30% of respondents identified "evaluation of training as the most difficult part of the job" (Galagan, 1983 & Del Faizo, 1984 cited in Foxon, 1989). This finding is not surprising since evaluation is poorly defined having different meanings for different people in many different contexts. There is a strong dependence in the profession on the determination of trainee reactions to programs as a major means of evaluation (AlMadhoun, 2006; Anonymous, 2007; Sutherland, 2009; Thacker & Yost, 2002; Williams, Graham & Baker, 2003). Foxon (1989) makes the point that many trainers see the "development and delivery of training as their primary concern, and evaluation something of an afterthought." She suggests that the reliance on post-course reactions results from an inability to deal with quantitative measurement techniques and a lack of finances, time and expertise in comprehensive evaluation (Anonymous, 2007; Williams et. al., 2003). Further, she suggested that training practitioners

were confused by the term and did not understand what its "essential features" were nor what "purpose it should serve". In addition, evaluation can also be developed by conducting the return-on-investment (ROI) studies (“Strategic Direction,” 1998). Phillips (1991) and Lawrie (1988) recommend “a change of attitude” among practitioners in order to achieve a successful evaluation methodology. The program evaluations should include not only the training process but also feedback from the participants in terms of content and applicability of such programs (Rodrigues, 2005; Worsfold & Griffith, 2003). It is suggested that a good evaluation system is a collaborative process, a co-creation by organizational leaders, trainers, participants and evaluators (Lingham, Richley & Rezaria; 2006).

Sanlier and Karakus (2010) have used questionnaire for 430 people to evaluate the safety practice at the workplace. In Taiwan, Tsai and Tai (2003) have used questionnaires to evaluate the participants perception (level 1) on training and behavior (level 3). The questionnaires method were also been used in AlMadhoun (2006) study in Palestine where the managers were asked to evaluate their own performance after they attended the management development training. He used Likert scale to measure effectiveness for level 1, 2 and 3.

The questionnaire approach of Level 1, 2 and 3 were also been used by Castrillon and Cantorna (2005) survey for 90 manufacturing technologies

companies in Spain; Tai (2006) studied to 126 employees in Taiwan on the effectiveness of new computer software and design; Billington, Neeson and Barrett (2009) studied where involving employees and managers on how to improve their knowledge and skills of work; and Johnson, Gueutral and Faber (2009) studied on courses, interaction of courses through e-learning to 964 students in United States Universities. Studied in Malaysia by Cheng, Yang and Mahmood (2009) and Taiwan by Chan and Mak (2010) used students to evaluate the effectiveness of education in their country. Lastly, Forrier and Sels (2003) used questionnaires for 815 companies for data collection to measure the ROI in term of productivity, quality, waste, cycle-time and employee turnover.

The above views suggest alternative in evaluating the training effectiveness. Kirkpatrick evaluation model suggests level 1 evaluation by respondents; level 2 evaluation by pre/post test, interview or observation; level 3 by observation and interview and level 4 by management report or system. However, based on the above discussions and views, the evaluation of all levels can also been done quantitatively by the respondents since they know best what they have learnt, applied and contributed. From the above discussion, it can be concluded that there is a lot of improvements can be done to Kirkpatrick Training Evaluation Model and method. Other training evaluation models suggested similar approach where some would agree that self-report could also been used to evaluate the effectiveness of the training program. Very importantly to know

that competency or performance may rely less on participants' satisfaction and more on the relevance of the learning as applied within practice, and the readiness and capability of the worker to do the job right, to make the right decisions and the right choice (Anonymous, 2007).

The next section discusses the main topic of this work which the training effectiveness as general and the levels of training effectiveness based on Kirkpatrick Model.

2.4.1 Training Effectiveness

Fraser (1994) defined effectives asa measure of the match between stated goals and their achievement. It is always possible to achieve 'easy', low-standard goals. In other words, quality in higher education cannot only be a question of achievements 'outputs' but must also involve judgments about the goals (part of 'inputs'). Erlendsson (2002) defined effectiveness as the extent to which objectives were met ('doing the right things').The UNESCO definition of Effectiveness (educational) is an output of specific review/analyses (*e.g.*, the *WASC Educational Effectiveness Review* or its *Reports on Institutional Effectiveness*) that measure (the quality of) the achievement of a specific educational goal or the degree to which a higher education institution can be expected to achieve specific requirements. It is different from efficiency, which is measured by the volume of output or input used.

Wojtczak (2002) defined effectiveness in the context of medical education as a measure of the extent to which a specific intervention, procedure, regimen, or service, when deployed in the field in routine circumstances, did what it was intended to do for a specified population. In the health field, it is a measure of output from those health services that contribute towards reducing the dimension of a problem or improving an unsatisfactory situation. West (1999) argued that in relation to training, as opposed to education, one way of looking at the issue of effectiveness was in terms of whether there were 'identifiable economic outcomes'. A broader definition still focuses on the extent to which training 'meets its objectives'. Descy and Westphalen (1998) have defined this more precisely as training that 'meets its objectives as defined by its funding body'. This is a useful definition since it is undoubtedly the funding body that ultimately decides whether or not training will be made available. Whilst this is a useful test, there are two points to bear in mind. First, it is not always the case that the funders' precise objectives are transparent, although their general aims may be. Second, whilst the funders may have objectives, it is only by relating the extent to which these are perceived to have been met – by the various stakeholders (e.g. individuals, enterprises) – that one can really understand the extent to which the training has been effective. There may also be unintended consequences of training that aid an individual's employability – for example, improving 'soft skills' such as an individual's self-esteem, motivation or ability to work in a team. Flippo (1976) outlined the

effectiveness of the training can be measured at any level. It is depend to the organization to decide whether to measure the whole things or some part of its (Kirkpatrick 1998, 2005).

Effectiveness measures are the reactions, learning, and/or results criteria which are used in studies to generally show results for the effect of training (Ostroff, 1991). Kamal (2004) viewed training effectiveness is a result from the implementation of any ideas at work and trainee assess over the boundary of job improvement ideas. Chapados, Rentfrow, and Hochheiser (1987) have recommended four principles of training to be incorporated into a training activity to guarantee a positive impact on organizational productivity. Chapados's four principles were derived from earlier work by prominent writers of the corporate area. The four principles recommended him include making the training content relevant to the trainees, making training objectives congruent with the work tasks you are trying to affect, making training event/design systematic and be sure it relates to training objectives, and lastly, making training delivery respond to trainees' frames of references. They concluded by saying that training is not the ultimate answer but it one of the components in a productivity improvement effort.

As a primary measure of success of a program or of a higher education institution, clear indicators, meaningful information, and evidence best reflecting institutional effectiveness with respect to student learning and

academic achievement have to be gathered through various procedures (inspection, observation, site visits, etc.). Engaging in the measurement of educational effectiveness creates a value-added process through quality assurance and accreditation review and contributes to building, within the institution, a culture of evidence (Vlãsceanu, Grünberg &Pârlea, 2004).

Tennant, Boonkrong, and Roberts (2002) have found that "wasted training" is a common problem in organization due to lack of appropriate assessment of training effectiveness. On the other hand, Hunt and Baruch (2003) have argued that one-off training programs do not generate high impact however the evaluation of training should be an involved process bringing together organizational and participant perspectives; and that it should be developed on a case-by-case basis (similar to that of action research) highlighting its uniqueness for each training program (Lingham, Richley & Rezaria, 2006). In order to leverage the learning experience and to ensure efficient use of resources, the evaluation of training program is both necessary and critical for organizations. Numerous studies have highlighted the importance of evaluation, few have given attention to whether such evaluations yield useful information for the organization and its members. Measure of learning effectiveness is not simple. As mentioned by Syverson (1999) that learning occurs across complex dimensions which were interrelated and interdependent.Savolainen (2000) stated in his study that change and learning reinforces each other.

Most training effectiveness has focused on cost-benefit analyses (Lewis & Thornhill, 1994) or simple evaluations such as level of happiness indices (Paauwe & Williams, 2001).The next step to explore in details is the level four of Kirkpatrick (1975;1979;1998) model: 'Business Result'. The fourth level in this model is to evaluate the business impact of the training program. Kirkpatrick's fourth level of evaluation, results, is still difficult to measure. The difficulty is the ability to separate training from the multitude of other variables that can impact long-term performance. The econometric and utility models may be statistically elegant but are not sufficiently intuitive to warrant widespread application. This fact suggests opportunities for further research into alternative approaches and methodologies for addressing results. The more qualitative, quasi-experimental approaches involving action research, critical incidents, and similar methods appear to be more promising. These approaches offer the advantage of observing and documenting the impact of training activities at the site.

Kirkpatrick was asked by the trainers during consultation work with one of the organization, to skip discussion on Level 1, 2 and 3 evaluation but focus more on how to evaluate training using level 4 – Result. This is what his customer wants to know how training brings result to the organization. He replied to the queries that to know all levels of training evaluation was very important but to measure them were not an easy task especially at level 4. This is because complicating factors can make it very difficult, it's not impossible, to evaluate

certain kinds of training program in term of result. He recommended the training directors begin to evaluate using the first three levels: reaction, learning, and behavior. Simms (1993) in his article 'Evaluating Public Sector Training Program' claimed that the fundamental reason for not evaluating training is because it is difficult, tedious, and time consuming.

Assesses the financial impact of the training course on the bottom line of the organization six months to two years after the course (Simms, 1993). The only scientific way to isolate training as a variable would be to isolate a representative control group within the larger population. Carliner (1995) stated that for many reasons, Level 4 was the most difficult level to measure. First, most training courses do not have explicitly written business objectives, such as "this course should reduce support expenses by 20 percent". Second, the methodology for assessing business impact is not yet refined. Lastly, after 6 months or more, evaluators have difficulty solely attributing changed business results to training when changes in personnel, systems, and other factors might also have contributed to business performance. Alternatively, a logistics company could develop a safety-training course for forklift truck drivers, because a recent law made it obligatory for them to pass a national qualifying exam (level 2: learning). The company managing the security of an airport might train its staff about new procedures regarding liquids and personal computers in carry-on luggage, with the objective of ensuring staff members pay more attention to details (level 3: behavior). Finally, a public

hospital may train its radiology technicians in the use of a new computer tomography machine that will allow them to conduct more tests per day (level 4: results).

The above discussions indicate various perspectives or levels of measuring the training effectiveness. For this research, the training evaluation levels are based on Kirkpatrick's model since majority of the studies indicated similarity in their measurement levels. Therefore, the measurements of training effectiveness levels are grouped according to Kirkpatrick's Training Evaluation model. Below sections entail the level of training effectiveness adopted from Kirkpatrick's model.

2.4.1.1 Reaction

Based on Kirkpatrick (1975,1979, 2005) the reaction evaluation refers to how the participants felt about the training or learning experience. The perception about the training could be principles, facts, techniques, procedures, or processes emphasized in the

training program (Bernardin & Russel ,1998). They added reaction outcomes refer to trainees' perceptions of the program including the facilities, trainers, and content. Smith and Hayton (1999) in their study, have asked the respondents to evaluate how they felt about the training program, new technology and product innovation (Smith, Oczkowski, Noble & Macklin,

2003). Employees who were satisfied with their jobs will be more likely to exhibit more discretionary behaviors that benefit the organization than those who were not (Kuehn & Al-Busaidi, 2002).

Studies by Bateman and Organ (1983) and Smith et. al. (1983) were among the pioneers explore the relationship between job satisfaction and behavior. Later many researchers explores job satisfaction as a predictors to organization behavior such as George (1990), Organ and Lingl (1995) and Nasurdin, Ramayah and Jaafar (2003). Sanlier and Karakus (2010) used the respondents to evaluate the motivation of consumers to try new product. On the hand, study in United Kingdom by Sutherland (2009) on employee's skills realized that more than half respondents felt that their skill levels are higher than those required to do the jobs. Only 5percents felt that their skill levels are lower than those required to do the job.

Castrillon and Cantorna (2005) have studied to 90 manufacturing technologies companies in Spain used questionnaires to evaluate how the employees felt about working on metallic sector. The respondents were asked to evaluate, whether the objective of the training is met, the support from supervisor and the motivation of employees to attend the training for career development (Sutherland, 2009; Tai, 2006). Based on reaction of the respondents of Billington et. al. (2009) study, employees have improved their skills and knowledge, the training attended was relevant to their work (Sutherland, 2009)

and they are confident that the knowledge and skills learnt can help them succeed in their current and future job (Billington et. al., 2009, Sutherland, 2009; Tai, 2006). With the above discussion, the items included in the reaction evaluation include the objectives of the training, knowledge and skills, confident level to do the current and future job, career development and the overall perception of the training program in achieving company objectives.

2.4.1.2 Learning

Kirkpatrick (1975,1979, 2005) the learning evaluation refers to the measurement of increasing knowledge and skills after the training - the knowledge and skills acquisition. Typically, this is done through assessments or test before and after the training. Alliger and Horowitz (1989) have highlighted the concern that evaluating of training programs had not considered actual measures to capture knowledge gained and retained in training programs. They suggested the importance of content in program design. On the other hand, skill-based outcomes were used to assess the level of technical or motor skills and behavior (Bernardin & Russel, 1998). Thacker and Yost (2002) have found the students passed the communication test done by the leader. The participants were test based on problem solving skills, verbal communication skills (McEvoy et al., 1997; Williams et. al., 2003). The students also felts that their actual communication and problem solving skills were much better when there were put in the actual situation, not during the

test. (Rodrigues, 2005; Thacker & Yost, 2002; Williams et.al., 2003). Study in United Kingdom by Sutherland (2009) found that the more than half of all employees felt that their skill levels were improved after the training.

AlMadhoun (2006) used questionnaire to SME managers in Palestine in evaluating the training effectiveness on reaction, learning and behavior. He found that the managers improved their managerial skills better after the training and some of them had volunteered themselves to be a trainer to train others (AlMadhoun, 2006; Billington, Neeson &Garrett , 2009). The quizzes and tests were based on the course objectives and used to support the learning. The training attended had helped them to perform better compared to others who had not attended the training (AlMadhoun, 2006; Billington et. al., 2009; Castrillion & Cantorna, 2005). They have added that the training also helped the participants to overcome problems that could stop them from doing a good job. Cheng et. al. (2009) have conducted a study to 300 students to test their current skills versus future expectation. At level 2 (learning), the students did well in test immediately after the training and did much better after that where no pressure around them (Cheng et. al, 2009; Johnson et. al., 2009).

The above discussion suggests the learning evaluation include the pre and post test based on the learning objectives, the participants knowledge and skills acquisition after the training, their confident level to train others and their ability to overcome problems when it arises.

2.4.1.3 Behavior

The third level of Kirkpatrick's evaluation is the behavior. The behavior evaluation is the extent of applied learning back to the job implementation. In other word, behavior refers to the knowledge and skills application. Axtell, Maitlis and Yearta(1997) have suggested that effectiveness of training should be based on the extent to which trainees are able to apply the knowledge, skills and attitudes they obtained in the training. Bell and Kerr (1987) and London and Stumpf (1982) have mentioned that the effectiveness of training should be measured by its outcome that is enhancement of the on-the-job (OJT) skills or behavior. A part of " The purpose of organization" is to make them interesting in training that would be to enhance OJT performance. The author agrees with them because by practicing or drilling will improve the skills and performance. Van Scooter (2000) stated that when employees use technical skills and knowledge to produce goods or services through the organizational core technical processes or when they accomplish specialized tasks that support the core function of the organization, the employees are engaging in the task performance. Affective outcomes include attitudes and motivation (Bernardin & Russel, 1998). Systemic strategy such as learning by doing permits the individual to convert knowledge into action with the potential to imbed learning as a way of being into organizational culture (Adams, 2007).

Thacker and Yost (2002) have found change in behavior such as the ability to communicate and write effectively. Improve teaming, trust to leader and peer and problem solving skills are some of the indicator for behavioral change Williams et. al. (2003). A study done by Sparks et. al. (2009) in Australia for apprentices who work for various companies found that apprentice with previous skills and knowledge would be more productive and loyal to the company. The knowledge and skills acquired and applied from previous jobs have increased the capability to do the job, improve their quality of work as well as helping them to build relationship (AlMadhoun, 2006; Sparks, Ingram & Phillips, 2009; Sutherland, 2009). AlMadhoun (2006) found that the managers can make better decision after attending management development program and apply the skills and knowledge to achieve company's objectives. The managers also use their skills and knowledge to train or mentoring others.

Castrillion and Cantorna (2005) have done a survey to 90 manufacturing technology companies in Spain. One of the findings was that the employees had increased their motivation and confident levels. In addition, Castrillion and Cantorna (2005) have used survey questionnaires to measure the training effectiveness for reaction (level 1), learning (level 2) and behavior (level 3). Behavior evaluation of above discussions suggest to include the measurements of the participants motivation, confident level, ability to train other, making good decision, building good rapport among employees and the ability of the

employees to apply the knowledge and skill acquired in achieving company's objectives.

2.4.1.4 Result

Broad and Newstrom (1992) have reported that "…a generous assumption is that perhaps 50% of all training content is still being applied a year after training delivery. Considering our rough estimate of $50 billion spent on formal training per year, that mean a loss of $25 billion a year for training not fully used on the job." Dilemma exists between evaluating for refining purposes or just as a matter of survival. There are additional training outcomes that are useful for evaluating training programs. These outcomes include motivation and return on investment (ROI). Some outcomes can be measured numerically; however, some outcomes cannot be measured especially if it is related to behavior (Phillip, 1991). Kirkpatrick result evaluation is the effect on the business or environment by the trainee. Results are used to determine the training program's payoff for the company trained (Bernardin & Russel, 1998) such as increase in productivity and yield improvement (Forrier & Sels, 2003; Jones, 2005).

Adams (2007) stated that the impact of measurement can be seen from customer satisfaction index, financial impact such as return on investment (ROI) and efficient use of Human Resource. Jones (2005) did a study in

Australia for 871 Small-Medium-Enterprises (SME) included measurement of ROI on process cycle-time, productivity and quality improvement, waste elimination/reduction. The SMEs are also concerned on the manufacturing cost and machine downtime. Most companies expect to reduce manufacturing cost and improve machine uptime so that more products can be produced (Forrier & Sels, 2003; Jones, 2005). Williams et. al. (2003) have studied on leadership and team building for outdoor experiential training calculated ROI based on financial return, improve teamwork resulting in productivity, quality (McEvoy et. al., 1997; Wagner, Baldwin, & Roland, 1991; Shutte et al., 1999) and waste management (Jones, 2005).

The above views suggest many indicators for measuring ROI. For this work, the ROI or result evaluation items are productivity, quality, waste reduction, cycle-time, manufacturing cost and machine downtime. These items are more critical to semiconductor wafer industries and there are within the knowledge of respondents. For semiconductor wafer industries, the above information is sharing during daily/weekly/monthly meeting and during business update by the top management. With all the above views and discussions, the author suggests the measurement levels of training effectiveness for this research, is based on Kirkpatrick's model (reaction, learning, behavior and result). However, as stated in Section 2.3.2, in the evaluation approach is based on respondents' perception.

The next section discusses the contextual factors to training effectiveness of technical program in the company and how each factor affects each level of Kirkpatrick Model of training effectiveness.

2.5 Contextual Factors on Training Effectiveness

One important aspect that the management fails to view is the factors contribute to effectiveness of the training. Some of direct factors could affect the training effectiveness are trainer, classroom, duration, and the relevancy of course. On the other hand, the indirect factors include time, budget, and participant. Training can lead to change, which can lead to organization learning. As a result, enhancement of an organization competence at its current activities that is consistent with richer accumulation of skills and knowledge should lead to a lower risk of mort ability. Besides, leveraging technology 'know-how' can allow an organization to create competitive advantage and ability to profit faster. Moreover, increased individual learning and experience can improve personnel turnover, which has positive impact on organizational effectiveness and productivity (Price, 2001). In order to provide effective training, the factors contributes to the training effectiveness must be taken care so that the amount of money invested is not wasted. Training effectiveness is one of the biggest concerns by the organization as well as to the researchers and practitioners. Effectiveness is the extent to which an activity fulfils its intended purpose or function. It is a measure of how well the learning

objectives are met. The evaluator determines whether the unit meets or exceeds established training standards. Therefore, the process should exist to determine the effectiveness of training (i.e., how well the training is meeting the organization's needs).

2.5.1 Participant

Lee and Dean (1975) have studied on University management training program showed that the length of services indicates negative relationship with the perceived value of training program. This indicates that some senior staff is reluctant to change . The author believes it is much easy to train new employees instead of training the old staff. Younger participants are more prone into accepting changes through supervisory training program (Tai, 2006). This proves that age does play a role in determining the effectiveness of the training program. The author agreed with above statement because age does play an important role in accepting new things.

The employee should have motivation to attend the training otherwise the employee may not learn anything from the training (Al-Eisa et. al.; 2009; Billington et. al., 2009; Mathieu, Tannenbaum & Salas, 1992; Mathieu, Martineau &Tannenbaum, 2006; Owens & Price, 2009; Rodrigues, 2005; Sanlier & Karakus, 2010; Seikkula-Leino et. al., 2010; Tannenbaum & Yukl, 1992; Tsai & Tai, 2003; Yi & Davis, 2003). In a training environment,

motivation is defined as ‘‘the degree to which the learner is willing to make efforts to improve his or her performance of training and work’’ (Robinson, 1985) or the ‘‘special desire of participants to learn the contents of the training program’’ (Al-Eisa et. al, 2009; Noe & Schmitt, 1986; Yi & Davis, 2003). Trainees showed more positive emotional responses when they had higher motivation to succeed in the training (Billington et. al., 2010; Mathieu et. al.,1992; Seikkula-Leino et. al., 2010; Tsai & Tai, 2003; Yi & Davis, 2003).This was found to be proportionately related to improvement of work performance after the training (Seikkula-Leino et. al., 2010; Williams et.al., 2003).Another factors are appropriate selection and enabling of trainee’s participation (AlMadhoun, 2006; Rodrigues, 2005). Hence, allowing those who will be trained to select and participate in proper training programs (Pau, 2001; Tai, 2006). Trainability is determined by the trainees’ level of ability and motivation for learning (DeSimone & Harris, 1998; Sanlier & Karakus, 2010; Tsai & Tai, 2003). The importance of learning motivation is expected to be the same in online education situations as well (Owens & Price, 2009; Tai, 2006).

Hooi (2010) and Lam and Kong (1994) have studied companies in Malaysia conglomerate noted that there were lack of awareness and clarity on the part of participants on the organization’s training objectives and expectations vis-à-vis their own perceptions in meeting their own aspirations and needs. Their findings also confirmed that the common failure of the part of the organization to facilitate learning transfer by not providing opportunities for pre-course

briefings and post-course debriefing (Tai, 2006). The study also found that the participants were unable to recall the titles or subject area of previous training programs which they have attended. In addition, the course of poor learning transfer was found to be the obstacle caused by their superiors or their own attitude (AlMadhoun, 2006). Several training practitioners (Billington et. al.. 2009; Clark, 1991; Noe, 2005; Tannenbaum and Yukl, 1992; Tews, 1995) stated that motivated trainees take a more active role in training and get more from the experience than individuals who were not motivated. The motivated trainees believe everybody has the opportunity to learn something new while they are in the job regardless whether they are new or experience worker (Tai, 2006). In addition, the research literature provides some convincing evidence that those who are motivated to attend training are more likely to learn and apply their newly acquired knowledge and skills once training had been completed (Billington et. al.. 2009; Noe, 2008, Tai, 2006; Tews, 1995).

Billington et. al. (2009), Charles and Brian (1996) and Hooi (2010) have suggested the training's participants must be actively involved in the learning process and followed by reinforcement. They added that, the participants need to be informed about the benefits of their training.Billington et.al. (2009) and Rossett (1997) have experienced although the aftermath of a training course could be wonderful with participants applauding and passing great remarks about the training, there may be a deviation from what is supposedly meant to be. Both added that employees must be sufficiently prepared for the training in

order to help them to get the most from the training. For training to be effective, the participants need to be equipped with knowledge about another culture and deploys learning through discovery and hands-on style (Aung & Arias, 2006; Tai, 2006). The assessment before, during and after the program should be carried out to evaluate the training effectiveness. ("Development and Learning," 2005; Kirkpatrick, 1975, 1979). It is suggested that a good evaluation system is a collaborative process including participants and evaluators (Lingham, Richley & Rezaria; 2006).

2.5.2 Trainer

Flippo (1976) outlined the effectiveness of the training can be measured at any level. The measurement can be done to the training program itself, the trainer, the material, the results and the organizational support (Pau, 2001, Tai, 2006). It is suggested that a good evaluation system is a collaborative process including trainers (Lingham, Richley & Rezaria; 2006). No doubt, trainer plays an important role to make the training lively by checking whether the trainee understood the subject being thought (Tai, 2006). It is important for the trainer to know more about the trainees at the beginning stage of training to make sure its effectiveness. In other word, the trainer must well-prepared before conducting the training. This will help trainer do their job properly (Keith, 1997, Pau, 2001; Tai, 2006).

AlMadhoun (2006) conducted a study in Palestine for management development program to Small Medium Enterprise (SME)'s managers found that the delivery, communication and presentation skills and facilitation skills of the trainer are the main factor to contribute to training effectiveness. This is supported by studies of Seikkula-Leino et. al (2010) and Thacker and Yost (2002) to teacher and trainer where the trainer had to ensure the teacher able to learn and reflect their learning activities in effective way by effective communication skills and make the training environment fun. The trainer was also responsible to structure the training program appropriately (Rodrigues, 2005). Sparks et. al. (2009) have conducted a study in Australia to apprentice concluded that the skillful and knowledgeable trainer helps the apprentices to understand and appreciate of work, later become more productive and loyal to the company. On the other hand, the facilitation skills and knowledge about the subject matter are two important criteria for trainer when facilitating e-learning program (Johnson et. al., 2009; Sparks et. al., 2009). Tai (2006) in his study to MNCs in Malaysia further added the other responsibilities for trainer to ensure the training becomes more effective by managing the time effectively (Castrillion & Cantorna, 2005), giving real-life examples and relate each activity to the overall objective.

2.5.3 Training Material

Boyce (1996) mentioned that adults are quickly frustrated and develop poor attitudes towards training if they feel their time is wasted on material that is not useful. Attitudes are predisposition to behave in a certain way of tendency to response positively or negatively towards a certain things (Elangovan & Karakowsky, 1999; Jones, 2005; Johnson et. al., 2009; Rodrigues, 2005). Attitude is related to value and belief (Boyce, 1996; Johnson et. al., 2009).

Brinkerhoff (1987) stated values and beliefs held by a person are based upon their experiences that result to their own behavior. Barcala et. al. (2000), Brinkerhoff (1987), and Smith and Hayton (1999) have touched on the fact that HRD programs are sometimes designed and run when they are not needed at all. They also found the irrelevant content will not lead to effective achievement of training objectives. Al-Khayyat and Elgamal (1997) and Brinkerhof (1987) have put the reason for non-achievement of training objectives is perhaps due to the participants' characteristics such as age, gender, level of education, work experience, marital status, perception of training, and aptitude. They also elaborate that even though the programs are needed and done well, the learning never gets used because conditions in the workplace are unwelcoming to the HRD outcomes. Sometimes, even though the HRD is needed, it is not wanted and its value is not recognized by the trainees.

Alliger and Horowitz (1989) , and Barcala et.al. have suggested the importance of content in program design so that it can be used now and in the future. In addition, the training content should not be too long or too short or too details (Anonymous, 2007; Pau, 2001; Smith & Hayton, 1999) and must be relevant to the job (Pau, 2001). Pau (2001) further added that the training material should be equipped with pictures and diagram in order to increase the level of understanding. Study by Jones (2005) to 871 SMEs in Australia shows that the quality of material will help to increase the learning process. In addition, by using simple language will the participants understand the content much better (Jones, 2005; Johnson et. al., 2009).

2.5.4 Training Program

Lee and Dean (1975) have found that if the managers felt the program they attended had increased their effectiveness in their job, there might be some rewards for the improvement. They also found that the salary increments were given as a tool to recognize job improvement resulting from the effectiveness after training program. On the other hand, promotion will be given to certain people as part of the recognition too. Another finding was that the professional employee category showed the highest of relationship between the training program and job rewards. However, reward is only a short-term recognition. We need to look at the long-term recognition and create learning organization to booster employee's performance (Senge, 1990).

Barcala et. al (2000), Bramley (1996) and Harrison (1994) have assumed that by implementing a training program, the goals and objectives of an organization can be more easily met. It is also mentioned that many training offerings are intended to provide solutions to assumed skills, knowledge and attitude deficiencies (Kirkpatrick 1959, 1975, 1979; Castrillion & Cantorna, 2005). However, in reality, some of the training is developed and delivered without attempting to identify the expected results or benefits (Jones, 2005).

Johnson (1993) and Karuppaiya (1996) have listed down the merits and demerits of in-house training and development programs. An in-house program has a great potential – cost saving, increased commitment, self-education possibilities, and improved leadership skills. Karupaiya (1996) further added the important of the training program to be interesting and easy to understand (Pau, 2001) so that the trainees will not get bore. Dedicated employees support the efforts to match the needs of the organization and its people to the requirements of a quality training program. In turn, all participants benefit from the experience once the training program met the overall expectation (Barcala et. al., 2000; Smith, Oczkowski, Noble, & Macklin, 2003; Castrillion & Cantorna, 2005). Dessler (2005), Ivancevick (1995), and Noe, Hollenback, Gerhart and Wright (2009) have pointed out that most training and development activities focus on the individual, with the objective of enabling him or her to become more effective in the job.

Purushotman, a leading local corporate trainer and also a manager of Motorola Training and Education Centre interviewed by Ang (1997) said that "… there has to be a focus and objective for training, if there is no habit change elicited among the participants, then the training is meaningless….".Swaminathan (1998) in his study try to determine whether in-house training program has been effective for two groups of supervisors and production operators and whether there is a relationship between age, gender, education level, working experience, residence and course duration with the effectiveness of training. His findings revealed that there was significant difference in the amount of knowledge acquired by the supervisors and operators with supervisors having higher scores. The study also found that gender had a significant effect on the relationship between designation and reaction to knowledge. In particular, male respondents react more positively to knowledge than female respondents irrespective of designation. Interesting enough, the results of this study also shows that marital status, work experience, resident background, age and course duration have no effect on the relationship between designation and effectiveness of training.

Barcala et. al (2000) addressed the important of training program must be relevant to the job. While, Chella (2006) contended that training empowers and add value to the participants, thereby enabling them to seek better employment opportunities beyond the present organization. As a result, instead of retention

it becomes attrition! This study in- line with the contention that individual will invest in the enhancement of human capital's value when it is perceived that the investment will yield direct or indirect financial outcomes for the individual (Graf, 2006). These outcomes will enhance the individual's employability. Tai (2006) stated another important aspect when designing the training program where the trainer must use suitable example and relevant exercises that are relevant to trainees' job so that they can easily understand the topics.

Van Wart, Cayer and Cook (1993) have stated that conceptual training may be less agency specific than technical training, but the focus remains on immediate use of skills and knowledge learned. Technical training is a type of training that tends to be specific to a job or agency (Van Wart et. al., 1993). Technical training can be divided into three categories that are procedural, mechanical and professional. Procedural training is a form of technical training that focus on procedures, rules, laws, policies, or codes that are required for compliance with agency mandates and for coordination and flow of work. The most common type of procedural technical training is new-employee orientation, which focuses on employee benefits and agency policies. Mechanical technical training focuses on how they are built, how they can be fixed, and how they can be maintained. Manual or physical skills are large part of the training. One of the most common types of mechanical –technical training is computer skills training, such as MSExcel, MS Words, or computer

graphic package. Professional-technical training focuses on the select knowledge, skills, and abilities needed by practicing professionals in performing their jobs. On the other hand, the technical training for semiconductor industry includes Semiconductor Processing, Yield Management, 6-Sigma, Reliability and many others. For this work, the author selects the Yield Management training program as the subject to be studied classified as independent variable.

2.5.5 Company

Naisbitt and Aburdene (1990) have contended that the economies of the world are now interdependent. Consequently, major companies are allowing, encouraging, and sometimes subsidizing their employees' education in order to become more competitive and to increase their chances for survival in a world economy. Saiyadain and Juhary (1995) conducted a study on managerial training in Malaysia and their findings on training effectiveness showed that most organization seem to lack the formal mechanisms to access training effectiveness. They suggested that top management attitude is important for training to be effective. It is suggested that a good evaluation system is a collaborative process, a co-creation by organizational leaders, trainers, participants and evaluators (Lingham, Richley & Rezaria; 2006).

Chyau (1995) examined the impact of HRDF implementation on the Malaysian training industry. He concluded that companies which practice result-oriented training do not selectively train employees with more formal education. Neither do they provide more training for those with more work experience. Furthermore, there is no significant evidence to imply that companies which practice result-oriented training have a lower turnover of employment (Castrillion & Cantorna, 2005; McGettingan & O'Neil, 2009).

Though the success of training primarily relies on a program design itself, maximum training effectiveness cannot be achieved without subjective factors such as organizational support (Tai, 2006). Noe (1986) in particular argued that knowledge interaction between senior managers and employees has a great impact on the work-site application rate. In other words, though the trainees were properly trained, they cannot fully apply it to the workplace if there is not enough support or the surroundings are not conducive for such application.

Nusurdin (2001) have found that hotel's employee perceived organizational support had an indirect effect on employee behavior. Nasurdin, Ramayah and Jaafar (2003, 2005) have found that perceived organizational support significantly and positively affects organizational behavior. These results suggested that a supportive organization would reflect a caring workplace. These findings were supported by three important factors that were idea generation, management support and amenable of environment conditions

(Kamal, 2004). Moreover, the important key to make an effectiveness training is experiences the sensation of success and movement and not theory at all (Alan, 2005). On the other hand, Tanova and Nadiri (2005) have found that business organizations are more likely to invest in specific training that build common skills.

Tsai and Tai (2003) conducted a study in Taiwan for manufacturing companies found that the companies really support employees' training by encouraging and informing them to attend the training. This is supported by Jong and Hartog (2007) where some companies invested a lot of money to train their employees. The training is given the priority so that the knowledge and skills can be improved (Anonymous, 2007; Karuppaiya, 1996). Most of MNCs, provide on-line system for training registration and set auto-reminder. All employees are given a list of training to be attended within specific period of time. With the on-line system, the training administration will be become more efficient and effective. Hence, the company realizes the amount invested in the training will help the organization in-term of return-of-investment (McGettingan & O'Neil, 2009; Nisar, 2002).

2.5.6 Working Environment

Van Scooter (2000) highlighted the focus on behaviors that are more discretionary and interpersonally oriented than task performance, but are still expected to meet important organizational needs. Knight, Kagan and Buriel (1982) have found people were born with the propensity toward pro-social behavior such as friendliness and cooperation. All these concepts also highlight behaviors that involve cooperation and helping others in the organization (Motowidlo & Van Scooter, 1994). Brief and Motowidlo (1986) have defined as behaviors exhibited by members of organizations with the expectation that the behavior will bring some kind of benefit to the organizations, groups and individuals at which the behavior are directed. Organ (1988) looked at behaviors that are functional for the organization and extra-role in nature. Van Dyne, Graham and Dienesch (1994) used the term "extra-role behavior" and this construct had been hypothesized to contribute to organizational effectiveness. The employees may then feel morally obligated to respond to such support with increased effort, and displaying organizational behavior and loyalty (Eisenberger, Huntington, Hutchison & Sowa, 1986). Consistent with this notion, providing work life benefits and other types of employee support is likely to elicit citizenship behavior (Lambert, 2000). Podsakoff and MacKenzie (1997) have indicated that organizational behavior may influence organizational and training effectiveness through a wide variety of mechanisms. For example, helping peers with work-related problem is likely to result in improved productivity for the work group, good sportsmanship may

enhance the morale of the work group and thereby help to reduce employee turnover. If organizational characteristics are the main determinants, then organizational leaders need to take actions to increase behavior among employees (Organ & Konovsky, 1989).

Ellis (1965) stated that work environment have an impact on the training effectiveness. The working environment includes the support from management and peers, and the nature of work (Barcala et. al. 2000; McGettingan & O'Neil, 2009;Tai, 2006 Thacker & Yost, 2002). Employee helping someone cover up performance problem (Moorman & Blakely, 1995) or helping co-workers achieve personal goals at the expense of an organization (Schnake, 1991). LePine, Erez and Johnson (2002) have stated that some scholars and practitioners have only focused on activities that are directly related to the transformation of organizational inputs into outputs in evaluating employee performance through training and development but neglected activities that are support the social and psychological context in which the organizational technical core was embedded. Borman and Motowidlo (1997) referred to the former set of activities as "task performance" and the later that support the social context as "contextual performance".

Studies by Al-Eisa et. al. (2009), Pau (2001), and Tracey, Tannenbaum, and Kavanagh (1995) have found a direct relationship between an organization's culture and climate and the use of skills that were acquired in a formal training

program. The above studies demonstrate that the work environment may have a significant impact on preparation for training and the eventual transfer of training to the job.

Formal organizational systems, particularly the appraisal and reward systems, represent the third element of the work environment that can influence training effectiveness. The training professionals definitively stated that there must be some type of accountability for trainees to use their newly acquired knowledge and skills. Performance-appraisal systems should also be used to account for the training employees are expected to demonstrate (Smith et. al., 2003).

Mirza and Juhary (1993) have conducted study on the training functions and training needs for managers in Malaysia on 27 organizations. The results suggested relatively mild commitment of the top management to training and some resistance by middle management to the function of training. Overall, the study found that training seems to be active but was given low priority. The results also showed that some managers sponsor their subordinates to training programs to reward them for good work or pass problem managers to trainers for training duration (Al-Eisa et. al., 2009).

David (1997) in her study tried to create a better understanding of the importance of supervisors in the local manufacturing industries in facilitating training effectiveness. The aims of the study to find out whether perceived supervisors' support affect the effectiveness of training in the local

environment and whether the effect of perceived supervisors' support on the training effectiveness was influenced by gender, educational qualification and experience. Her findings to this study concluded that perceived supervisors' support was an important element in ensuring training effectiveness. The results of the study shows that there was no significant effect of educational qualification, working experience or gender on training effectiveness neither was there a moderating effect caused by these variables. On the other hand, Winkler (2009) conducted a study to students in German to understand the social integration between the superior, peer and management. The results showed that there were positive relationships between all of them.

According to Dan and Amanuel (2005) the important parts in training effectiveness is a number of contextual and work environment factors. They also found that the highly motivated trainees would be one of the factors to training effectiveness. They further added that it is more likely to see the training as a means to obtain some future benefits. Besides that training motivation also has a positive relationship to training effectiveness. They also added other factors to training effectiveness were the supervisors support and differential interventions. It will be focus on the continuous-learning culture. Other factors that affect the training effectiveness are the classroom arrangement (Barcala et. al., 2000) and meals. The seating arrangement of training varies depending on type of training. Classroom training requires different setting as compare to workshop training. (Al-Eisa et. al., 2009, McGettingan & O'Neil, 2009; Smith et. al., 2003)

Beside former trainer, Beal (2007) found that leader can also assist in developing effective training program. She quoted a history where Lt. Scott Swearengin has "long been seen as an innovative leader" during his 17 years at Western Missouri Correctional Center (WMCC). According to Missouri Department of Corrections Director Larry Crawford, Swearengin is well-known for his training and staff recruitment programs at WMCC, a maximum-security facility that houses about 1,900 male inmates. Swearengin has developed two supervisory programs. The first was known as Supervisor's Camp I. It provides two days of training for experienced supervisors (as a refresher course) and for newly promoted supervisors who need working knowledge before completing supervisory classes. Swearengin's second supervisory program is called Supervisor's Camp II. An ACA video is used in this training program, which focuses on developing leadership skills.

2.5.7 Technology

Merriam and Caffarella (1991) have identified three major areas of change that influence adult learning which are demographic, economic and technological changes. They further added, in making their judgments of the training, managers will question whether the efforts expended have produced more effective, efficient, flexible employees; faster results in making newcomers knowledgeable and effective than would follow from experience; more effective or efficient use of machinery, equipment and work procedures; fewer requirements to implement redundancy by retraining; fewer accidents both

personal and to property; improvements in the qualifications of staff and their ability to take on tougher roles and lastly better employee loyalty to the organization with more willingness to innovate and accept change.

Williams et. al. (2003) have stated very important for training administrator to provide suitable training equipment to support the outdoor training activities. Further to that, Wong (2004) addressed the training room must be bright enough so that the trainees will not fall asleep. He highlighted the case where some Hotels only have dim light that was not good enough to support the learning process (Pau, 2001; Rodrigues, 2005). On the other hand, Sanlier and Karakus (2010) have found the well-arranged furniture such as racks, tables and chairs will foster the learning activities and attract the employees to attend the training program (Harvey et. al., 2001; Kubiak & Bertram, 2010). The training becomes effective when more consumers attract to come to supermarket not only due to product but to the services provided by the supermarket's employees (Harvey et. al., 2001). Study in United Kingdom (UK) by Owens and Price (2009) on two UK Higher Education Institutes have realized that new technologies not necessarily make their institution more friendly. In addition, new technology may not necessarily improve learning activities (Barcala, et. al., 2000; Kassim et. al., 2006).

In view of all the above discussions in Section 2.5, the author has summarized and selected the contextual factors for this study includes the participant,

trainer, training material, training program, company, working environment, and technology.

2.6 Summary

In this chapter, the definition of training, the learning process, evaluation model, evaluation methods and training outcomes have been discussed in details. The author shares the training and development at semiconductor industry especially in semiconductor wafer fabrication in Malaysia and highlights the findings from previous researchers on the contextual factors or determinants to effective training. The Kirkpatrick training evaluation model and his approach have been discussed and debated based other management practitioners and scholars. The author has concluded to use Kirkpatrick model in evaluating the training effectiveness but using self-report approach in his work. This chapter also discussed in detail the contextual factors that affect the training effectiveness such participant's attitude, trainer, training program, training material, organization support, technology, working environment. The effectiveness can be categorized into four categories as reaction, learning, behavior and result. Many researchers have emphasized the training effectiveness of the training program conducted. However, this research discusses other contributing factors to training effectiveness which also include training program as one of the factors. The training effectiveness can be seen from the evaluation conducted before and after the training and whether the

objectives are met. There are many evaluation techniques to evaluate the training effectiveness. The most popular model introduced by Kirkpatrick. Other models include CIPP and CIRO. In this study the training evaluation model is developed to evaluate the relationship between the contextual factors or training determinants and the training effectiveness. The training is effective if there is some change in any of the above factors. In the next chapter , the author will discuss the research methodology, research framework and create hypotheses that were based on this chapter.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter discusses the research methodology include research design, type of study undertaken, conceptual framework, types of sample, data collection techniques, instrument for data collection, hypotheses, and data analysis techniques. This study is an applied research (Zikmund, 1994; 2000). It has been undertaken to answer questions about specific problems or to make decision within the given field. Its intended use is to add to research based knowledge. As for the approach, this study is a discipline research. Data analysis for this study is a quantitative type. The effectiveness level of the trained employees were analysed based on the data gathered from respondents perception and experiences.

3.2 Research Framework

The literature discussed in Chapter 2 seemed to suggest that factors such as participant, trainer, training material, training program, environment, the organization or company, and technology have a positive influence to the performance of the employees especially the technician, engineer and manager. In this study, those factors are the independent variables (IV) and training effectiveness is the dependent variable (DV).There are situations where a doctoral research framework can use a direct relationship between the

independent variable and the dependent variable (Dania, 2005; Smith, 2009; Wallace, 2009).

According to Kirkpatrick (1975,1977) training effectiveness can be divided into four categories:

1) Reaction – how participants rate the overall training program that include the trainer competencies, training material, training equipment used (technology), administration of training, trainer and training environment.

2) Learning –this evaluation refers to the skills and knowledge acquisition (pre and post test). Normally, the trainer evaluates the participant's understanding by giving pre and post test. The pre-test will be given just before the training and the post-test will be given just after the training. However, for this study, the 'learning' evaluation was done by the participants based on their perception as discussed in Chapter 2.

3) Behaviour – this evaluation refers to the skill and knowledge application (pre and postevaluation). Basically, the pre-evaluation will be done by the immediate supervisor of the participant before the training takes place. The post-evaluation will be done again after certain period of time after the participants back to the job. They need to be at the job for a certain time to

observe whether the participant applies what s/he has learnt from the training (Kirkpatrick, 1994, 1996, 2005).

If the same supervisor is no longer supervising the said employee, the evaluation should be done by head of department since the new supervisor may not be able to gauge and compare previous employee's performance. However, for this study, the 'behaviour' evaluation was done by the participants based on their perception as discussed in Chapter 2.

4) Result – this refer to return on investment. Hence, to evaluate whether the training can bring some return to the organization such as productivity and quality improvement, improve in cycle-time (work), reduce waste and cost saving. Again, as discussed in Chapter 2 (Literature Review), the evaluation will be done by the participants.

The aim of this study is to identify the contextual factors that affect the training effectiveness in Silterra Malaysia Sdn Bhd., the wafer fabrication company. The theoretical framework (Figure 3.1) indicates the relationship between two types of variables which are independent and dependent variables. Independent variables consist of contextual factors that affect the training effectiveness such as participant, trainer, training material, training program, working environment, the organizationor company and technology. Dependent variables is the training effectiveness such as reaction of participant,

knowledge and skill acquisition, knowledge and skill application and lastly the return of investment (ROI).

Data analysis for this study was a quantitative type. The effectiveness level of the trained employees are analysed based on the data gathered from technical staff of Silterra Malaysia Sdn. Bhd.

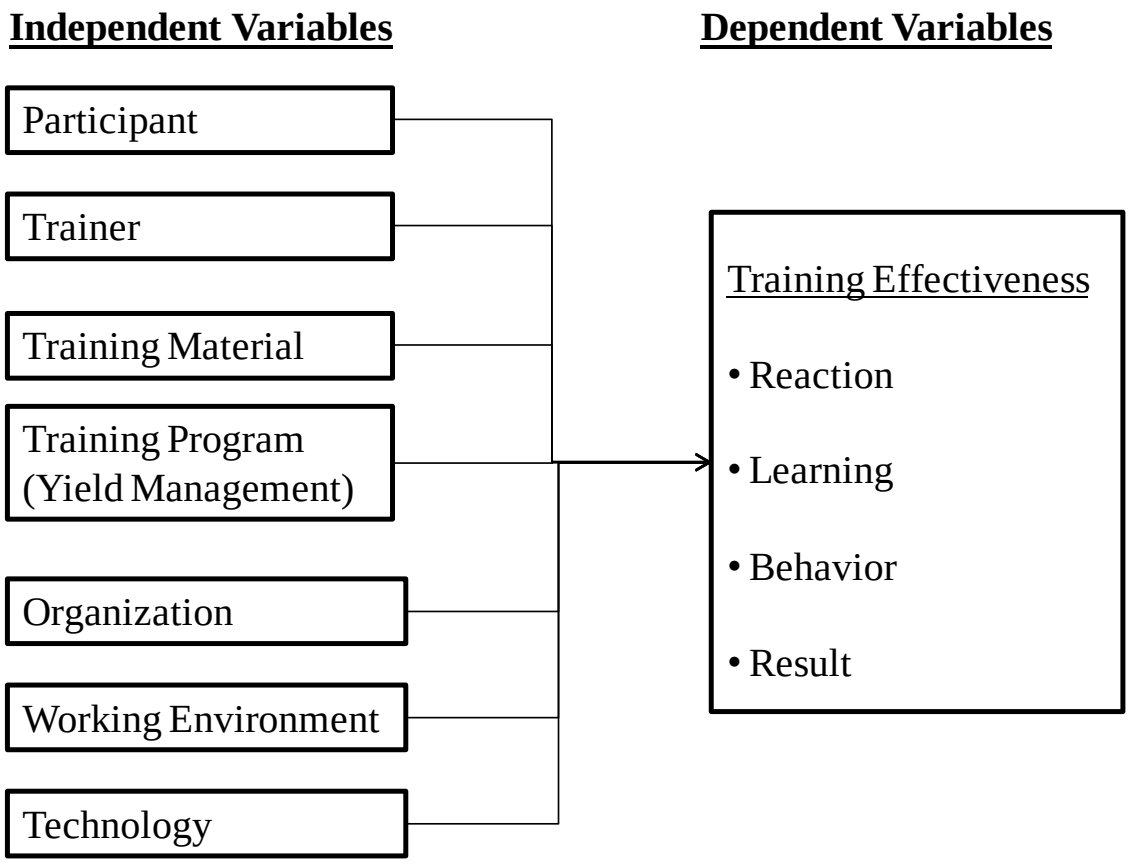

Figure 3.1: The Research Framework

3.3 Research Hypotheses

The hypotheses were set to identify the direct relationship between contributing factors and training effectiveness, besides proving that those factors are important in ensuring that the training program conducted adds value to the organization. Thus, it is worth to conduct the program for all employees. It is also to find out whether all the contextual factors had contributed positively to training effectiveness. In addition to that, it was also to see whether the training conducted so far had achieved the training objectives. Twenty eight (28) hypotheses have been derived in this research (Table 3.1). There are as follows:

Table 3.1 The Study's Research Hypotheses

No	Hypothesis
H1	There is a relationship between participant and reaction.
H2	There is a relationship between participant and learning (knowledge and skill acquisition).
H3	There is a relationship between participant and behaviour (knowledge and skill application).
H4	There is a relationship between participant and result (ROI)
H5	There is a relationship between trainer and reaction.
H6	There is a relationship between trainer and learning (knowledge and skill acquisition).
H7	There is a relationship between trainer and behaviour (knowledge and skill application).
H8	There is a relationship between trainer and result (ROI)
H9	There is a relationship between training material and reaction.
H10	There is a relationship between training material and learning

	(knowledge and skill acquisition).
H11	There is a relationship between training material and behaviour (knowledge and skill application).
H12	There is a relationship between training material and result (ROI)
H13	There is a relationship between training program and reaction.
H14	There is a relationship between training program and learning (knowledge and skill acquisition).
H15	There is a relationship between training program and behaviour (knowledge and skill application).
H16	There is a relationship between training program and result (ROI)
H17	There is a relationship between organization and reaction.
H18	There is a relationship between organization and learning (knowledge and skill acquisition).
H19	There is a relationship between organization and behaviour (knowledge and skill application).
H20	There is a relationship between organization and result (ROI)
H21	There is a relationship between working environment and reaction.
H22	There is a relationship between working environment and learning (knowledge and skill acquisition).
H23	There is a relationship between working environment and behaviour (knowledge and skill application).
H24	There is a relationship between working environment and result (ROI)
H25	There is a relationship between technology and reaction.
H26	There is a relationship between technology and learning (knowledge and skill acquisition).
H27	There is a relationship between technology and behaviour (knowledge and skill application).
H28	There is a relationship between technology and result (ROI)

3.4 Research Population and Sampling Technique

The research population comes from wafer fab company called Silterra Malaysia Sdn Bhd.According to HRD Manager of Silterra Malaysia, the number of technical staff in this company was1306.Marczyk, DeMatteo and Festinger (2005) and Tai (2006) have found that the participants were unable to recall the titles or benefits of previous training programs which they have attended long time ago. Tai (2006) suggested the longest duration for the respondents to participate in his study to be less than two years. Furthermore, the respondents must attend the training at least three months ago prior responding to the questionnaire (Kirkpatrick, 1994, 1998, 2005). New employees which was less than three months with the company may not be able to relate the job application and return on investment after attending this training (Carliner, 1995, Marczyk et. al., 2005; Tai, 2006). Therefore, only 294 technical staff consist of technician, engineer and manager are suitable for this research since the date of them attended the training was between three months to two years. Hence, as at November 2010, it was 22.5% (i.e. 294 employees) of the total technical population of Silterra Malaysia Sdn. Bhd. were suitable to participate in this survey.

The rules of thumb proposed by Roscoe (1985) (cited in Sakaran, 1992) such as that sample size larger than 30 and less than 500 are appropriate and the sample size should be several times (preferably 10 times or more) as large as

the number of variables in multivariate study (including multiple regression analysis).

In this study the data received for the analysiswas 194(194/294 = 66%)where good enough and met the proposed criteria. The research samples indicate homogeneity in their character.

3.5Research Instrument – The Survey Questionnaire

The distribution of questionnaires was used to collect data.The questionnaire comprised four main parts – the information about the respondent, about the Yield Management training program, the contextual factors affecting training, and the training effectiveness.

The research model guided the construction of the questionnaire. Questionnaire method avoids biases of the researcher (Sadri & Snyder, 1995; Spatz & Kardas, 2008). It provides the feeling of anonymity to the respondents who then tend to give genuine responses, places less pressure for immediate responses and enables researchers to measure perceptions relatively in more accurate way (Emory, 1985; Schmitt and Klimoski, 1991).

The questions set in English language only because all the respondents can understand English language. The questionnaires were distributed to them

through direct hard copies by the HRD Manager and his team of Silterra Malaysia Sdn. Bhd.Out of 294 forms, 201 survey forms received, only 194 survey forms were completed. Data collected by 194 employees were processed using SPSS for Window – Version 17.0.

First pilot run was done to technician and engineer of First Solar Malaysia Sdn. Bhd. to check their understanding of the questionnaire. There were no feedbacks on the words used and construction of sentences that confused them. This is because, simple words had been used and certain sentences were reconstructed. Therefore, the author concluded that the questionnaires were good to be used for data collection at Silterra Malaysia Sdn. Bhd.

3.5.1 Yield Management Training Program

Yield Management training program has been selected for actual study. Yield Management training program is a technical training program designed for all technical staff at Silterra Malaysia Sdn. Bhd. This program is made compulsory to all technicians and engineers, and is classified as a Core Program for them. They must complete this training program during their probation period, otherwise their probation period will be extended till the completion of the program. In addition, the other categories of staff are recommended to attend this program since it covers a very important subject in semiconductor wafer business.

The objectives of Yield Management training program are to provide the participants with the knowledge on yield or quality, calculating the yield, the impact of poor yield to the company and customers, and actions to be taken before and after to ensure the yield of the product meets the customer's expectation. This program is workshop-based as it involves classroom discussion and exercises. There are a few exercises in this training program which show the participants on how to calculate the yield, manufacturing cost, and wastage. To further consolidate, the participants are made to practice in improving the final product. The participants will also realize the importance of being alert in their work since every step of their work in producing the semiconductor wafer will have an impact on the product yield, productivity, operation cost and wastage. Therefore, their commitment is crucial to their work.

The duration of this program is about six hours and sometimes it could be extended to 7 or 8 hours, depending on the number of participants and the speed of the participants in completing the exercises. Normally, the training coordinator books the participants' time for 8 hours which is equivalent to one-workday for the purpose of this training.

3.6 Measurement of Variables

All variables in this study were measured by Likert 5-point rating scale. The total 90 items were constructed consist of 56 items represent the Independent Variables and 34 items represent the Dependent Variables. The 60 items (67%) were adapted and 12 items (12%) were adopted from previous researches (Al-Eisa, Furayyan &Alhemoud, 2009; Barcala, Martin & Gutierrez, 2000;Barker, 1997; Harvey, Bolam, Gregory &Erdos , 2001; Karuppaiya, 1996; Kassim &Ahmed Abdulla, 2006; Kubiak & Bertram, 2010; Pau, 2001; Price, 2001; Tai, 2006; Yi & Davis, 2003; Wilson, 2000). The remaining 18 items (20%) were constructed by the researcher.

As for adaptation, some of the items had been revised and restructured for easy understanding of the respondents. The feedbacks from the pilot runs were taken into account when restructuring the statements or questionnaires.

The statements agree or disagree were used to get the response from the respondents.

3.6.1 Measures of Independent Variables

The independent variables in this study were the contextual factors to the success of Yield Management (YM) training program namely participant, trainer, training material, training program, organization,

workingenvironmentand technology. All the determinants to training effectiveness were measured with the total of 56 items were derived from previous studies and developed from by the researcher.

3.6.1.1 Participant

Participant refers to participant's motivation to attend training, prior knowledge and skills before attending the training and their attitude towards training.

Ten items were derived to test the relationship between the participant and training effectiveness. Four items were adopted from Yi and Davis (2003) and modified slightly by Al-Eisa et. al. (2009). The items are as follows;

1. I am very much excited about attending this training program
2. I was interested in learning the training material that will be covered in this training program.
3. I had learnt as much as I can from this training program.
4. I was motivated to learn the training material that will be emphasized in this training program

Two items were adopted from Tai (2006) and slightly modified by the author which are as follows:

1. I have the prior skill and knowledge before attending this training program
2. My job has provided me opportunities to learn knowledge and skills related to this training program.

One item was adopted from Guthrie and Schwoerer (1994) and also modified slightly by Al-Eisa et. al. (2009) and the author which is "I am confident that I can succeed in this training program". In addition, one item was adapted from Pau (2001) which is "I believe that I can perform better job after attending this training program".

The balance two items were constructed by the researcher as follows:

1. I attended this training program willingly
2. I was informed about the objectives of this training program

Respondents indicated their agreement or disagreement with the statement and using the following five-point rating scale.

1- Strongly disagree
2- Disagree
3- Neutral
4- Agree

5- Strongly Agree

3.6.1.2 Trainer

For Yield Management program, the trainer refers to the ability to deliver the training material to the target participants effectively. It includes the ability of trainer to facilitate the class, communication and presentation skills, trainer's skills and knowledge of Yield Management subject and the attitude of the trainer in conducting the training program.

Nine items were derived to test the relationship betweenthe trainer and training effectiveness. Four items were adapted from Pau (2001). The items are as follows;

1. The trainer is knowledgeable in the subject matter
2. The trainer has good experienced in the subject matter
3. The trainer has good communication skill
4. The trainer has good presentation skill

Four items were adopted from Tai (2006) and there are as follows:

1. The trainer checked whether the participants understand the topics.
2. The trainer knows how to manage time effectively

3. The trainer was well prepared
4. The trainer explained how each activity related to the overall objective

The balance one item was constructed by the researcher: “The trainer failed to show suitable examples or practical application of the concept taught”

Respondents indicated their agreement or disagreement with the statement and using the following five-point rating scale.

1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

3.6.1.3 Training Material

Design and structure of the training material will help the participant to understand the topic well. Another element for effective training material were the relevancy of the content, amount of content and presentation or the flow of the content.

Nine items were derived to test the relationship between the training material and training effectiveness. Two items were adapted from Pau (2001). The items are “The course content is not too details “ and “The course content is relevant to my job”

Five items were adapted from Barcala et. al. (2000)which were as follows:

1. The printed material is easy to read.
2. The course content is easy to understand.
3. The course content is well structured.
4. The material will provide a useful reference in the future.
5. The printed materials and other handouts are well organized.

The balance two items wereconstructed by the researcher: “The picture/diagrams shown are good” and “The material will provide a useful reference in the future”.

Respondents indicated their agreement or disagreement with the statement and using the following five-point rating scale.

1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

3.6.1.4 Training Program

Training program refers to one of the technical training programs conducted for technical employees of Silterra Malaysia Sdn Bhd. which is Yield Management training program. The important element in designing the training programs are relevancy to the job, meeting the company objectives, meet the employee's expectation and it must be easy to understand and interesting. Yield Management training program is made compulsory for all technician and engineer of Siltterra Malaysia Sdn. Bhd. to attend while they are at probation period. Failure to comply will result to not confirming as permanent employee. Yield Management will help the technician and engineer to understand, calculate and improve the quality, productivity, anticipated cost and associate wastage. By understanding and applying the knowledge and skills of this training program, the technician and engineer will help to improve the quality, productivity, cost and waste (Tai, 2006). Hence, bring ROI to the company. Therefore, Yield Management training program was chosen for this study.

Nine items were derived to test the relationship between the Yield Management training program and training effectiveness. Three items were adopted from Pau (2001) which are as follows:

1. The training program is easy to understand
2. The training program meet the company's objectives
3. The duration of training is not too long or too short.

One item was adopted from Karuppaiya (1996): "The training program is interesting" and one item was adopted from Barcala et. al. (2000) which was "The training program is relevant to my job". In addition, one item was adapted from Barcala et. al.(2000) which was "The training program is reached to my expectation". One item was adapted from Tai (2006) and divided by the researcher into two items which are as follows:

1. The examples used in this training were relevant to jobs
2. The exercises used in this training were relevant to jobs

The balance one item was constructed by the researcher: "I found this program is boring." This item is contradicted with item taken from Karuppaiya (1996) above. This item was included in the measurement to test consistency of the participants.

Respondents indicated their agreement or disagreement with the statement and using the following five-point rating scale.

1. Strongly disagree
2. Disagree

3. Neutral
4. Agree
5. Strongly Agree

3.6.1.5 Company

The company refers to the support given by the organization (i.e. Silterra) such as allocating budget for the training, set training goal, and set priority for employees to attend training. Six items were derived to test the relationship between the organization (Silterra) and training effectiveness. Two items were adapted from Karuppaiya (1996) which are as follows:

1. My company sets priority for me to attend this training program
2. My company informed me to attend this training program.

The balance four items were constructed by the researcher. There were as follows:

1. My company communicates to all employees that this training program is very important.
2. My company allocates budget for this training program every year.
3. My company concerns on return of investment (ROI) of this training program

4. My company does not understand why I need to attend this training program

Respondents indicated their agreement or disagreement with the statement and using the following five-point rating scale.

1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

3.6.1.6 Working Environment

Conducive environment and no interruption during the training are two main factors for training to be effective. The other measurements include in working environment are the nature of work (i.e. shift work or normal working hour) and the support from the supervisor, colleague and manager. Providing drink and food will help the participant feel good about the training environment (Al-Eisa et. al., 2009).

Eight items were derived to test the relationship between the working environment and training effectiveness. Two items were adapted from Pau (2001)which were “The training room was conducive during this training

program" and "The general atmosphere during this training program enhance the learning process". Two items were adapted from Al-Eisa et. al.(2009) which were "My supervisor gives recognition to those who apply new knowledge and skills to their work after attending this training program. " and "My supervisor encourages employees to attend this training program". One item was adapted from Barcala et. al.(2000) which was "The seating arrangement of the classroom for this training program was well arranged" and one item was adapted from Tai (2006) which was "The nature of my work allows me to attend this training program without interruption". This item represents the nature of work and the shift pattern.

The balance two items were constructed by the researcher. There were as follows:

1. The meals served for this training program were good.
2. My working partner (colleague) does not encourage me to attend this training program.

Respondents indicated their agreement or disagreement with the statement and using the following five-point rating scale.

1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

3.6.1.7 Technology

Technology refers to the training equipment used to support the learning activities such LCD projector and computer. Suitable chair, table and lighting are also important to make the training participant at ease (Harvey et. al., 2001).

Five items were derived to test the relationship between the technology and training effectiveness. One item was adopted from Pau (2001) which was "The lighting is not too dark or too bright". Two items were adapted from Barcala et al.(2000) and modified slightly in order to suite the environment which were "The equipment and facilities used in this training program support the learning process. (example: LCD projector, white board & overhead projector)" and "The training equipment used was not up-to-date". One item was adapted from Kassim et.al. (2006) and slightly modified the statement by the researcher to suit the training environment and became "The computer software used to support the training is up-to-date".The remaining one item was constructed by the researcher: "The chairs and tables used during this training program were good". The chair and table would also contribute to the technology where the suitable design of chair and table will influence the training environment (Harvey et. al. 2001; Kubiak & Bertram, 2010).

Respondents indicated their agreement or disagreement with the statement and using the following five-point rating scale.

1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

3.6.2 Measure of the Dependent Variables

The dependent variable was the training effectiveness. There were several methods of measuring training effectiveness used by past researchers (Blumenfeld & Holland, 1971; Bruce Tracey & Cardenas, 1996; Cannon-Bowers, Salas, Tannenbaum & Mathieu, 1995; Jedrziewski, 2007). However, in general the training effectiveness could be observed in terms of employee's reaction toward training, knowledge and skill acquisition, knowledge and skills application, and the return on investment (ROI).

Training effectiveness was measured through a self-report of the trainees (Guthrie & Schwoerer, 1994; Merzoff, 1987). Hansemark and Albinsson (2004)and Huang (2010) havesupported the findings of previous researches that self-report is an effective method of obtaining information on training effectiveness provided that response-shift-bias is eliminated. Hence,

respondents in this research are required to indicate their agreement or disagreement with the statement using the Likert five-point scale. This interval scale allows us to compute the mean and standard deviation of the responses on the variables, thus allowing us to measure the magnitude of the differences in the preferences among the individuals.

The five-point scale are as follows:

1- Strongly disagree

2- Disagree

3- Neutral

4- Agree

5- Strongly Agree

3.6.2.1 Reaction

The reaction of the participants is often a critical factor in the continuance of any training program. Reaction refers to how the participant felt about the overall training such as the training program, trainer, and overall arrangement by training department. Responses on reaction questionnaires help to ensure against decision based on comment (agree/disagree) from the participants.

Eleven items were derived to see the respondents' reaction towards training. Four items below were adapted from Pau (2001).

1. The training has helped me to improve my knowledge and skills
2. The training has helped me to utilize my potential
3. The skills I have learnt from this training has been very helpful to develop my career
4. The training objectives were clearly stated and discussed

Three items were adapted from Al-Eisa et al. (2009). There are as follows:

1. I believe those who attend this training program would perform better after attending it.
2. The training provided was very relevant to my work.
3. The training program provided improves my potential for future career growth.

The first item below was adopted and the subsequence one item was adapted from Barcala et al.(2000) as follows:

1. I am confident that I have the ability to succeed in my work.
2. Each training objective was achieved successfully.

One item was adopted from Wilson (2000) as "I can align my career development to meet company's objectives."

The last onelast item was constructed by the researcher as follow:

1. Now I can relate the importance of this training program to overall company objectives.

Respondents indicated their agreement or disagreement with the statement and using the following five-point rating scale.

1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

3.6.2.2 Learning

Learning refers to knowledge and skills acquisition. It is concerned with measuring the learning of principles, facts, techniques, skills presented in the program. However, they can still be measured objectively especially on how the participants understood and absorbed the materials. This can be done through pre and post test. The training will be considered as effective if the participant passed the post test or be able to demonstrate physically or verbally communicate to trainer or colleague the level of her/his understanding of the subject matter (Guthrie & Schwoerer, 1994; Harvey et. al., 2001).

Seven items were derived to measure the skills and knowledge acquisition which were adopted from previous studies. Two items were adapted from Al-Eisa et. al(2009), one item adapted from Tai (2006), one item adapted from Price (2001) and three items were constructed by the researcher. Below items show the constructs as per the above sequence.

1. I am sure I can overcome obstacles on the job that hinder my use of new knowledge and skills acquired from this training program.
2. I feel confident that my skills and abilities equal or exceed those of my colleagues.
3. Now, I am confident to train other people.
4. Now, I have better understanding to do the actual jobs.
5. The quizzes and test used in this training program were based on the course objectives and the materials.
6. I successfully passed all the tests in this training program.
7. I managed to demonstrate to the trainer that I completed all the exercises successfully.

Respondents indicated their agreement or disagreement with the statement and using the following five-point rating scale.

1. Strongly disagree
2. Disagree

3. Neutral

4. Agree

5. Strongly Agree

3.6.2.3 Behaviour

Behaviour refer to knowledge and skills application that involve what participants are expected to know, think, do or produce in the real world setting for which the program has prepared them (Kirkpatrick, 1959; 1975; Phillips, 1987; 1991) . The training will be considered effective if the participant applied what had been learned during the training (Kirkpatrick, 1979; Tony, 1996). If the knowledge and skills are not applied in their work, the training will be considered ineffective. In other word, the employee has chosen and attended the wrong training or the manager sent employee for the wrong training (Huang, 2010).

Ten items were constructed to measure the skills and knowledge application. Two items were adopted and eight items were adapted from previous studies. The eight constructs need to be modified slightly to suit the study environment where simple phrases is used to address skills and knowledge application such as the 'I can apply what I have learnt from this training program". Two items were adapted from Barcala et al (2000), and two items wereadapted from Price (2001). Three items were adapted from Tai (2006), two items from Wilson

(2000), one item from Barcala et.al (2000), one item from Price (2000) and lastly one item was adapted from Pau (2001). Below are items as per the above order.

1. I performed better on the job after attending this training program
2. I have positive working relationship with my working colleagues after attending this training program.
3. My quality of work has improved after attending this training program.
4. I can apply what I have learnt from this training program.
5. I used my knowledge and skills to train others after attending this training program.
6. This training program has increased my capability to do the jobs.
7. Overall, I am able to work independently after attending this training program.
8. I made better decisions in my work after attending this training program.
9. I have contributed significantly in achieving company's objectives after attending this training program.
10. I would not have performed better in now without this training program.

Respondents indicated their agreement or disagreement with the statement and using the following five-point rating scale.

1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

3.6.2.4 Result

Measuring the return on investment (ROI) is very tedious and time consuming (Kirpatrick, 1975; Phillip, 1991). Most of the organizations take for granted that the training is important and relevant to their employees without really measure the return in-term of dollar. For instance, training will contribute in improving productivity, quality, cycle-time, cost saving and waste reduction (Barker, 1997; Cagnazzo, Taticchi & Brun, 2010;Kirkpatrick 1979).

Six items were derived to study whether there was ROI from the training. Five items were adapted from Barker (1997) with minor modification and the last one item was constructed by the researcher. Below are the items as per the above sequence.

1. After attending this training program the productivity of the company has improved
2. After attending this training program the quality of the product at my line has improved
3. After attending this training program the waste generated by the company has reduced
4. After attending this training program the process cycle-time at my line has improved.
5. After attending this training program the manufacturing cost has reduced.
6. After attending this training program the machine downtime has reduced.

Respondents indicated their agreement or disagreement with the statement and using the following five-point rating scale.

1. Strongly disagree
2. Disagree
3. Neutral
4. Agree
5. Strongly Agree

3.6.3 The Background Information

The positions of the respondents (the trainees) were classified into three categories which were:

1. Technician
2. Engineers
3. Technical Manager

The ethnic consists of Malay, Chinese, Indian, and other Malaysian. The highest qualification of the respondent was divided into six levels which are STPM, Certificate, Diploma, Degree, Master and PhD. The gender is either male or female, marital status for single, married or divorced. Lastly, the respondent is required to state the age and years of working experience.

The above information was important for the analysis as it helped the overall findings before making any conclusion was made. Data for these variables would be obtained from the questionnaire on the respondent's background information.

The details of the questionnaires are shown at **Appendix 2.**

3.7 The Research Approach

The survey method was used in this study with the distribution of questionnaires to the study participants such as the technicians, engineers and technical managers.The study had attempted the quantitative case study with survey questionnaire as its main instrument (sometimes called a ‘case survey’). In a case study, a researcher closely studies either a single person, a single group, a single organization or a single industry (Spatz & Kardas, 2008). In this study, the researcher had made the study at Silterra Malaysia Sdn. Bhd., the semiconductor wafer fabrication company in Kulim, Malaysia.

The research was based primarily on deductive forms of logics and theories and hypotheses are tested in a cause-effect order. Moreover, the goal was to develop generalizations that could contribute to theory that would enable the researcher to predict, explain, and understand some phenomenon (Creswell, 1994; Kothari 1995; Zikmund, 2000). There were few reasons for proposing thiscase survey design which the individual people were the unit of analysis;the researcher’s interest in collecting original data from a population which is too large to observe; saving in terms of time and lastly usefulness for testing the hypothesis.

The use of survey method precludes the ability to establish the casual priorities of the independent and dependent variables. Also it is to determine the

existence of cause and effect relationship thus to demonstrate variation between the independent variables and dependent variables (Cook &Campbell, 1976).

The first draft of questionnaires had been tested to 30 people covering technician and engineer at First Solar Malaysia Sdn Bhd. to check their understanding.All completed forms were received for analysis. However, the name of training programhad been changed from Yield Management to Six Sigma. The researcher needs to change the program name because Yield Management was not conducted at First Solar. The main reason for this pilot run was to check whether the respondents can understand the questionnaires as well as check for reliability of the questionnaires. In addition, they are not going to be the actual respondents in this study. The actual respondents are the technician, engineer and technical manager of Silterra Malaysia Sdn. Bhd.

After the testing, no amendment is needed since most of the questionnaires were tested in previous studies and designed with the assistance of UUM staff.

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3.8 Data Collection Methods

Questionnaires were distributed to the participants by hardcopy with the help of HRD Manager and his team. This wasbecause, the author did not get the approval to meet the potential respondents in order to avoid conflict of interest.

Hence, the Silterra management tried to avoid ‘staff pinching’ since the author was involved in mass hiring for his company.

Data was collected from primary source. The questionnaires had been distributed to294 participants comprising technicians, engineers, and technicalmanagers of Silterra Malaysia Sdn. Bhd.Based on the discussion in Section 3.4, only 294 out of 1306 technical staff are suitable to participate in this survey. This is because, only 294 technical staff had attended the Yield Management training program between three months and less than two years. The selection of participants was based on the years of service in Silterra and the time when the training was attended by the respondents. Those who were with Silterra for two years or less are eligible to participate in this survey. The Yield Management training program has to be completed by the technical staff with six month after joining the company.

Data were gathered through questionnaire with close-ended question. Closed-ended format was used in order to make the respondents feel easier to answer and to increase the number of completed responses and also to make data analysis convenient and more objective (Sekaran, 1999, 2003).

The survey was administered by HRD team of Silterra Malaysia. The author follow-up through phone calls, face-to-face meeting and emails with HRD team. The survey was done for more than two months beginning in mid-

November 2010 until February 2011. This survey should be completed by December 2010. Unfortunately, HR of Silterra was also involved in Hewitt survey. Hewitt survey was organizational survey mainly cover all aspects of organizational effectiveness. The result will be used by HR to design competitive compensation and benefits and development for the employees and also use it to participate in 'Employer of Choice' selection. Therefore, this survey was put on-hold until Hewitt survey was completed which was in end of November 2010. The main reason for this survey was putting on-hold due to poor response received from the Hewitt survey. After that, Silterra HRD team took three weeks off before this survey takes place. The short break was taken to iron out the data collection strategy and gave a break to HRD team and employees. In other words, the actual survey started in mid-December 2010 and ended by mid-February 2011. Hence, it was approximately two months.

Confidentiality of the answers was assured by giving each respondent an envelope to enable them to return the sealed questionnaire. However, there were some issues such as the respondents were not responding on time because of their tight work scheduled, they had to work shifts and their lack of understanding on the benefits of the study. To overcome these problems, HRD team follow-up with mass communication over the email and face-to-face meeting. A token of appreciation (i.e; RM2 voucher) was given to the respondents who are completing the survey. A RM2 breakfast voucher was given to each respondent after they handed over the form. This action has

helped us to increase the response rate. The token of appreciation and all other related cost were borne by the author. To recognize effort made HRD Manager, the author gave him a piece of 501 Levis Jean specially bought from USA.

The overall response rate for the study was quite good achieving68.4 percent as the norm for response rate in management research in Malaysia was claimed to be between 20 to 40 percent (Rozhan, 1996; Rozhan & Zakaria, 1996).

A total of 294 sets of questionnaire were distributed by face-to-face meeting by HRD team of Silterra . Out of which, 201sets of questionnaire were returned with 7 sets rejected due to incomplete answered questions. Discounting the number rejected, a total of 194 sets of questionnaire were usable, resulting in 66 percent return rate.

3.9 Expected Response Problems and Implemented Action

This research was done by distributing the hardcopy of the questionnaires to respondents through HRD Manager and his team of Silterra Malaysia Sdn Bhd.

Distribution by HRD Manager and his team deemed to be the best strategy compared to interviews and factory visits because interviews and factory visits were time consuming for as well as costly to the researcher.One of the

advantages by hardcopydistribution by HRD Manager was that the data could be collected in real situation with no influence by the presence of the researcher. As such, the respondents are free to response to the questionnaire without any influence or being bias (Sekaran, 1999, 2003). However, sometimes there is one disadvantage where the survey response rate is usually quite low (Spatz & Kardas, 2008).

Earlier researches were done to overcome this problem. For instance, Berdic (1973), Blumberg, Fuller and Hare (1974), Duncan (1979), Dillman and Frey (1974), Yammarino, Skinner and Childers(1991) have reported that in order to increase the response rate was by manipulation of the length of the question or statement. Fox, Crask and Kim (1998), Jobber and Sanderson (1993), and Johnson, Parson and Warnecke (1993) have suggested to vary the size and color of the question paper. On the other hand, Amstrong and Lusk (1987), Duncan (1979), Elkind, Tryon and De Vito (1986) and Fox et. al. (1988)have found that by changing the mailing style to the respondents will help to improve the response rate.

Blumberg, Fuller and Hare (1974), Carpenter (1974), Dillman and Frey (1974), Dodd and Markwiese (1987),Duncan (1979) and Nederhof (1983) have suggested that by using personalize envelope and put an attachment would also increase the response rate. In addition, by giving a token of appreciation such

as pen or key-chain will also help in getting high response and return from the respondents (Blumberg et. al., 1974; James & Bolstein, 1990; Church, 1993).

All the above suggestions were taken into consideration by the researcher before distributing the questionnaires to HRD team of Silterra.With the assistance of Silterra HRD team, the researcher used recommendation by Jobber and Sanderson (1993), Johnson et. al. (1993) and Fox et. al. (1998) by using color paper (ie, red, yellow and green) and put it inside personalized envelope for distribution (Blumberg et. al.,1974; Carpenter, 1974; Dillman & Frey, 1974; Dodd & Markwiese, 1987; Duncan, 1979; Nederhof, 1983).

3.10 Statistical Data Analysis Method

3.10.1 Introduction

In this study, the computer software Statistical Package for Social Science (SPSS) Version 17 for Windows was used to compute the data collection. All the data were checked to ensure that all assumption made were correct for further analysis. In addition, the data were checked and tested for its reliability as instrument and linearity.

There were 90 items were constructed to measure the dimension of the research model that include factors affecting the training effectiveness such as

participant, trainer, training material, training program, organization support, working environment, and technology; the training effectiveness which are reaction, knowledge and skill acquisition, knowledge and skill application and return investment (ROI).

3.10.2 Pilot Test and Reliability Checked

Pilot studies are tools in determining, in a preliminary fashion, the potentialities and perils of almost any research idea (Mauch & Park, 2003). Pilot run can sharpen the procedures, remind one of the permissions and approval needed, assay likely costs in time, and check the feasibility of a larger study. Investment of energy in a pilot study can enhance the quality of subsequent study and minimize the likelihood of unexpected delays and possible failure.

A pilot studywas done in year 2010 as part of PhD work. The objective of this study is to check the reliability and validity of new research framework for PhD study. In this study, the dependent variables are classified as reaction, learning, behaviour and result. The study was done to 30 technical staff to ensure that the instrument used in this research is valid and can be used. This study was self-administered by the author where the respondents were given the hardcopy of the survey. The respondents to this survey were given a week to response to the questionnaire and return the completed form to author.There

is no feedback received concerning the words used since most of the items had been tested in previous studies. The survey was done with First Solar Malaysia Sdn. Bhd. employees as they are not going to be the actual respondents. The validity test was done prior to actual data collection. Thirty (30) technical staff were involved in this study. Table 3.2 below shows demographic of the respondents of this survey.

Table 3.2: Demographic of the respondents for the pilot test.

	Designation	Qualification	Ethnic	Gender	Marital Status	Freq
Technician	3					
Engineer	24					
Technical Manager	3					
Certificate		6				
Diploma		6				
Degree		18				
Malay			18			
Chinese			6			
Indian			6			
Male				30		
Female				0		
Single					6	
Married					4	
1 time						30
2 times						0
3 times						0
Total	30	30	30	30		30

With regard to the above Table 3.2, the average age of the respondents is 36.4 years and they have been in the multinational company for an average of 8.1

years. All of them had attended the Six Sigma program one time only which is about 11 months ago.Reliability result showed in Table 3.3 indicated the Cronbach's alpha of all the variables were above 0.7 and acceptable.

Table 3.3: Initial result of validity check

Variables	Number of Items	Cronbach Alpha
Participant	10	0.941
Trainer	9	0.911
Training Material	9	0.710
Training Program	9	0.830
Organization	6	0.883
Working Environment	8	0.922
Technology	5	0.873
Reaction	11	0.937
Learning	7	0.885
Behaviour	10	0.937
Result	6	0.917
Total	**90 items**	

3.11 Summary

This chapter discussed the method of study to be made in Silterra Malaysia Sdn Bhd, a semiconductor wafer fabrication company in Malaysia. It also covers research design, research framework, data collection technique, hypothesis, instrument used in the analysis, data analysis technique,

measurement of variables, and statistical tests. The primary data will be collected using distribution of questionnaires by HRD Manager and his team of Silterra Malaysia Sdn. Bhd. The theoretical framework has been developed consists of independent variables and dependent variables. The independent variables are the contextual factors that affect training effectiveness which as participant, trainer, training material, training program, organization, working environment, and technology; the dependent variables are the training effectiveness which are the reaction, knowledge and skill acquisition, knowledge and skill application and ROI. Twenty eight hypothesises have been established to see the relationship between the contextual factors that affect the training effectiveness and training effectiveness. The research questionnaires had been distributed to respondents in Silterra Malaysia Sdn Bhd. The first survey was done in year 2007 at Silterra Malaysia Sdn Bhd and the subsequent survey was done at First Solar Malaysia Sdn. Bhd., a multinational corporation (MNC) located at Kulim Hi-Tech Park, Kulim, Kedah, Malaysia. The first survey was done at Silterra Malaysia Sdn. Bhd. for testing purposes as well as to get some data for paper publication. After receiving feedbacks from the recipients at the conferences, the survey items had been amended. The respondents were required to decide whether to agree or disagree with the statements in the survey. The Likert 5-point scale was used to represent the measurement. The primary data of this study was collected through distribution of hardcopy returned by the respondents. Lastly,

the SPSS software version 17 was used to compile the data and the details of the analysis are discussed in the next chapter. (i.e. Chapter 4).

CHAPTER 4

ANALYSIS AND RESULTS

4.1 Introduction

This chapter will explore and interpret the data collected in order to answer the four research questions in Chapter 1 that demonstrated through twenty eight hypotheses. This chapter divided into four sections. The first section will provide the information regarding demographic respondent such as age, gender, marital status, race, education level and current position. The second section will analyze the goodness of measures the tools that used in this study through factor analysis and reliability testing. The third section will provide the information about relationship each variable that used in this current study. Finally, the fourth section will examine the hypotheses testing among variables including independent variables and dependent variable using regression analysis.

4.2 Overview of the Data Gathered

Table 4.1 shows the summary of the sample profile discussed in Chapter 3.

Table 4.1: Sample Profile.

Number of questions distributed - (X)	294
Number of questions collected back – (Y)	201
Response rate – Y/X * 100%	68.4%
Number of question used for analysis	194
Percentage of question used for analysis (194/294) * 100%	66%
Reject rate – (201-194)/201 *100%	3.5%

Table 4.2 provides information about demographic respondent that divided into nine categories which is job designation, highest qualification, ethnic, gender, marital status, age, duration of working experience, the frequency of attending the Yield Management training program and the duration from the month s/he attended the training with regard to month s/he took part in the survey.

From a total of 194 respondents, in term of job designation, majority of them are technician (168 respondents, 82.5%). Other job categories are engineer (31 respondents, 16.0%) and technical manager (3 respondents, 1.5%). The highest qualifications of respondents is Diploma (149 respondents, 76.8%), Degree (28

respondents, 14.4%), STPM (12 respondents, 6.2%) and Master (5 respondents, 2.6%)/ There were no respondent having Certificate (0%) or PhD (%). Majority of the respondents are Malay (109 respondents, 56.2%) follow by Indian (55 respondents, 28.4%), Chinese (28 respondents, 14.4%) and other race (2 respondents,1.0%). Most the respondents who participated in this study were male (171 respondents, 88.7%), followed by female 22 respondents (11.3%). The respondents' status indicated that 133 of them were single (68.6%), while in the married categories were 61 respondents (31.4%) and there is zero divorcees (0%).

The age of respondents are range from 20 to 30 years old (145 respondents, 74.7%), 31 to 40 years old (48 respondents, 24.6%) and 1 respondent (0.5%) is above 40 years old. In term of working experience, 46 respondents have less than 1 year of working experience (23.7%), 55 respondents have between one 1 to less 3 years of experience (28.4%), 70 respondents have between 3 to less than 5 years of working experience (36.1%) and 23 respondents have more than 5 years of experience (11.8%). The study was focused on the Yield Management training program which was conducted before November 2010. Therefore, 120 respondents were taken the program less than one year ago (61.8%), 74 respondents were taken between 1 year to 2 years ago (38.2%) and none of the respondent took the program more than 2 years ago (0%). All of the respondents were taken this program one time only. This will help to ensure that the respondents respond to the questionnaire correctly.

Table 4.2: *Demographic of respondents*

No.	Demographic	Categories	Frequency	%
1	Designation	Technician	160	82.5
		Engineer	31	16.0
		Technical Manager	3	1.5
		Total	194	100.0
2	Highest Qualification	STPM	12	6.2
		Certificate	0	0
		Diploma	149	76.8
		Degree	28	14.4
		Master	5	2.6
		PhD	0	0
		Total	194	100
3	Ethnic	Malay	109	56.2
		Chinese	28	14.4
		Indian	55	28.4
		Others	2	1.0
		Total	194	100.0
4	Gender	Male	172	88.7
		Female	22	11.3
		Total	194	100.0
5	Marital Status	Single	133	68.6
		Married	61	31.4
		Divorced	0	0
		Total	194	100.0
6	Age	20 to 30 years old	145	74.7
		31 to 40 years old	48	24.6
		Above 40 years old	1	0.5
		Total	194	100.0

7	Working Experience	Less than 1 year	46	23.7
		1 to less than 3 years	55	28.4
		3 to less than 5 years	70	36.1
		More than 5 years	23	11.8
		Total	194	100
8	How long ago attended the training program?	Less than 1 year ago	120	61.8
		1 to less than 2 years ago	74	38.2
		More than 2 years ago	0	0
		Total	194	100
9	How many times attended?	1 time	194	100
		More than 1 time	0	0
		Total	194	100

4.3 Goodness of Measures

A reliability analysis was run on each of the seven dimensions of independent variables, which are participant, trainer, training material, Yield Management training program, company, working environment and technology. The reliability analysis was also run for dependent variables, which are reaction, learning, behaviour and result.

4.3.1 Factor Analyses

Statistical procedures have to be applied to ensure the validity and reliability of survey-based measures for theoretical assessment. With regards to validity, a procedure called factor analysis allows the researcher to ascertain whether or not the number of items can be reduced to the number of concepts that were initially hypothesized.

In this study, two factor analyses (see Tables 4.3 and 4.4) were run to verify the postulated dimensions of the independent variables (the seven factors contribute to training effectiveness) and dependent variables (the four levels of training effectiveness), utilizing the VARIMAX rotation.

The factor analyses were diagnosed and found to have met the necessary statistical assumptions as indicated by their high Kaiser-Meyer-Olkin (KMO) measure in conjunction with the diagonals of the anti-image correlation matrix possessing values above 0.5. Sufficient unique loadings (for more than one extracted factor) and the ability for each item to account for a minimum of fifty percent (50%) of its variation were conditions set in retaining the items.

4.3.1.1 Factor Analysis for Independent Variables

The factor analyses for the Independent Variables where the seven factors affecting the training effectiveness, are shown below in Table 4.3. There are a

total of fifty six (56) questions or items in the questionnaire for this section. However fifteen (15) out of the total did not meet the condition and have been removed. Hence, only the remaining forty one (41) questions were used for the factor analysis. For factor analysis, the factor loading must be more than 0.50 and the cross loading must be less than 0.35 (Hair, Anderson, Tatham & Black, 1998).

Table 4.3: *Factor Loadings for Independent Variables (the seven factors that affect the Training Effectiveness)*

Independent Variables	**Factors**						
Participant	1	2	3	4	5	6	7
I am confident that I can succeed in this training program.	**.900**	.120					.111
I believe that I can perform better on the job after attending this training program	**.885**	.127		.159		.102	
I was informed the objectives of this training program	**.884**	.115				.107	
I was interested in learning the training material that was covered in this training program	**.866**						
I had learnt as much as I can from this training program.	**.823**	.190	.172	.107	.126	.128	.143

I was motivated to learn the training material that was emphasized in this training program	**.820**	.159	.176	.142		.185	
I am very much excited about attending this training program	**.817**			.255			
I attended this training program willingly	**.801**			.127			
I have the prior knowledge and skill about yield management before attending this training program	**.775**		.122	.207			
My job has provided me opportunities to learn knowledge and skills related to this training program.	**.722**	.230	.138	.142			.121
Training Material							
The printed materials and other handouts are well organized	.133	**.899**	.137				
The printed material is easy to read.	.119	**.889**	.164		.163		
The course content is relevant to my job	.135	**.871**	.177				
The course content is easy to understand	.157	**.858**	.160		.203		
The course content is well structured.	.200	**.837**	.206		.154		.128

The training program is relevant to my job	.174	**.751**	.166	.131	.201		
The picture/diagrams shown are good	.110	**.694**	.169		.328	.146	
The material will provide a useful reference in the future	.202	**.689**	.224		.365	.173	
Working Environment							
The seating arrangement of the classroom for this training program was well arranged		.195	**.896**		.116	.104	
My working partner (colleague) does not encourage me to attend this training program.		.151	**.893**	.100			
My supervisor gives recognition to those who apply new knowledge and skills to their work after attending this training program.	.118	.194	**.891**				
The general atmosphere during this training program enhance the learning process		.193	**.874**	.131			
The nature of my work allows me to attend this training program without interruption	.120	.170	**.832**	.125		.114	
The training room was conducive during this training program	.105	.165	**.830**	.147	.143		

My supervisor encourages employees to attend this training program	.149	.105	**.823**			.122	
Trainer							
The trainer has good communication skills	.178			**.883**			
The trainer has good presentation skills	.191			**.855**			
The trainer has good experience in the subject matter	.181	.133		**.817**	.110		
The trainer is knowledgeable in the subject matter	.184			**.812**	.113	.140	
The trainer checked whether the participants understood the topics	.199		.168	**.779**			
The trainer knows how to manage time effectively	.102		.178	**.736**			.206
Yield Management Training Program							
The duration of training is not too long or too short.	.114	.199			**.913**		
The training program met the company's objectives	.129	.214	.103		**.897**		
The training program is interesting		.253			**.816**		
The training program met my expectation		.204	.148		**.797**	.129	
The training program is easy to understand	.187	.260	.125	.155	**.713**		

Company							
My company sets priority for me to attend this training program	.170	.195	.139		.130	**.864**	
My company informed me when to attend this training program	.211	.193	.217		.167	**.847**	.103
My company communicates to all employees that this training program is very important.	.191	.105	.237		.187	**.797**	
Technology							
The lighting is not too dark or too bright	.253	.194	.144	.111			**.808**
The chairs and tables used during this training program were good.				.171	.169		**.731**
The equipment and facilities used in this training program support the learning process. (example: LCD projector, white board & overhead projector	.134		.171				**.683**
Variance (76.05%)	**34.10**	**12.06**	**8.73**	**7.46**	**5.60**	**4.61**	**3.48**
Eigenvalue	**15.34**	**5.43**	**3.93**	**3.36**	**2.51**	**2.08**	**1.57**
Reliability	**0.96**	**0.95**	**0.96**	**0.92**	**0.93**	**0.94**	**0.69**
KMO	**0.84**						
χ^2 (df), p < 0.01	**.000 (990)**						

The above examination employed a seven (7) component solution of the factor affect to training effectiveness variables. The analysis revealed a combined total variance of 76.05%.

4.3.1.2 Factor Analysis for Dependent Variables

On the other hand the factor analysis for the Dependent Variables which are the Training Effectiveness (i.e. Reaction, Learning, Behaviour and Result), revealed only one (1) component structure for each variable (see Table 4.4, Table 4.5, Table 4.6 and Table 4.7). There are total of thirty four (34) items representing the four dependent variables and all were subjected to the factor analysis independently. The factor analyses were run revealing a total variance of 71.52% for Reaction, 67.16% for Learning, 74.89% for Behaviour and 53.93% for Result.

Table 4.4:*Factor Loadings for Dependent Variable (Reaction)*

Component Matrix[a]

Reaction		Factor Loading
I believe those who attend this training program would perform better after attending it.		.922
The training has helped me to utilize my potential		.909
I can align my career development to meet my company's objectives		.900
The training has helped me to improve my knowledge and skills		.881
I am confident that I have the ability to succeed in my work.		.868
Each training objective was achieved successfully		.805
The training objectives were clearly stated and discussed		.585
Total Variance Extracted	**71.52**	
Eigenvalue	**5.01**	
Reliability	**.93**	
KMO	**.88**	
χ^2 (df), p < 0.01	**.000(21)**	

a. Only one component was extracted. The solution cannot be rotated.

Table 4.5:*Factor Loadings for Dependent Variable (Learning)*

Component Matrix[a]

Learning		Factor Loading
Now, I have better understanding to do the actual jobs.		.905
I managed to demonstrate to the trainer that I completed all the exercises successfully.		.899
Now, I am confident to train other people.		.886
I am sure I can overcome obstacles on the job that hinder my use of new knowledge and skills acquired from this training program.		.873
I feel confident that my skills and abilities equal or exceed those of my colleagues		.786
I successfully passed all the tests in this training program.		.758
The quizzes and test used in this training program were based on the course objectives and the materials		.578
Total Variance Extracted	67.16	
Eigenvalue	4.71	
Reliability	.92	
KMO	.88	
χ^2 (df), $p < 0.01$	.000(21)	

a. Only one component was extracted. The solution cannot be rotated.

Table 4.6: *Factor Loadings for Dependent Variable (Behaviour)*

Component Matrix[a]

Behaviour	Factor Loading
This training program has increased my capability to do the jobs.	.910
My quality of work has improved after attending this training program	.873
I would not have performed better now without this training program	.868
I have contributed significantly in achieving company's objectives after attending this training program.	.857
I make better decisions in my work after attending this training program	.851
I used my knowledge and skills to train others after attending this training program.	.833
Total Variance Extracted	**74.89**
Eigenvalue	**4.49**
Reliability	**.93**
KMO	**.89**
χ^2 (df), p < 0.01	**.000(15)**

a. Only one component was extracted. The solution cannot be rotated.

Table 4.7:*Factor Loadings for Dependent Variable (Result)*

Component Matrix[a]

Result	Factor Loading
After attending this training program the quality of the product at my line has improved	.806
After attending this training program the process cycle-time at my line has improved.	.766
After attending this training program the waste generated by the company has reduced	.738
After attending this training program the manufacturing cost has reduced.	.733
After attending this training program the machine downtime has reduced.	.731
After attending this training program the productivity of the company has improved	.618
Total Variance Extracted	**53.93**
Eigenvalue	**3.24**
Reliability	**.83**
KMO	**.82**
χ^2 (df), p < 0.01	**.000(15)**

a. Only one component was extracted. The solution cannot be rotated.

4.4 Reliability Analysis

Table 4.8 shows the result of the reliability test for contextual factors that affect the training effectiveness (participant, trainer, training material, training program, company, environment and technology) and training effectiveness (reaction, learning, behaviour and result).The items that represent each individual factor were subjected to reliability analysis. The computation of the Cronbach's alpha will determine the extent of agreement between respondents for each dimension. A higher score will indicate a higher reliability, with the range being from 0 to 1. Majority of dimensions in this study have high levels of reliability and are well above the cut-off value of 0.70 as suggested by Nunnally and Bernstein (1994). However, Cronbach alpha value of 0.6 is still acceptable (Sekaran, 1992, 2003).

Table 4.8**:** *Reliability Analysis: Alpha Coefficients*

Factors	Total No of Items	No of Items Dropped	No of Items used	Cronbach Alpha
Independent Variable				
Participant	10	0	10	**0.96**
Trainer	9	3	6	0.92
Training Material	9	2	7	0.96
Training Program (Yield Management)	9	4	5	0.93
Company	6	3	3	0.94
Working Environment	8	1	7	0.96
Technology	5	2	3	0.69
Dependent Variable				
Reaction	11	4	7	0.93
Learning	7	0	7	0.92
Behaviour	10	4	6	0.93
Result	6	0	6	0.83

Based on the Reliability Analysis for the study, the alpha coefficients are reported in Table 4.8 above. The Independent Variables which registered with the lowest value is Technology, which has a value of 0.69 (very close to 0.7), while the participant, training material and working environment has the highest value at 0.96. The rest are valued at 0.92 for trainer, 0.95 for training

material, 0.93 for Yield Management training program and 0.94 for company. The Dependent Variables are valued very satisfactorily where 0.93 for reaction and behaviour, 0.92 for learning and 0.83 for result. There were fifteen (15) items dropped from the Independent Variable and eight (8) items were dropped from Dependent Variable because the Alpha values were not significant i.e. were less than 0.6 as reported in Table 4.8.

4.5 Descriptive Analysis

After passing the validity and reliability analysis, the items were then averaged. The mean was applied as a measure of central tendency, which indicated that all items in the variables were above their midpoint level as shown in Table 4.9 and Table 4.10.

Table 4.9**:** *Descriptive Analysis of Independent Variables*

Independent Variables	**Mean**	**Standard Deviation**
Participant		
I am very much excited about attending this training program	3.93	.727
I have the prior knowledge and skill about yield management before attending this training program	3.86	.683
I am confident that I can succeed in this training program.	3.89	.715
I believe that I can perform better on the job after attending this training program	3.91	.684
I attended this training program willingly	3.82	.675
My job has provided me opportunities to learn knowledge and skills related to this training program.	3.95	.638
I was informed the objectives of this training program	3.95	.774
I was interested in learning the training material that was covered in this training program	3.85	.757
I had learnt as much as I can from this training program.	3.99	.731
I was motivated to learn the training material that was emphasized in this training program	3.96	.708

Trainer		
The trainer is knowledgeable in the subject matter	3.58	.641
The trainer has good experience in the subject matter	3.47	.645
The trainer has good communication skills	3.51	.587
The trainer has good presentation skills	3.51	.596
The trainer checked whether the participants understood the topics	3.49	.604
The trainer knows how to manage time effectively	3.53	.612
Training Material		
The printed material is easy to read.	3.87	.700
The course content is easy to understand	3.89	.696
The picture/diagrams shown are good	3.81	.690
The material will provide a useful reference in the future	3.94	.569
The course content is relevant to my job	3.91	.793
The printed materials and other handouts are well organized	3.90	.759
The course content is well structured.	4.02	.694
Training Program (Yield Management)		
The training program is relevant to my job	3.98	.737
The training program is easy to understand	3.81	.644
The training program is interesting	3.63	.649
The training program met the company's objectives	3.71	.637
The duration of training is not too long or too short.	3.67	.655
The training program met my expectation	3.63	.695

Company		
My company sets priority for me to attend this training program	3.76	.738
My company informed me when to attend this training program	3.86	.702
My company communicates to all employees that this training program is very important.	3.82	.715
Working Environment		
The training room was conducive during this training program	3.80	.750
The nature of my work allows me to attend this training program without interruption	3.76	.687
The seating arrangement of the classroom for this training program was well arranged	3.78	.730
My supervisor gives recognition to those who apply new knowledge and skills to their work after attending this training program.	3.80	.743
My supervisor encourages employees to attend this training program	3.76	.704
My working partner (colleague) does not encourage me to attend this training program.	3.79	.774
The general atmosphere during this training program enhance the learning process	3.81	.753

Technology		
The equipment and facilities used in this training program support the learning process. (example: LCD projector, white board & overhead projector	3.46	.549
The chairs and tables used during this training program were good.	3.30	.494
The lighting is not too dark or too bright	3.56	.508

All the 41 items of seven (7) independent variables have means more than three (M > 3.00). In terms of standard deviation, all variables exhibited satisfactory deviations from the mean values. This indicates that there is sufficient variability captured in the variables.

Table 4.10**:** *Descriptive Analysis of Dependent Variables*

Dependent Variables	**Mean**	**Standard Deviation**
Reaction		
The training objectives were clearly stated and discussed	3.68	.540
Each training objective was achieved successfully	3.55	.691
The training has helped me to improve my knowledge and skills	3.65	.705
The training has helped me to utilize my potential	3.60	.670

I believe those who attend this training program would perform better after attending it.	3.53	.653
I can align my career development to meet my company's objectives	3.58	.738
I am confident that I have the ability to succeed in my work.	3.56	.675
Learning		
The quizzes and test used in this training program were based on the course objectives and the materials	3.66	.527
I successfully passed all the tests in this training program.	3.61	.661
I managed to demonstrate to the trainer that I completed all the exercises successfully.	3.60	.707
I am sure I can overcome obstacles on the job that hinder my use of new knowledge and skills acquired from this training program.	3.56	.682
Now, I have better understanding to do the actual jobs.	3.57	.726
Now, I am confident to train other people.	3.54	.763
I feel confident that my skills and abilities equal or exceed those of my colleagues	3.51	.685
Behaviour		
I used my knowledge and skills to train others after attending this training program.	3.37	.640
My quality of work has improved after attending this training program	3.40	.551

This training program has increased my capability to do the jobs.	3.36	.647
I would not have performed better now without this training program	3.31	.526
I have contributed significantly in achieving company's objectives after attending this training program.	3.35	.659
I make better decisions in my work after attending this training program	3.28	.571
Result		
After attending this training program the productivity of the company has improved	3.43	.537
After attending this training program the quality of the product at my line has improved	3.31	.617
After attending this training program the waste generated by the company has reduced	3.32	.560
After attending this training program the process cycle-time at my line has improved.	3.14	.683
After attending this training program the manufacturing cost has reduced.	3.27	.660
After attending this training program the machine downtime has reduced.	3.15	.591

All the 26 items of four (4) dependent variables have mean more than three (M > 3.00). In terms of standard deviation, all variables exhibited satisfactory deviations from the mean values. This indicates that there is sufficient variability captured in the variables.

4.6 Correlation Analysis

4.6.1 Introduction

Correlation analysis is a coefficient that describes the strength of the association between two variables. Pearson correlations coefficient is a common tool that applied for many studies especially the study that using continuous variables for their data. The value of Pearson correlation coefficient can be positive relationship or negative relationship among the variables ranging between -1 to +1. The perfect relationship denoted by 1 or -1, the value of 0 indicates that no relationship between the two variables.

4.6.2 Discriminant and Predictive Validity

One-tailed Pearson correlation tests were employed to assess discriminant validity of the variables. All independent variables were found not to be too highly correlated among themselves (< 0.6), which is the prerequisite condition for removing concerns about multicollinearity problems prior to conducting multiple regression analysis in the subsequent section.

In terms of predictive validity, the matrix in Table 4.11 shows that there are a number of significant variables which can warrant further multiple regression analyses. Visual inspection of their values suggests that all seven (7)

Independent Variables (i.e. participant, trainer, training material, Yield Management training program, company, working environment and technology have significant correlations with all four (4) Dependent Variables (i.e. reaction, learning, behaviour and result).

Table 4.11: *Discriminant and Predictive Validity: Correlation Coefficients (n = 194)*

	1	2	3	4	5	6	7	8	9	10	11
Participant	-										
Trainer	.382**	-									
Training Material	.371**	.226**	-								
Training Program (YM)	.283**	.191**	.508**	-							
Company	.361**	.138*	.391**	.377**	-						
Working Environment	.274**	.244**	.429**	.285**	.383**	-					
Technology	.327**	.289**	.279**	.196**	.233**	.262**	-				
Reaction	.305**	.158*	.339**	.260**	.261**	.237**	.190**	-			
Learning	.267**	.233**	.256**	.179**	.253**	.231**	.206**	.283**	-		
Behaviour	.192**	.123*	.131*	.069	.110	.107	.141*	.164*	.076	-	
Result	.009	-.029	.110	.083	.092	.025	.037	.148*	.124*	.212**	-

* Correlation is significant at the 0.05 level (1-tailed).

** Correlation is significant at the 0.01 level (1-tailed).

4.7 Regression Analysis

4.7.1 Introduction

The regression analysis was used to find out the contextual factors that influence the training effectiveness. The hypotheses and the research questions were tested by means of multiple regressions.

4.7.2 Assessing Statistical Assumptions

The mediating analyses were verified that they are free from any violations towards assumptions of least squares procedures used in multiple regression analyses. The rationale behind to conduct diagnostic procedures is to ensure whether the errors in prediction are the result of the absence of relationship among the factors that affect the training effectiveness which are participant, trainer, training material, Yield Management training program, company, working environment and technology or some nature of the data that could not be detected by the regression model.

The models under investigation were diagnosed for the following assumptions: 1) linearity of the research model; 2) the constant variance of the error terms (heterocedasticity), 3) the independence of the error terms, and 4) the normality of the error term distribution. The linearity of the phenomenon was investigated through Pearson correlation matrix. In addition, multicollinearity (condition index < 36, VIF < 10, tolerance > 0.1) and independence of error

term (Durbin Watson ranges 1.0 - 2.1) were found to be within the acceptable limit. Homoscedasticity was confirmed by plotting the standardized residual values (Y-axis) vs. regression standardized predicted regression (X-axis), with no significant patterns obtained from the plot. In addition, the use of P-P plots showed that the normality of the error distribution assumption was verified (e.g. illustrated that all the residuals were located approximately along the diagonal line) for all the regression models. In addition, the Histogram chart indicates that the data are normally distributed and Scatter Plot shows that the data are well scattered. Therefore, the model use is adequate and fit. The details of SPSS results as per the Attachment 3.

Multiple Regressions was used to find out whether the factors to training effectiveness (i.e. participant, trainer, training material, Yield Management training program, company, working environment and technology) have any significant effect to training effectiveness (i.e. reaction, learning, behaviour and result. Table 4.12 shows the result of regression analysis between reaction and independent variables.

Table 4.12: *Regression Analysis between Reaction and the independent variables* - Result of Multiple Regression Analysis

Variables	**Beta**	**T-ratio**	**Sig. t**
Participant	.161	2.019	**.045***
Trainer	.008	.107	.915
Training Material	.177	2.068	**.040***
Yield Management Training Program	.071	.889	.375
Company	.076	.961	.338
Working Environment	.055	.704	.482
Technology	.039	.535	.593
R Square	**.169**		
F	**5.417**		
Sig. F	**.000**		
Durbin-Watson	**1.366**		

Note: *p < 0.05

Participant (sig t = .045) and training material (sig t = .040) have significant effect to reaction at 5% significance level. Therefore, hypothesis H1 and H9 are accepted. On the other hand, trainer (sig t = .915), training program (sig t=. 375), company (sig t= . 338), working environment (sig t= . 482) and technology (sig t = . 593) have no significance effect to reaction. As such, hypothesis H5, H13, H17, H21 and H25 are rejected.

The R square is 16.9%, meaning that the regression model used for this study can explain 16.9 percent variations on the training effectiveness. This means that there were other factors associated to training effectiveness. The Durbin-

Watson fell within the acceptable range (1.366). Therefore, there was no auto-correlation problem in the data. The F-value (F = 5.417) found to be significant at 1 percent significance level (sig F = 0.000). This constructs that the regression model used in this study was adequate or in another word, the model was fit.

Table 4.13 shows the result of regression analysis between learning and independent variables.

Table 4.13: *Regression Analysis between Learning and the independent variables* - Result of Multiple Regression Analysis

Variables	**Beta**	**T-ratio**	**Sig. t**
Participant	.056	.687	.493
Trainer	.152	1.991	**.048***
Training Material	.106	1.216	.226
Yield Management Training Program	.046	.554	.580
Company	.122	1.507	.134
Working Environment	.084	1.048	.296
Technology	.070	.929	.354
R Square	**.168**		
F	**5.200**		
Sig. F	**.000**		
Durbin-Watson	**1.908**		

Note: *p < 0.05

To ensure the model is fit, six (6) outliers out of 194 participants had been removed from the analysis. Therefore, the remaining balance for this regression analysis was 188 (N=188).

Trainer (sig t = .048) has significant effect to learning at 5% significance level. Therefore, hypothesis H6 is accepted. On the other hand, participant (sig t = .493), training material (sig t = .226), training program (sig t=. 580), company (sig t= . 134), working environment (sig t= . 296) and technology (sig t = . 354) have no significance effect to learning. As such, hypothesis H2, H10, H14, H18, H22 and H26 are rejected.

The R square is 16.8%, meaning that the regression model used for this study can explain 16.8 percent variations on the training effectiveness. This means that there were other factors associated to training effectiveness. The Durbin-Watson fell within the acceptable range (1.908). Therefore, there was no auto-correlation problem in the data. The F-value (F = 5.200) found to be significant at 1 percent significance level (sig F = 0.000). This constructs that the regression model used in this study was adequate or in another word, the model was fit.

Table 4.14 shows the result of regression analysis between behaviour and independent variables.

Table 4.14: *Regression Analysis between Behaviour and the independent variables* - Result of Multiple Regression Analysis

Variables	**Beta**	**T-ratio**	**Sig. t**
Participant	.123	1.386	.167
Trainer	.045	.550	.583
Training Material	.092	.992	.322
Yield Management Training Program	-.083	-.947	.345
Company	.141	1.640	.103
Working Environment	.000	-.011	.991
Technology	.048	.599	.550
R Square	**.079**		
F	**2.130**		
Sig. F	**.043**		
Durbin-Watson	**2.093**		

Note: *p < 0.05

To ensure the model is still fit, another six (6) outliers out of 188 participants had been removed from the analysis. Total outliers been removed were 12. Therefore, the remaining balance for this regression analysis was 182 (N=182).

However, the result from regression analysis between behaviour and independent variable indicates that all the independent variables have no significance effect to behaviour – participant (sig t = .167), trainer (sig t = .583), training material (sig t = .322), training program (sig t=. 345), company

(sig t= .103), working environment (sig t= . 991) and technology (sig t = . 550) have no significance effect to behaviour. Therefore, hypothesis H3, H17, H11, H15, H19, H23 and H27 are rejected.

The R square is 7.9%, meaning that the regression model used for this study can explain 7.9 percent variations on the training effectiveness. This means that there were other factors associated to training effectiveness. The Durbin-Watson fell within the acceptable range (2.093). Therefore, there was no auto-correlation problem in the data. The F-value (F = 2.130) found to be significant at 5 percent significance level (sig F = 0.043). This constructs that the regression model used in this study was adequate or in another word, the model was fit.

Table 4.15 shows the result of regression analysis between result and independent variables.

Table 4.15: *Regression Analysis between Result and the independent variables* - Result of Multiple Regression Analysis

Variables	**Beta**	**T-ratio**	**Sig. t**
Participant	-.120	-1.355	.177
Trainer	.046	.562	.575
Training Material	.202	2.144	**.033***
Yield Management Training Program	.050	.576	.565
Company	.228	2.669	**.008***
Working Environment	-.105	-1.232	.220
Technology	-.079	-.986	.326
R Square	**.096**		
F	**2.574**		
Sig. F	**.015**		
Durbin-Watson	**1.123**		

Note: *p < 0.05

To ensure the model is still fit, another four (4) outliers out of 182 participants had been removed from the analysis. Total outliers been removed were 16. Therefore, the remaining balance for this regression analysis was 178 (N=178).

Training material (sig t = .033) has significance effect at 5% significance level and company (sig t = .008) has significant effect to result at 1% significance level. Therefore, hypothesis H12 and H20 are accepted. On the other hand, participant (sig t = .177), trainer (sig t = .575), training program (sig t=. 565),

working environment (sig t= . 220) and technology (sig t = . 326) have no significance effect to result. As such, hypothesis H4, H8, H16, H24 and H28 are rejected.

The R square is 9.6%, meaning that the regression model used for this study can explain 9.6 percent variations on the training effectiveness. This means that there were other factors associated to training effectiveness. The Durbin-Watson fell within the acceptable range (1.123). Therefore, there was no auto-correlation problem in the data. The F-value (F = 2.574) found to be significant at 5 percent significance level (sig F = 0.015). This constructs that the regression model used in this study was adequate or in another word, the model was fit.

4.8 Findings of the Hypotheses

Scrutinizing from the analyses, the hypotheses that are supported or rejected are indicated in below Table 4.16. As a reverberation, the following are major findings gathered through this study's relationship testing regime. They are as follows:

1. Out of the seven (7) Independent Variables, only participant and training material are related to reaction; only trainer related to learning, and only training material and company/organization related to result. Other Independent Variables no relationship with Training Effectiveness.

2. Yield Management training program, working environment and technology have no significance effect to any level of training effectiveness (i.e; reaction, learning, behaviour and result).

3. None of Independent Variables exhibit any relationship with behaviour.

4. Total of 16 outliers had been removed gradually from the regression analyses in order to ensure the model adequate and fit. There were six (6) outliers out of 194 had been removed when running the regressing analysis for learning (N=188), another six(6) outliers had been removed when running the regressing analysis for behaviour (N=182) and lastly the researcher had to removed another four (4) when running the regressing analysis for result (N=178).

5. Even though the model was adequate and fit, the coverage (R square) is quite small. Generally, there are many other factors could contribute to training effectiveness (i.e. reaction, learning, behaviour and result).

Table 4.16: ***Results of the Analyses***

Hypothesis	Statement of Hypothesis	Supported
H1	There is a relationship between participant and reaction.	**ACCEPTED**
H2	There is a relationship between participant and learning (knowledge and skill acquisition).	REJECTED
H3	There is a relationship between participant and behaviour (knowledge and skill application).	REJECTED
H4	There is a relationship between participant and result (ROI)	REJECTED
H5	There is a relationship between trainer and reaction.	REJECTED
H6	There is a relationship between trainer and learning (knowledge and skill acquisition).	**ACCEPTED**
H7	There is a relationship between trainer and behaviour (knowledge and skill application).	REJECTED
H8	There is a relationship between trainer and result (ROI)	REJECTED
H9	There is a relationship between training material and reaction.	**ACCEPTED**
H10	There is a relationship between training material and learning (knowledge and skill acquisition).	REJECTED
H11	There is a relationship between training material and behaviour (knowledge and skill application).	REJECTED
H12	There is a relationship between training material and result (ROI)	**ACCEPTED**
H13	There is a relationship between training program and reaction.	REJECTED
H14	There is a relationship between training program and learning (knowledge and skill acquisition).	REJECTED
H15	There is a relationship between training program and behaviour (knowledge and skill application).	REJECTED

H16	There is a relationship between training program and result (ROI)	REJECTED
H17	There is a relationship between organization and reaction.	REJECTED
H18	There is a relationship between organization and learning (knowledge and skill acquisition).	REJECTED
H19	There is a relationship between organization and behaviour (knowledge and skill application).	REJECTED
H20	There is a relationship between organization and result (ROI)	**ACCEPTED**
H21	There is a relationship between working environment and reaction.	REJECTED
H22	There is a relationship between working environment and learning (knowledge and skill acquisition).	REJECTED
H23	There is a relationship between working environment and behaviour (knowledge and skill application).	REJECTED
H24	There is a relationship between working environment and result (ROI)	REJECTED
H25	There is a relationship between technology and reaction.	REJECTED
H26	There is a relationship between technology and learning (knowledge and skill acquisition).	REJECTED
H27	There is a relationship between technology and behaviour (knowledge and skill application).	REJECTED
H28	There is a relationship between technology and result (ROI)	REJECTED

4.9 Answer to Research Objectives

From the above summary, the analyses and hypotheses help to answer the research objectives of this study. The first objective of this study is to determine the contextual factors that affect the training effectiveness of Yield Management training program at Silterra Malaysia Sdn. Bhd., a wafer fab company. From the above findings, the contextual factors such as participants affect the training effectiveness at Level 1 (Reaction); trainer affects the training effectiveness at Level 2 (Learning); training material affects the training effectiveness at Level 1 (Reaction) and Level 4 (Result), and lastly, organization or company affects the training effectiveness at Level 4 (Result). Therefore, it is concluded that the first objective is met.

The second objective of this study is to investigate the relationship between the training effectiveness and the contextual factors (participants, trainer, training material, training program, organization, working environment and technology). From the above findings, the participants have a positive relationship with training effectiveness at Level 1 (Reaction); the trainer has a positive relationship with training effectiveness at Level 2 (Learning); the training material has a positive relationship with training effectiveness at Level 1 (Reaction) and Level 4 (Result), and the organization has a positive relationship with training effectiveness at Level 4 (Result). Hence, participants, trainer, training material and organization have a positive and significant

effect on training effectiveness of Yield Management training program at Silterra Malaysia Sdn. Bhd. It is therefore concluded that the second objective is also met.

4.10 Summary

This study uses the primary data, collected in Silterra Malaysia Sdn. Bhd. Prior to this data collection, the similar study and data collection were done at Silterra. Therefore, there was some difficulty encountered by the researcher and his team in obtaining the response from the participants. There are seven (7) factors represent Independent Variables (i.e. participant, trainer, training material, Yield Management training program, company/organization, working environment and technology). On the other hand, there are four (4) levels of training effectiveness representing Dependent Variables with regard to Kirkpatrick training evaluation model (Kirkpatrick, 1975,1979, 2005).

The statistical analyses were used to analyse the data such as descriptive analyses, factor analyses, reliability, correlation analysis, and lastly regression analysis. Multiple regressions are employed in the data analysis to test the conceptual models. Data is checked for outliers, normality, reliability and validity before the analysis is carried out. The assumptions underlying multivariate analysis such as multicollinearity, heteroscedasticity and specification error are also checked before analyzing the models. The result

from the regression analyses were used to answer the research objectives, research questions and the hypotheses.

The results from the analyses show only five (5) hypotheses out of 28 were accepted. The other hypotheses were rejected. The result also indicated that Yield Management training program, working environment and technology had no significance effect to any level of training effectiveness.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1 Introduction

This chapter concludes the writing of this study by recapitulatingthe study's findings, presenting comprehensive discussions and highlighting the important implications of this study. This chapter will also include the discussion the relationship between the training determinants such as participant, trainer, training material, training program, organization, environment, technology and training effectiveness which is reaction, learning, behaviour and result. The discussion will be outlined by discussing the significant relationship and insignificant relationship with all the variables.Lastly, this chapter will recap the recommendations for future research and conclude the overall study.

5.2 Recapitulation of the Study

The purpose of the study was to examine the contextual factors that have a significant relationship to training effectiveness. The study also answered the research questions, research objectives and research hypothesis. Hence, this study has identified the extent of contextual factors related to training effectiveness which are the reaction, the skills and knowledge acquisition, the

skills and knowledge application, and return on investment. It is also looking at how the training effectiveness is measured or gauged and lastly identified the gap exists between what is needed and what is good to have. Participants for this research were the technical staff from Silterra Malaysia Sdn. Bhd., a wafer fabrication company. This is because, technical staff is directly involved in operational matters such as productivity, quality, cost, waste management and cycle time. Most of the HRD programs were designed to meet operational needs.

The independent variables are the participant, trainer, training material, training program, organization, environment and technology. On the other hand, the dependent variables are the training effectiveness. Training effectiveness was measured in four major areas – reaction, learning, behaviour and result. The study looked at the relationship between independent variables and dependent variables. The respondents selected were the Technicians, Engineers, and Technical Manager. The Yield Management training program was selected in this study since this program was directly related to all respondents in Silterra Malaysia Sdn Bhd. The survey had been distributed through Silterra training team by hardcopy. They had assisted the researcher to distribute the questionnaires to the targeted participants. The information obtained was based on self-reports as this is believed to be a reliable source of information (Merzoff, 1987).

5.3 Discussions

The results of this study have answered the research objectives. The results show the participant and training material have the effect to reaction, trainer has the effect to learning and lastly, the training material and company have the effect to result. This is show that the first objective is met.

The study also examined the relationship between the contextual factors (i.e. participant, trainer, training material, training program, company/organization, working environment and technology) and training effectiveness – reaction, learning, behaviour and result. Based on the findings, participant and training material are significantly related to reaction, trainer is significantly related to learning, and training material and company are significantly related to result. On the other hand, in this study, trainer, Yield Management training program, company, working environment and technology are not significantly related to reaction; participant, training material, Yield Management training program, company, working environment and technology are not significantly related to learning; participant, trainer, training material, Yield Management training program, company, working environment and technology are not significantly related to behaviours and lastly participant, Yield Management training program, working environment and technology are not significantly related to result. These 23 non-positively related dimensions do not mean that they are

not important but just that in this scope study it doesn't have the significant relationship. Therefore, the second objective of this study is also met.

While, these three factors are identified to be the only ones strongly associated with reaction, learning and result will be further discussed below with relevant empirical research support.

5.3.1 Positive Relationship Between Participant and Reaction

To answer the first research question, there is an effect by the participants to reaction. Reaction evaluation is the evaluation done by the participants on the training arrangement, program, environment and trainer. In order for the training to be effective, the participant must have the initiative to attend the program, have the basic knowledge and skills before attending the program, enjoy the training and be positive. S/he must also ensure that the training objectives are met. Without the participant initiative, knowledge and good attitude towards training, the training will not be effective. For example, if the training program is good but the participant late for class and not putting attention to the training, the training will be a waste to him/her. At the same time, the company will also loose resources (ie, operation resources) by sending de-motivated employee.

The feedback from participants will be used to gauge the first level of the training effectiveness. However, this measurement was not good enough to conclude the effectiveness of the training. Clark (1991) and Noe (1986, 2005) have stated that motivated participants will be more active in the training. As such, they will give positive feedback and the training will be effective. Also, if the training program run smoothly, the participants will perceive that other factors will no effect to the effectiveness of the training. This findings support the study made by Leslie (1991, 1997). Leslie (1991,1997) highlighted that the three main factors for effective training were approach, method and equipment use for the training. In addition, employees who are satisfied with their jobs will be more likely to exhibit more discretionary behaviours that benefit the organization than those who are not (Kuehn & Al-Busaidi, 2002; Sutherland, 2009).

5.3.2 Positive Relationship Between Training Material and Reaction

From the same of the first research question, there is an effect by the training material to reaction. The training material must be appropriate in term of the content, simplicity to understand the content, the language used and it must be well structured. Poor training material will result ineffective training program because the participant cannot make a good reference during and after the program. In addition, the training material should be relevant to the actual job that meant to support in achieving the training objectives.

Based on the above, the respondents of this study responded positively since the Yield Management training material is well done. This is in line with the study by Alliger and Horowitz (1989), Anonymous (2007), Pau, (2001), Smith and Hayton (1999). This finding also supports the study by Jones (2005) in Australia where the quality of material will help to increase the learning process. In addition, by using simple language will the participants understand the content much better (Jones, 2005; Johnson et. al., 2009).

5.3.3 Positive Relationship Between Trainer and Learning

This is to answer the second question of this study where there is relationship between trainer and learning. In this study, learning refers to knowledge and skills acquisition by the participants. In order for the training to be effective, it is very important to ensure the trainer is subject matter in the content and know how to deliver the training effectively. As such, all the trainers must attend the train-the-trainer program so that they can deliver the training more effectively. Used of simple language, clear explanation with diagrams or pictures will help the participants understand the training much better. The pre and post evaluation or quizzes are some of the method used by the trainer in checking the understanding of the participant (Kirkpatrick, 1975, 1979).

This finding supports the study by AlMadhoun (2006), Seikkula-Leino et. al (2010), and Thacker and Yost (2002) that the delivery, communication and presentation skills and facilitation skills of the trainer are the main factor to contribute to training effectiveness. The trainer is also responsible to structure the training program appropriately (Rodrigues, 2005) so that the training will more effective.

5.3.4 Positive Relationship Between Training Material and Result

To answer the fourth question, there is positive relationship between training material and result. In this study, result refer to return on investment (ROI) which are productivity and quality improvement, short cycle-time, improve machine up-time and reduce wastages. The employee's contributions in making the operation run smoothly will be the main factor for successfully deliver the product on-time with good quality to the customers. In addition, good training material helps to support the training. Good technical training material would addressed how each activity support in producing good quality, productivity, cycle-time and reduce wastages. Therefore, in this study, Yield Management training material has been designed comprehensively in order for the participants to understand and apply at work. The researcher had taken this training program when he was in Silterra Malaysia Sdn. Bhd.

This finding is in line with study by Boyce (1996) that adults are quickly frustrated and develop poor attitudes towards training if they feel their time is wasted if the training material that is not useful. Bad attitude will lead to poor productivity, quality, long cycle-time and create more wastes. Attitudes are predisposition to behave in a certain way of tendency to response positively or negatively towards a certain things (Elangovan & Karakowsky, 1999; Jones, 2005; Johnson et. al., 2009; Rodrigues, 2005). Attitude is related to value and belief (Boyce, 1996; Johnson et. al., 2009).

5.3.5 Positive Relationship Between Company and Result

To answer the last research question (question 4), there is positive relation between the company and the result. The company policy and management team will influence the working attitude. In order to boost the learning and training, the support from the company and commitment from participant must be there. The supervisor cannot force the subordinate to use the specific method. It is up to the employee to use whatever method that they think suitable to solve the problem. What the organization interested to see is the result or whether the problem is solved or not. The customer should accept it as long as the problem is solved with no negative impact to others. Again, it is solely up to employees whether they want to apply what they have learnt in the training.

This finding is supported by Saiyadain and Juhary (1995) where the top management attitude is important for training to be effective.In line with this finding, Smith and Hayton (1999) have addressed in their study the important of senior management commitment to training. The company must ensure certain amount of money to be budgeted yearly (Castrillion & Cantorna, 2005; McEvoy et.al, 1997; Shutte et.al. 1999; Tsai & Tai, 2003).

This finding is also in-line with Tsai and Tai (2003) study in Taiwan for manufacturing companies found that the companies really support employees' training by encouraging and informing them to attend the training. This is supported by Jong and Hartog (2007) where some companies invested a lot of money to train their employees. The training is given the priority so that the knowledge and skills can be improved (Karuppaiya, 1996; Anonymous, 2007).

5.4 Implication

The result of the study will give direct impact to the academic study, manufacturing industry especially the senior management of the semiconductor industry. In addition, it is also give an impact to the Malaysia Government especially in their policies and strategies on the workforce development. There are few areas that academia, the senior management or training managers, and government need to work on for the improvement.

5.4.1 Underpinning Theory

This study was based on the basic training evaluation theory by Kirkpatrick (1959, 1975). Kirkpatrick and other researchers (Easterby-Smith, 1986; Fitz-Enz, 1994; Lawrie, 1988; Philips, 1987, 1991) have discussed in details the level of training evaluation to be used in any organization. However, the most popular training evaluation used by the semiconductor industry was the model introduced by Kirkpatrick. The evaluation was divided into four levels namely reaction, learning, behaviour and result. The training evaluation is used to measure the effectiveness of training program. This is study all about.

Basically, Kirkpatrick theory underlines the level of evaluation and anticipated outcomes of each level of evaluation. Unfortunately, the process and methodology were not been discussed and shared in details. As such, the significant of Kirkpatrick theory would not been surfaced if no study on the actual evaluation process. Hence, by incorporating the evaluation process of the training program, the measurements can be introduced to measure the effectiveness of the training.

This finding will help the academia not to generalize and make assumption of the contextual factors of training effectiveness. The academia has to treat the contextual factors to training effectiveness separately based on the type of organization, country, environment and people. Another important point to be

addressed while sharing this theory with students is the training effectiveness in the eyes of other industries. All the studies made were look at the participants from the same industry. In other words, the training effectiveness was only based on the perception of the people within the same industry. However, people from other organization may view differently. In other words, people in semiconductor industry may perceive Silterra Malaysia has effective training program but people in Textile industry may think that Silterra's training programs were not effective. As such, the evaluation theory should be expanded by consideration all angles that may affect the training effectiveness. Therefore, the academia has to play a major role in addressing this theory to the real application.

5.4.2 Managerial Implications especially to Semiconductor Wafer Fabrication Industry

5.4.2.1 Evaluation questionnaire

During the study, researcher found some of the statements used for level 1 were not suitable or out-of-date. The training managers must update the questionnaires to reflect the current need. Out-of-date questionnaires may give wrong answer to the organization. As a result, wrong corrective actions were taken. Therefore, the researcher suggested to the training manager to work with trainers to come out with few sets of pre-post test so that the participant may

not know what questions to be asked in his/her class. Even though this problem cannot be 100% eliminated but it will help to reduce the above problem. In summary, this study helps the training manager to revise their level 1 questionnaires to reflect the current needs, reduce copy or integrity issue of the participants as well as improve the overall evaluation reliability.

5.4.2.2 Training evaluation process and application

Mostly the evaluation only been done at level 1 and 2 where the participants and trainer evaluate the effectiveness of the training. Level 1 involves participants' perception about the training. Level 2 evaluate the skills and knowledge gained by the participants. These two evaluations are not good enough to tell the management that the training is effective. The most important parts are the skills and knowledge application and result (ROI) from the training. It is good for the participants to score good grade during the post test but not useful if they unable to apply it at work. If they cannot apply to their work, it will not help to generate return. What the top management will like to see the 'value add training' to the organization. As such, the training managers must at least introduce or start using level 3 evaluation in their organization. It is also good to implement level 4 but this can be done at ad-hoc basis since it will need a lot of resources and time.

5.4.2.3 Corrective action

The corrective actions will be taken based on the evaluation report/result. The result will describe the trainer's competency, the training arrangement, training relevancy, etc. The training managers will make proposal to change the trainer if the report indicated that she or he not competence to conduct the training. On the other hand, training manager can also send the trainer for train-the-trainer class to increase his communication and presentation skills. The evaluation report will help the training manager to do a proper Training Need Analysis (TNA) so that the program will be more relevant to the employees. Some of the managers just take a short cut while doing the TNA. They just submit the form for department head to fill-in the training requirements without conducting interview to understand or validate the training requirements. This study has a great impact to the training managers as they need to do a systematic TNA so that the resources invested in training will add value to the organization.

5.4.2.4 Senior management involvement

During the study, the success of the training in the organization is under HRD. Training is solely under HR custody. Very rare the top management drives the training or jointly responsible for the success of training in their organization. This study revealed the important of top management to get involve in

selecting the right programs for the employees so that the resources given for training add value to the organization. The 'add-value' refers to the skills and knowledge application and ROI. The training should be a Key Result Area (KRA) and the training effectiveness will be the Key Performance Indicator (KPI) for every division. The training goals must be set and monitor monthly so that people in that organization will feel that training is part of their culture.

5.4.3 Implications to Government Policy

The rate technology is rapidly changing the way we work and live, change is thus essential for any organization as well as the Government. Technological changes are often easier to handle than changes in the human resources. Realizing to that the Malaysia Government under the Ministry of Human Resource has come out with policy where any company has 50 or more employees must contribute one percent of their monthly wages to Human Resource Development Fund (HRDF) – HRD Act, 1992). Looking back the year before 1990s, the Malaysia Government not fully emphasize on training especially to the workers in the private sector. The duty of getting training and development for people working in the private sector relies to the Union. Therefore, before the year 1998, the Union in Malaysia was very strong in highlighting and demanding their needs to the private organization. The same phenomena occurred to most of the industries including electronics manufacturing companies.

Unfortunately, the freedom given to Union by Malaysia Government put the electronics companies in difficult situation. Hence, it's very hard for them to do a business in Malaysia. As such, in 1998, Malaysia Government has put a stop to Union whereby no National Union is allowed to operate in electronics industry. By implementing that policy, the Malaysia Government gains back the investor's confident. Hence, more electronics manufacturing investors opened their business in Malaysia and at the same time increase employability as well as national productivity of Malaysia.

The positive trend was not sustained for long since we have bad world economic turmoil where a lot of retrenchment occurred in year 2001 to 2003 especially to electronics companies. Most of the semiconductor companies including Silterra Malaysia had reduced its operation so that the operation cost can be reduced. Instead of retrenching the workers, Silterra had reduced the operation and implement salary deduction. Unfortunately, 1st Silicon in Sarawak had to sell its business to X-Fab in year 2006. Due to economic turmoil from year 2001, the employment rate is getting lower and lower especially for the fresh graduates. Thus, a lot of fresh graduate were unemployed. The number of unemployed people is getting bigger by adding the retrenched workers. Therefore, the Malaysia Government has come out with action plans and policies to increase employability and be country of choice in Asia Pacific for investors to open their business.

i) Introduced free training for fresh graduate and retrenched workers. The Malaysia Government has invested million of Ringgit for training under The Kementrian Sumber Manusia and Jabatan Tenaga Kerja. In year 2005 to 2007, Malaysia Government has come out the program called Industrial Skills Enhancement Program (INSEP) for fresh graduates. This program is joint program with private sectors especially manufacturing industry and training providers where the Malaysia Government sponsored the training fees and participant's allowances, training providers such Penang Skills Development Centre (PSDC) and Selangor Human Resource Development Centre (SHRDC) will facilitate the training programs and the company sponsored the place for practical training. The prior condition before implementing the program, the company must absorb at least 50% of the the participants to their organization. This program received well response from the private sectors such as Silterra, Infineon, Dell and Motorola (source: PSDC; SHRDC).

ii) Designed the universities curriculum to meet the industry needs. One of the leading universities that take this challenge is the University Malaysia Perlis (UNIMAP) formerly known as KUKUM. More than 90% of UNIMAP graduates were employed by the private sector (source: UNIMAP). Another leading universities that follow the same

style were University Technology Petronas (UTP) and University Tenaga Nasional (UNITEN).

iii) Privatize the local universities. A lot of local universities are operating towards privatization such as UNIMAP, UNITEN, University Malaysia Sabah (UNIMAS), etc.

iv) Globalize Malaysia higher education system. The policies, programs and projects that are associated with this development process have been succinctly analyzed by people like Molly Lee (now at UNESCO Bangkok), Morshidi Sirat, and several other scholars. Due to that, Apex Universities was launched by former Malaysia Prime Minister Tun Abdullah Ahmad Badawi in *National Higher Education Action Plan 2007-2010* that includes a policy to support the emergence (via regulatory and material support) "Apex Universities", as well as greater autonomy, and independent auditing to ensure quality. One of the strategies for Apex University is to foster 'teaching and learning' (Global Higher Education, 2007). University Science Malaysia (USM) currently is Apex University.

v) Malaysia Government also introduced 'Stimulus Package' to enhance domestic growth and improve market confidence. This package ensures that a larger segment of the population will realize the benefit of

productive expenditure from the government. The Malaysia Government has allocated training funds under Kementerian Sumber Manusia and Jabatan Tenaga Kerja (JTK) to train fresh graduates, unemployed people and retrenched workers. In year 2011, the Government has launch new fund under '1 Malaysia' concept and this is still very new to the industry. Any companies in Malaysia can take this benefit to train the new workers. In the long run, Malaysia can reduce the intake of foreign workers (Zainuddin, 2009). The stimulus and '1 Malaysia' fund packages also helps the local companies to increase their training activities even under economic turmoil. In year 2009 only, all electronics companies will be exempted to pay one percent of their monthly wages to HRDF. Therefore, the stimulus package would be helpful to train new workers.

One important question is how the above policies and strategies affect the training effectiveness? Of all, the Government policies and strategies to increase employability and business market share would only help in training activities but the evaluation process was left behind. In recent Pembanguan Sumber Manusia Berhad (PSMB Conference - 23 May 09) the author as one the presenters presented the paper entitled 'Training Needs Analysis'. PSMB is under Kementerian Sumber Manusia. The last topic the author presented was the Training Evaluation. During the discussion with the participants and PSMB staff, majority of the companies as well as the Government Sector not

evaluating the training effectiveness in term of the behaviour and result (ROI). At most, the evaluation was done at Level 1 and 2.

The author has given the opportunity to work with JTK to train fresh graduates and unemployed workers for RapidKL. The objective of the program is to absorb these people to RapidKL after completion of the training. The condition given is providing training but the training effectiveness was not been mentioned or become a condition. It is sad to find that the Government has allocated a lot of money but not putting serious consideration to training effectiveness. It is just train and place. As a conclusion, as of current policies and strategies by Malaysia Government does not help to improve training effectiveness rather it's help to boost up the training activities.

5.5 Limitation

Like any other study, there are always some limitations, may they be internal or external. This study is no exception. A couple of the limitations are worth mentioning here.

5.5.1 Limited Methodology

The methodology used by the researcher while doing this research had exposed a few weaknesses as follow:

i. The research used the 5-point Likert scale (Likert, 1967) where the respondents were asked to evaluate the statements based on their agreement or disagreement. As mentioned by Brown (1990) that the respondents will tend to response to the statements immediately without reading the statement thoroughly or understand it. Some of the respondents like to be neutral by choosing '3' for most of the statement. The response received from the evaluation based on the respondents' understanding and perception. It is quite difficult for the researcher to check whether the respondents understand the question correctly even though the questionnaires were pilot run for several times.

ii. This is quantitative research where the researcher analyzed the framework. Quantitative research has its own limitation especially using people perception. The question is how do we transform or translate people perception into number? (Zakaria, 1999). It would be good to combine quantitative and qualitative research for similar research in the near future.

5.5.2 Limited Respondent and Industry

The respondents of this research were the technical staffs at Silterra Malaysia Sdn Bhd in the technician, engineer, and technical manager catagories. It did

not represent the entire spectrum of employees from other semiconductor wafer fabrication.

5.6 Future Research

The scope of the study only focuses to technical community in semiconductor wafer fabrication which is Silterra Malaysia Shn. Bhd. One of the possible areas for the research could be the target industry. For instance, new research can be done at Silterra with the involvement of non-technical staff but the training program must be common for both technical and non-technical staff. In addition, the research can also been done with a similar group of industry such as automotive, electronics or semiconductor industry where their population is very large.

This study and previous literatures by Kirkpatrick (1977, 1979, 1994, 1996, 2005), Mondy (2008), Osburn and Stock (2005), Pau (2001) and Swaminathan (1998) have only discussed the training effectiveness that involved the people in that particular organization. Regardless what level of evaluations yet the respondents evaluate it own organization. In other words, the respondent will evaluate the training effectiveness at his or her organization only. Future research can also look at two more items in evaluating training effectiveness. Firstly, the evaluation of training effectiveness from other people perspective. Study found that no one discuss or highlight the evaluation from customers or

suppliers perspective. A respondent from company A evaluates the training effectiveness of company B. This method also involves the perception of respondent about other company in term of training and development. The researcher can check the gap between evaluations done by employees in company A versus employees in company B about company A. So, the validation can be done between what has been declared versus the actual perception by other people outside the company. The researcher would like to call this evaluation as level 5 of training effectiveness – evaluation by customers or suppliers called **'acceptation'**.

Level 1 – Reaction

Level 2 – Learning

Level 3 – Behaviour

Level 4 – Result

Level 5 – Acceptation (additional new level of evaluation)

Secondly, the study can also focus one level of evaluation only either reaction or learning or behaviour or result or level 5 (acceptation). Lastly, this study had used only the quantitative approach while the result had indicated that there were many other factors which could contribute to training effectiveness. A qualitative or mixed-approaches will be useful in the future research so that different results may be obtained.

5.7 **Conclusion**

Although this study has a couple limitations and room for future research, the findings of this study still have their own significance. The findings can be used by any industry when considering their effort towards training. The evaluation of training effectiveness is very important so that the amount of energy and money invested are worthwhile. Results from this study have answered all the research questions, research objectives and research hypothesises that been developed earlier. This study showed that there were some contextual factors such as participant, trainer, training material and company that affect the reaction, learning and result but none of the contextual factors affect the behaviour. This finding was quite interesting since behaviour is one the important elements in training effectiveness (Kirkpatrick, 1975, 1996, 2005; Noe, 1986; Pau, 2001).

In summary, the overall results were not positive enough which means that there are other factors that affect the training effectiveness. However, the findings of this study have the potential to be generalized to other technical-based organizations in other countries. The result of this study exposed new findings about the contextual factors that affect the training effectiveness in the semiconductor wafer fabrication in Malaysia.

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Appendix 1

UNIVERSITI UTARA MALAYSIA
College of Business,
Sintok, Kedah.

SURVEY QUESTIONNAIRE

TOPIC: FACTORS AFFECT TRAINING EFFECTIVENESS IN SEMICONDUCTOR WAFER FABRICATION COMPANY. A CASE OF SILTERRA MALAYSIA SDN.BHD.

Dear Participants,

Thank you for taking the time to participate in this study on Training Effectiveness. We would appreciate it very much if you could answer all the questions/statements carefully. The information given by you will influence the accuracy and the success in this study.

All answer will be treated with strictly confidentiality and will be used for the purpose of this study only. If you want to receive the findings of the study, please give us your details (Name, Email and Contact Number). I am happy to give you a summary of the findings of this study.

Thank you for your cooperation.

Yours Sincerely,

Abdullah

Hj Abdullah bin Lin
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T **Appendix 2**
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GUIDELINES FOR FILLING-UP THIS SURVEY QUESTIONNAIRE

1. There is no right or wrong answer. All you need to do is to respond to the statements/questions as accurate as possible.
2. Kindly answer all statements/questions in the survey. Incomplete response will be difficult to analyze
3. Please return back to me after filling-up the survey
4. Thank you for taking the time to participate in this study of Training Effectiveness.
5. Estimate time to fill-up this questionnaire is about 15 to 20 minutes.

Important Note:

1.The evaluation is based on your recent training you have attended called **'Yield Management (YM)**'.
2.If you had attended the YM more than 1 times, please evaluate based on the most recent training.
3.You **are NOTrequired** to complete the survey if you have NOT attended the 'Yield Management' training program.

Part 1 - Background Information.

The information is for statistical purposes only and will be kept strictly confidential. Do not write your name anywhere in this questionnaire.

Designation:(please tick √)

Technician	
Engineer	
Technical Manager	

Highest Qualification. (Please tick √)

STPM :	
Certificate :	
Diploma:	
Degree :	
Master :	
PhD:	

Ethnic (Please tick √):

Malay:	
Chinese:	
Indian:	
Others (Malaysian)	

Please tick √ for each category

a. Gender	Male		Female			
b. Marital Status	Single		Married		Divorced	

Age: _____ years

Working Experience (in Semiconductor Industry or equivalent): ___ years ____months

Part 2: About Yield Management Training Program

1. Number of YM training program you had attended? ____ (Answer: 1 or 2 or 3).
2. Gender of the trainer for the most recent training program? *(Please tick √ of below box)*

Male	
Female	

3. What was the recent month and year you attended this training program?
Month _____ Year _____

Part 3: Participant, Trainer, Training Material, Training Program, Organization Working Environment and Technology of Yield Management

Following are statements pertaining to factors that influence the training effectiveness in the organization. Considering only the most recent training on Yield Management that you had attended, please indicate your response to following statements by ticking the appropriate number on the scale given below. Your feedback will be treated strictly confidential - do not write your name anywhere in the evaluation form.

Please indicate your response to the most recent Yield Management training program you had attended based on the following scale.

1 - Strongly Disagree(SD) 2 – Disagree(D) 3 – Neutral(N) 4 – Agree(A) 5 - Strongly Agree(SA)

		Scale				
A	**About you (Participant)**	**SD**	**D**	**N**	**A**	**SA**
1	I am very much excited about attending this training program	1	2	3	4	5
2	I have the prior knowledge and skill about yield management before attending this training program	1	2	3	4	5
3	I am confident that I can succeed in this training program.	1	2	3	4	5
4	I believe that I can perform better on the job after attending this training program	1	2	3	4	5
5	I attended this training program willingly	1	2	3	4	5
6	My job has provided me opportunities to learn knowledge and skills related to this training program.	1	2	3	4	5
7	I was informed about the objectives of this training program	1	2	3	4	5
8	I was interested in learning the training material that was covered in this training program.	1	2	3	4	5
9	I had learnt as much as I can from this training program.	1	2	3	4	5
10	I was motivated to learn the training material that was emphasized in this training program	1	2	3	4	5

Please circle/tick the appropriate answers based on the following scale.

1 - Strongly Disagree(SD) 2 – Disagree(D) 3 – Neutral(N) 4 – Agree(A) 5 - Strongly Agree(SA)

B	About the Trainer	SD	D	N	A	SA
11	The trainer is knowledgeable in the subject matter	1	2	3	4	5
12	The trainer has good experience in the subject matter	1	2	3	4	5
13	The trainer has good communication skills	1	2	3	4	5
14	The trainer has good presentation skills	1	2	3	4	5
15	The trainer checked whether the participants understood the topics.	1	2	3	4	5
16	The trainer knows how to manage time effectively	1	2	3	4	5
17	The trainer failed to show suitable examples of the concept taught	1	2	3	4	5
18	The trainer was well prepared	1	2	3	4	5
19	The trainer explained how each activity is related to the overall objective	1	2	3	4	5
C	**About Training Material**	**SD**	**D**	**N**	**A**	**SA**
20	The course content is not too detail	1	2	3	4	5
21	The course content is not too short or too long	1	2	3	4	5
22	The printed material is easy to read.	1	2	3	4	5
23	The course content is easy to understand	1	2	3	4	5
24	The picture/diagrams shown are good.	1	2	3	4	5
25	The material will provide a useful reference in the future	1	2	3	4	5
26	The course content is relevant to my job	1	2	3	4	5
27	The printed materials and other handouts are well organized	1	2	3	4	5
28	The course content is well structured.	1	2	3	4	5

Please circle/tick the appropriate answers based on the following scale.

1 - Strongly Disagree(SD) 2 – Disagree(D) 3 – Neutral(N) 4 – Agree(A) 5 - Strongly Agree(SA)

D	About Yield Management Training Program	SD	D	N	A	SA
29	The training program is relevant to my job	1	2	3	4	5
30	The training program is easy to understand	1	2	3	4	5
31	The training program is interesting	1	2	3	4	5
32	The training program met the company's objectives	1	2	3	4	5
33	The duration of training is not too long or too short.	1	2	3	4	5
34	The training program met my expectation	1	2	3	4	5
35	I found this training program is boring.	1	2	3	4	5
36	The examples used in this training were relevant to my job	1	2	3	4	5
37	The exercises used in this training were relevant to my job	1	2	3	4	5
E	**About the Company**	**SD**	**D**	**N**	**A**	**SA**
38	My company sets priority for me to attend this training program	1	2	3	4	5
39	My company informed me when to attend this training program	1	2	3	4	5
40	My company communicates to all employees that this training program is very important.	1	2	3	4	5
41	My company allocates budget for this training program every year.	1	2	3	4	5
42	My company concerns on return of investment (ROI) of this training program	1	2	3	4	5
43	My company does not understand why I need to attend this training program	1	2	3	4	5
F	**About Working Environment**	**SD**	**D**	**N**	**A**	**SA**
44	The training room was conducive during this training program	1	2	3	4	5
45	The nature of my work allows me to attend this training program without interruption	1	2	3	4	5
46	The seating arrangement of the classroom for this training program was well arranged	1	2	3	4	5
47	My supervisor gives recognition to those who apply new knowledge and skills to their work after attending this training program.	1	2	3	4	5
48	My supervisor encourages employees to attend this training program	1	2	3	4	5

Please circle/tick the appropriate answers based on the following scale.

1 - Strongly Disagree(SD) 2 – Disagree(D) 3 – Neutral(N) 4 – Agree(A) 5 - Strongly Agree(SA)

49	The meals served for this training program were good.	1	2	3	4	5
50	My working partner (colleague) does not encourage me to attend this training program.	1	2	3	4	5
51	The general atmosphere during this training program enhance the learning process	1	2	3	4	5
G	**Technology**	**SD**	**D**	**N**	**A**	**SA**
52	The equipment and facilities used in this training program support the learning process. (example: LCD projector, white board & overhead projector)	1	2	3	4	5
53	The training equipment used was not up-to-date	1	2	3	4	5
54	The computer software used to support the training program was up-to-date	1	2	3	4	5
55	The chairs and tables used during this training program were good.	1	2	3	4	5
56	The lighting is not too dark or too bright	1	2	3	4	5

Part 4: Training Effectiveness

Following are statements pertaining to training effectiveness of Yield Management training program in your organization. Considering only the most recent training on Yield Management you had attended, please indicate your response to following statements by circle the appropriate number on the scale given below.

Please indicate your response to the most recent Yield Management training program you had attended based on the following scale.

1 - Strongly Disagree(SD) 2 – Disagree(D) 3 – Neutral(N) 4 – Agree(A) 5 - Strongly Agree(SA)

		SCALE				
H	**Reaction: After the program.**	**SD**	**D**	**N**	**A**	**SA**
57	The training objectives were clearly stated and discussed	1	2	3	4	5
58	Each training objective was achieved successfully	1	2	3	4	5
59	The training has helped me to improve my knowledge and skills	1	2	3	4	5
60	The training has helped me to utilize my potential	1	2	3	4	5
61	I believe those who attend this training program would perform better after attending it.	1	2	3	4	5

Please circle/tick the appropriate answers based on the following scale.

1 - Strongly Disagree(SD) 2 – Disagree(D) 3 – Neutral(N) 4 – Agree(A) 5 - Strongly Agree(SA)

62	I can align my career development to meet my company's objectives	1	2	3	4	5
63	I am confident that I have the ability to succeed in my work.	1	2	3	4	5
64	The training program provided was very relevant to my work.	1	2	3	4	5
65	The training program provided improves my potential for future career growth.	1	2	3	4	5
66	The skills I have learnt from this training has been very helpful to develop my career	1	2	3	4	5
67	Now I can relate the importance of this training program to overall company objectives.	1	2	3	4	5
	Learning: Knowledge and Skill Acquisition	**SD**	**D**	**N**	**A**	**SA**
68	The quizzes and test used in this training program were based on the course objectives and the materials	1	2	3	4	5
69	I successfully passed all the tests in this training program.	1	2	3	4	5
70	I managed to demonstrate to the trainer that I completed all the exercises successfully.	1	2	3	4	5
71	I am sure I can overcome obstacles on the job that hinder my use of new knowledge and skills acquired from this training program.	1	2	3	4	5
72	Now, I have better understanding to do the actual jobs.	1	2	3	4	5
73	Now, I am confident to train other people.	1	2	3	4	5
74	I feel confident that my skills and abilities equal or exceed those of my colleagues.	1	2	3	4	5
	Behavior: Knowledge and Skills Application	**SD**	**D**	**N**	**A**	**SA**
75	I performed better on the job after attending this training program	1	2	3	4	5
76	I used my knowledge and skills to train others after attending this training program.	1	2	3	4	5
77	My quality of work has improved after attending this training program.	1	2	3	4	5
78	This training program has increased my capability to do the jobs.	1	2	3	4	5
79	I would not have performed better now without this training program	1	2	3	4	5
80	I have contributed significantly in achieving company's objectives after attending this training program.	1	2	3	4	5
81	I make better decisions in my work after attending this training program	1	2	3	4	5
82	I can apply what I have learnt from this training program	1	2	3	4	5

Please circle/tick the appropriate answers based on the following scale.

1 - Strongly Disagree(SD) 2 – Disagree(D) 3 – Neutral(N) 4 – Agree(A) 5 – Strongly Agree(SA)

83	I have positive working relationship with my working colleagues after attending this training program.	1	2	3	4	5
84	Overall, I am able to work independently after attending this training program	1	2	3	4	5
	Result: Return on Investment	**SD**	**D**	**N**	**A**	**SA**
85	After attending this training program the productivity of the company has improved	1	2	3	4	5
86	After attending this training program the quality of the product at my line has improved	1	2	3	4	5
87	After attending this training program the waste generated by the company has reduced	1	2	3	4	5
88	After attending this training program the process cycle-time at my line has improved.	1	2	3	4	5
89	After attending this training program the manufacturing cost has reduced.	1	2	3	4	5
90	After attending this training program the machine downtime has reduced.	1	2	3	4	5

THANK YOU FOR YOUR PARTICIPATION.

Appendix 3

SPSS RESULT

A. Data for Factor Analyses of Independent Variables

KMO and Bartlett's Test

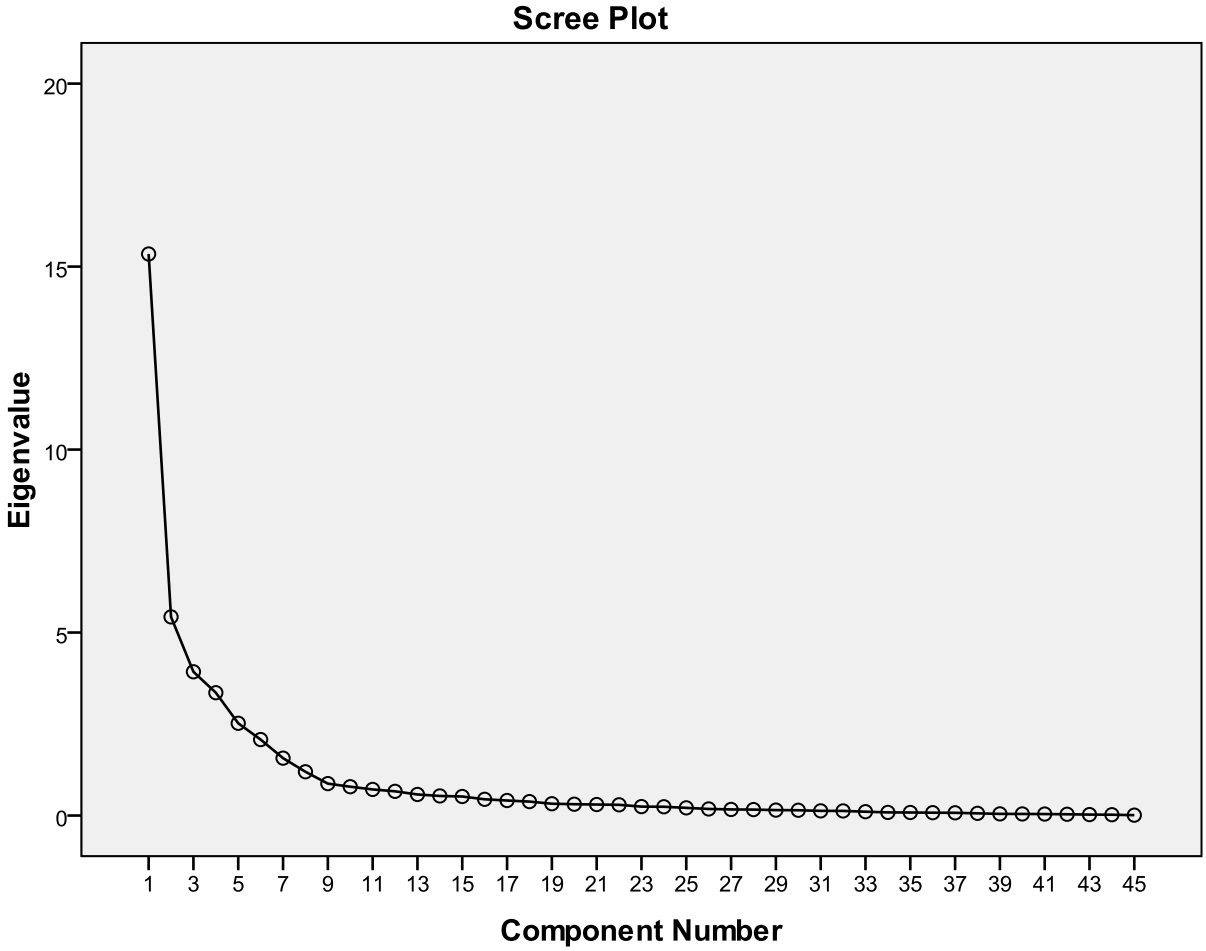
dimension0	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.840
	Bartlett's Test of Sphericity	Approx. Chi-Square	10412.926
		df	990
		Sig.	.000

Total Variance Explained

Component		dimension1								
		Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
		dimension2			dimension2			dimension2		
		Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
dimension0	1	15.344	34.098	34.098	15.344	34.098	34.098	7.777	17.282	17.282
	2	5.428	12.062	46.160	5.428	12.062	46.160	6.276	13.946	31.228
	3	3.928	8.729	54.889	3.928	8.729	54.889	6.003	13.341	44.568
	4	3.356	7.458	62.347	3.356	7.458	62.347	4.417	9.816	54.384
	5	2.521	5.602	67.948	2.521	5.602	67.948	4.147	9.215	63.599
	6	2.076	4.614	72.562	2.076	4.614	72.562	2.612	5.806	69.405
	7	1.568	3.485	**76.047**	1.568	3.485	76.047	2.299	5.109	74.514
	8	1.196	2.658	78.705						
	9	.872	1.938	80.643						
	10	.787	1.749	82.392						
	11	.714	1.586	83.978						
	12	.661	1.469	85.447						
	13	.576	1.280	86.727						
	14	.535	1.190	87.917						
	15	.520	1.156	89.072						
	16	.444	.986	90.058						
	17	.410	.912	90.970						

18	.381	.846	91.817						
19	.323	.717	92.533						
20	.310	.688	93.221						
21	.301	.668	93.890						
22	.293	.651	94.541						
23	.244	.542	95.083						
24	.240	.532	95.615						
25	.210	.466	96.082						
26	.180	.400	96.482						
27	.166	.370	96.851						
28	.163	.361	97.213						
29	.149	.330	97.543						
30	.144	.321	97.863						
31	.128	.283	98.147						
32	.126	.280	98.427						
33	.105	.233	98.660						
34	.086	.190	98.850						
35	.083	.185	99.035						
36	.078	.173	99.207						
37	.075	.166	99.373						
38	.060	.133	99.506						
39	.045	.100	99.606						
40	.043	.096	99.702						
41	.041	.090	99.793						
42	.035	.077	99.869						
43	.026	.058	99.927						
44	.023	.050	99.977						
45	.010	.023	100.000						

Extraction Method: Principal Component Analysis.



B. Data use for Factor Analyses for Dependent Variables

1. Reaction

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.881
Bartlett's Test of Sphericity	Approx. Chi-Square	1213.221
	df	21

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.881
Bartlett's Test of Sphericity	Approx. Chi-Square	1213.221
	df	21
	Sig.	.000

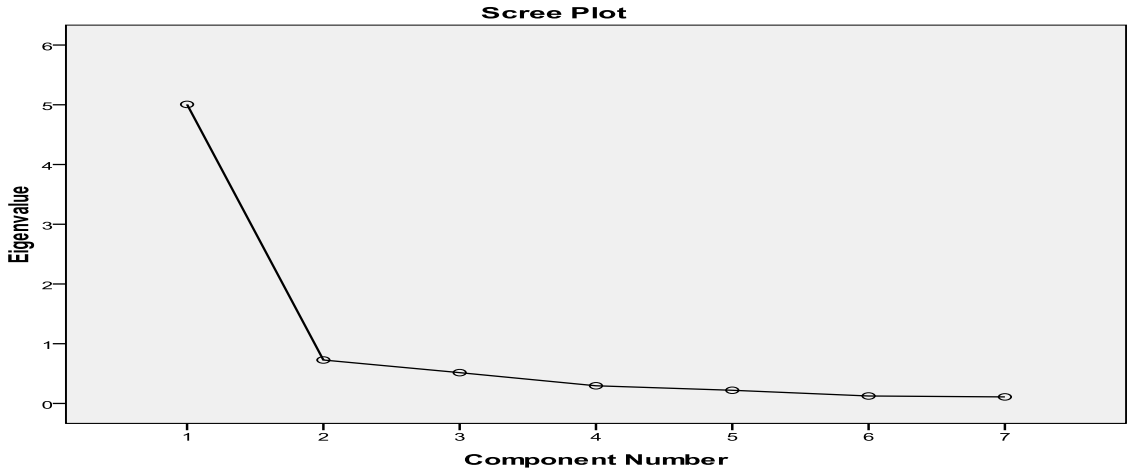
Rotated Component Matrix[a]

a. Only one component was extracted. The solution cannot be rotated.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.006	71.517	**71.517**	5.006	71.517	71.517
2	.727	10.390	81.906			
3	.516	7.367	89.273			
4	.296	4.227	93.500			
5	.221	3.151	96.651			
6	.125	1.783	98.434			
7	.110	1.566	100.000			

Extraction Method: Principal Component Analysis.



2. LEARNING

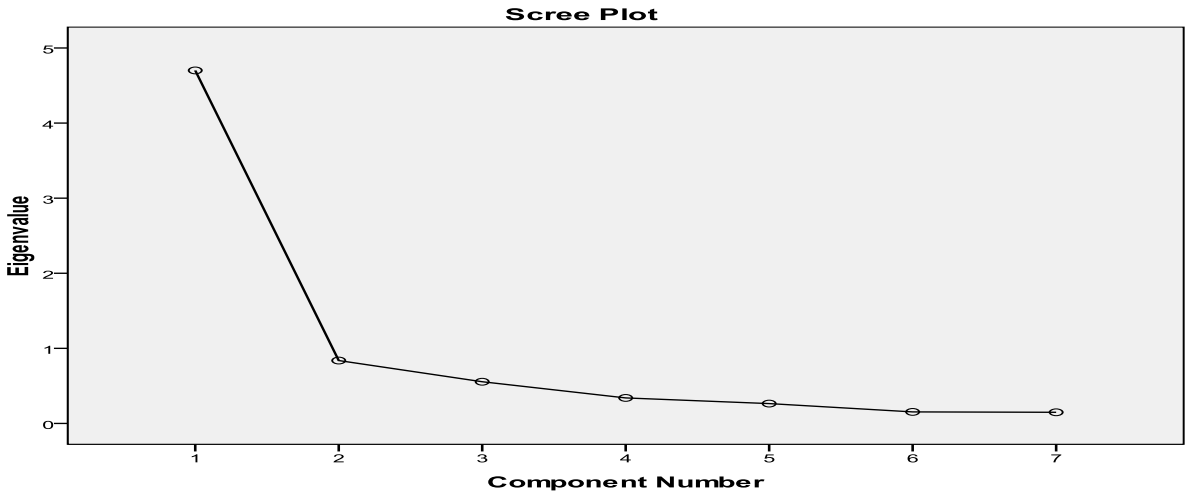
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.878
Bartlett's Test of Sphericity	Approx. Chi-Square	1026.735
	df	21
	Sig.	.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.701	67.157	**67.157**	4.701	67.157	67.157
2	.838	11.965	79.122			
3	.555	7.933	87.055			
4	.340	4.854	91.909			
5	.264	3.776	95.685			
6	.154	2.195	97.880			
7	.148	2.120	100.000			

Extraction Method: Principal Component Analysis.



Rotated Component Matrix[a]

a. Only one component was extracted. The solution cannot be rotated.

3. BEHAVIOR

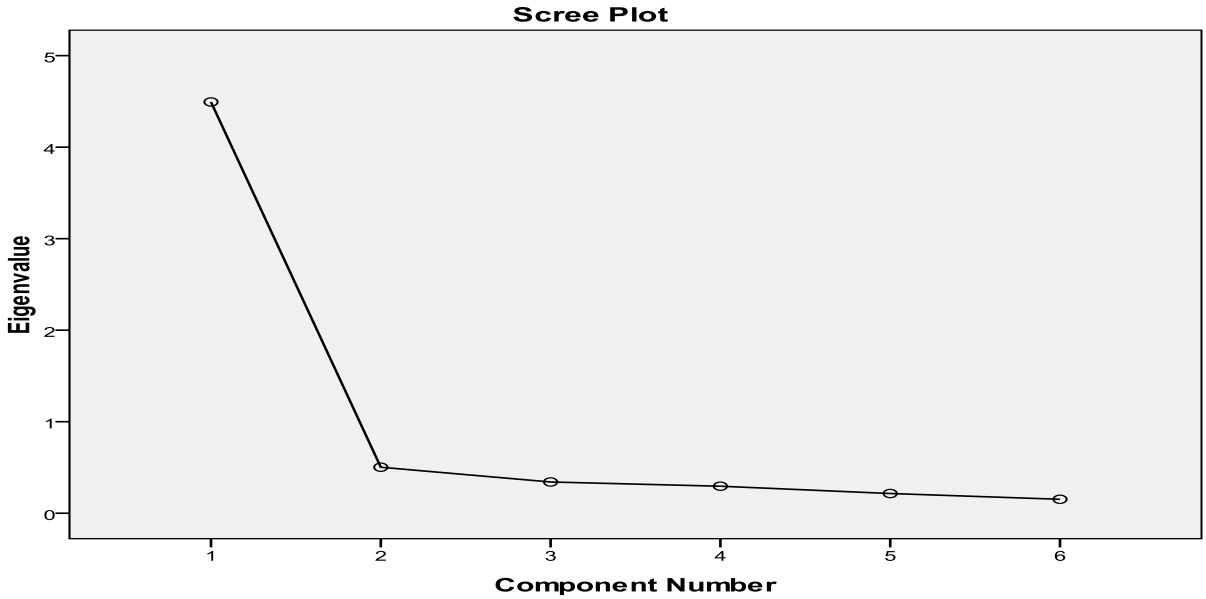
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.889
Bartlett's Test of Sphericity	Approx. Chi-Square	931.415
	df	15
	Sig.	.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.493	74.888	**74.888**	4.493	74.888	74.888
2	.503	8.376	83.264			
3	.341	5.689	88.953			
4	.295	4.918	93.872			
5	.215	3.590	97.461			
6	.152	2.539	100.000			

Extraction Method: Principal Component Analysis.



4. RESULT

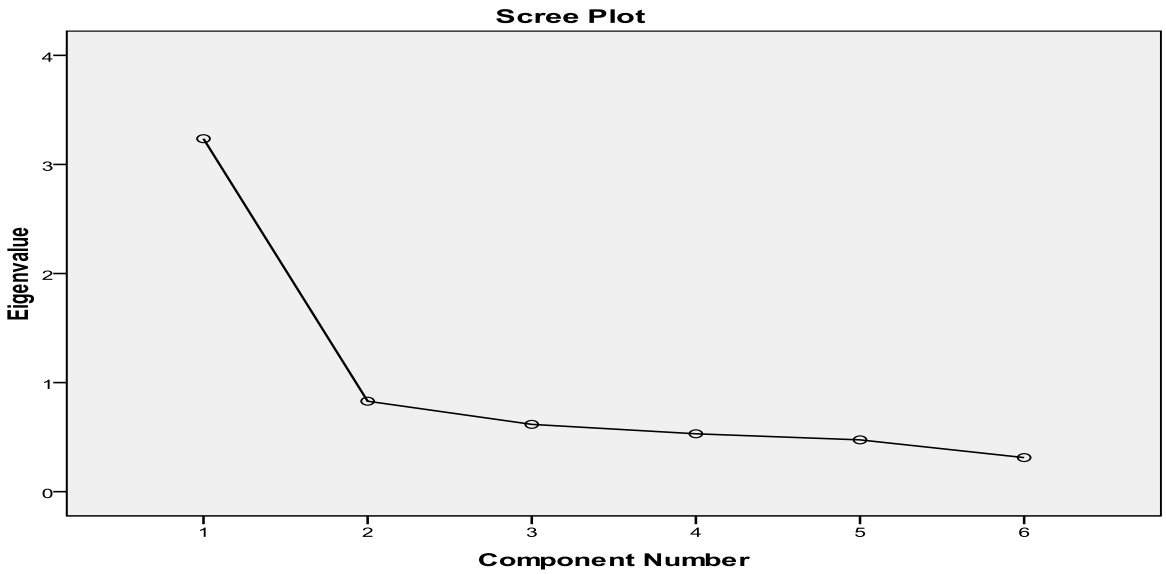
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.817
Bartlett's Test of Sphericity	Approx. Chi-Square	387.548
	df	15
	Sig.	.000

Total Variance Explained

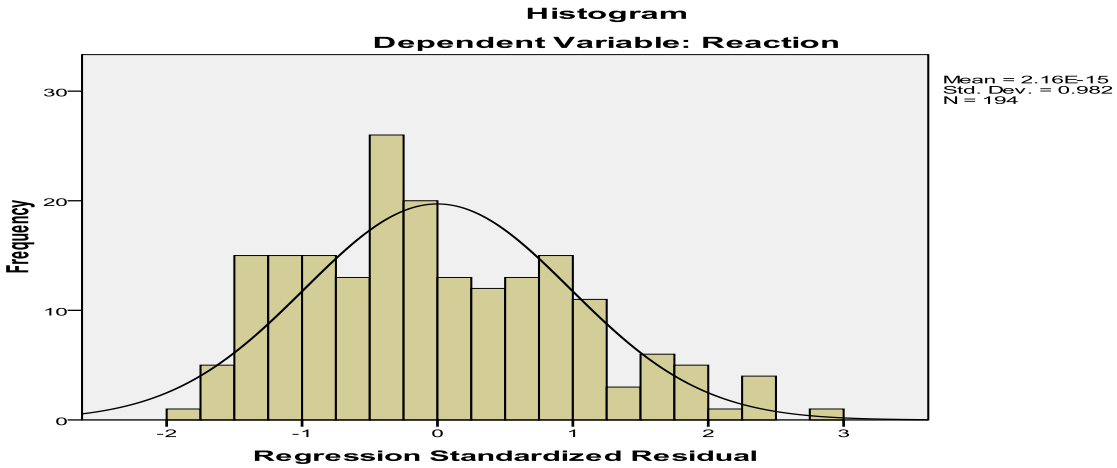
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.236	53.932	**53.932**	3.236	53.932	53.932
2	.829	13.822	67.754			
3	.617	10.283	78.037			
4	.531	8.843	86.880			
5	.475	7.914	94.794			
6	.312	5.206	100.000			

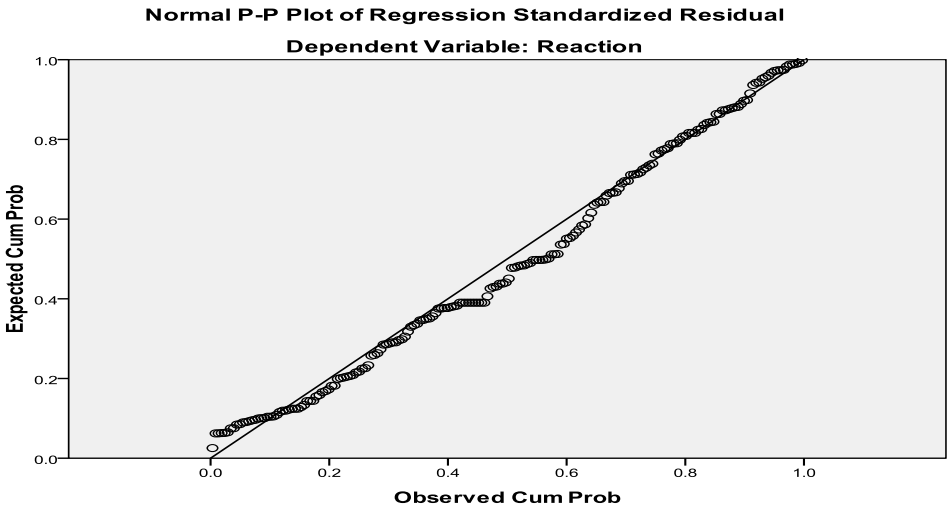
Extraction Method: Principal Component Analysis.

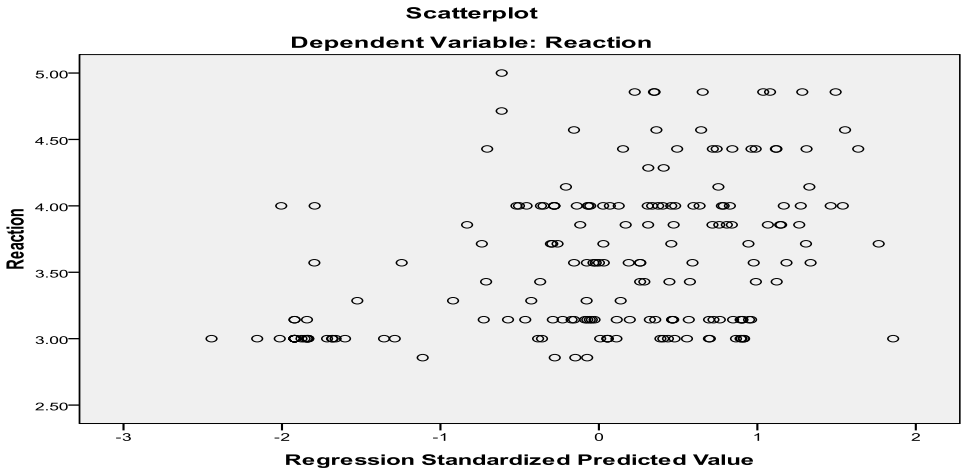


C. Regression Analyses Chart

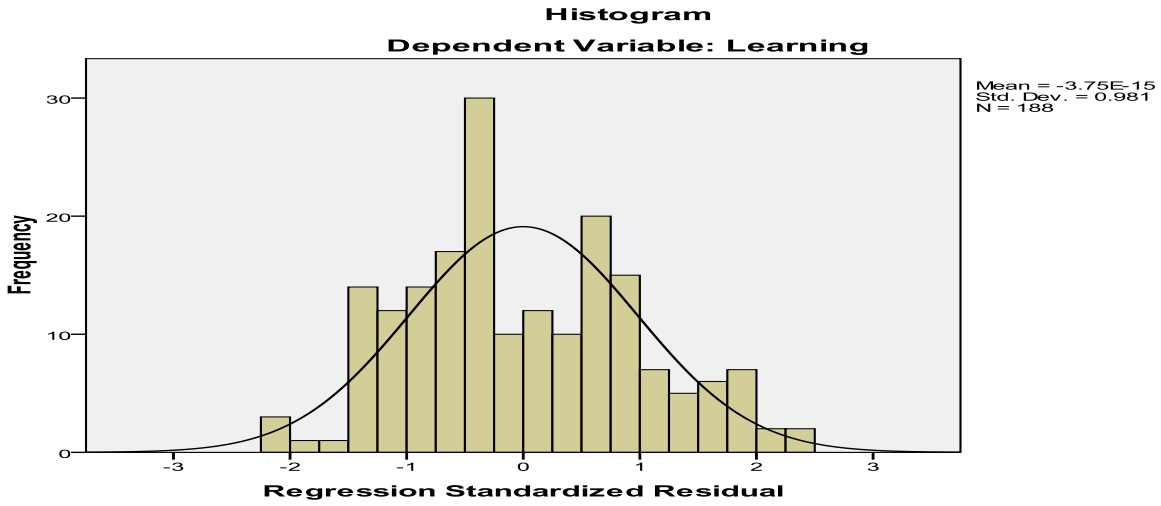
1. Reaction

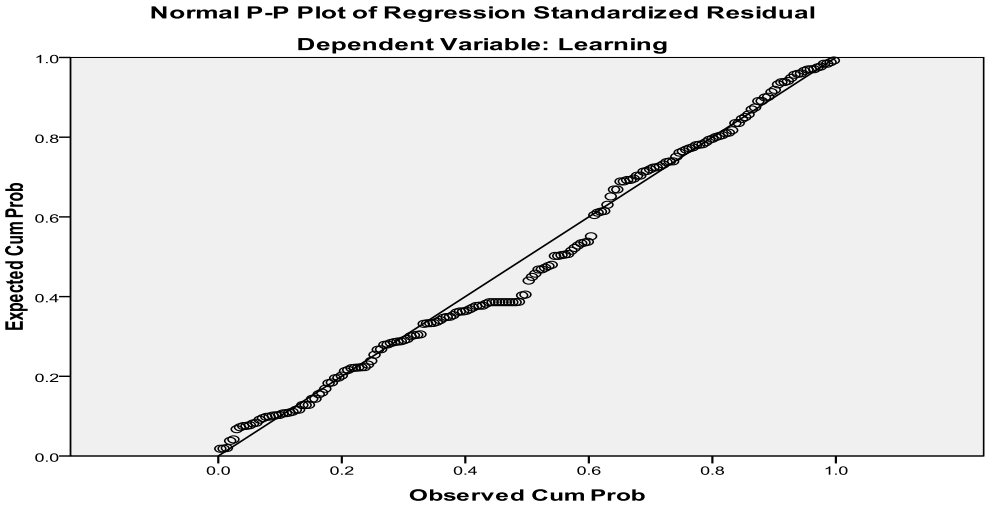


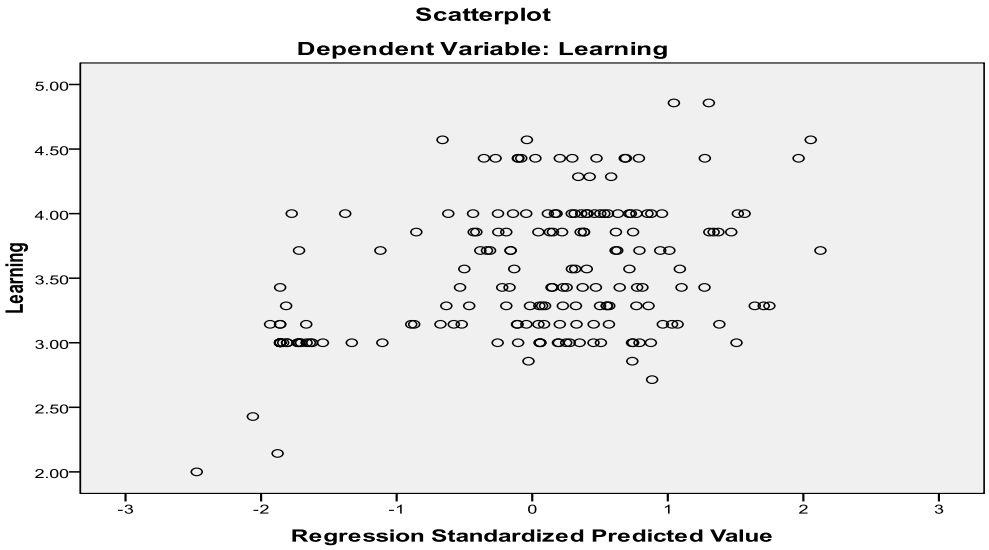




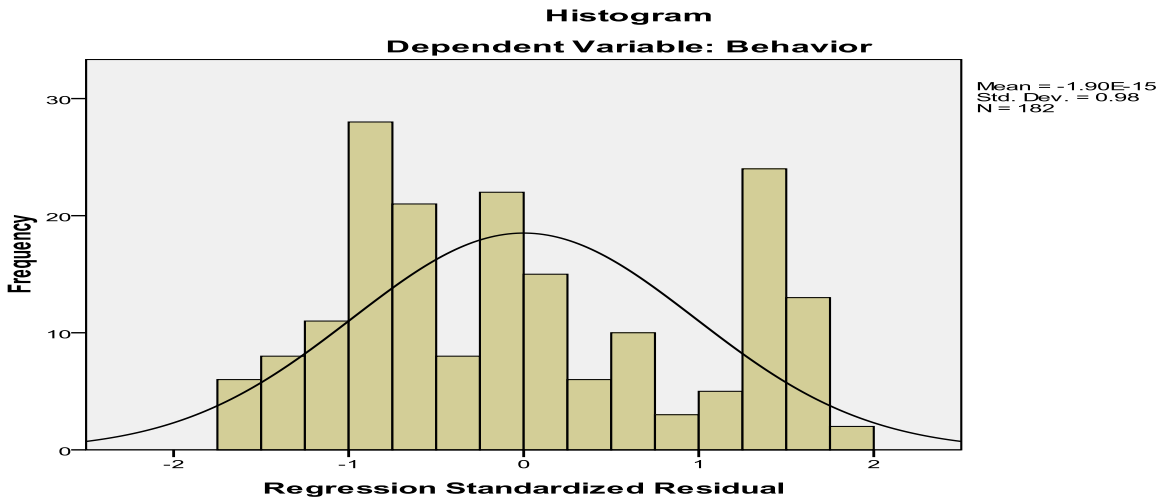
2. Learning

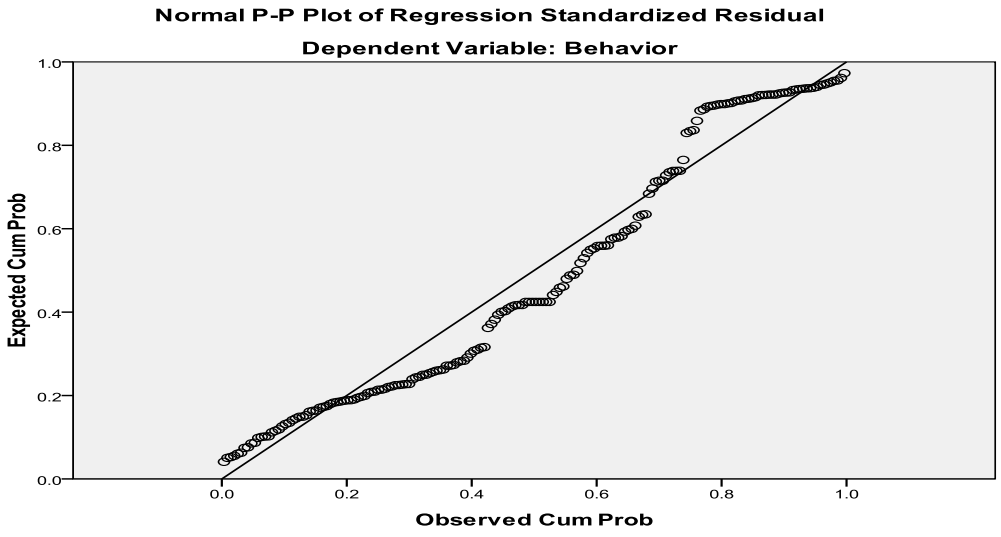

Histogram
Dependent Variable: Learning
Mean = -3.75E-15
Std. Dev. = 0.981
N = 188
Frequency
Regression Standardized Residual

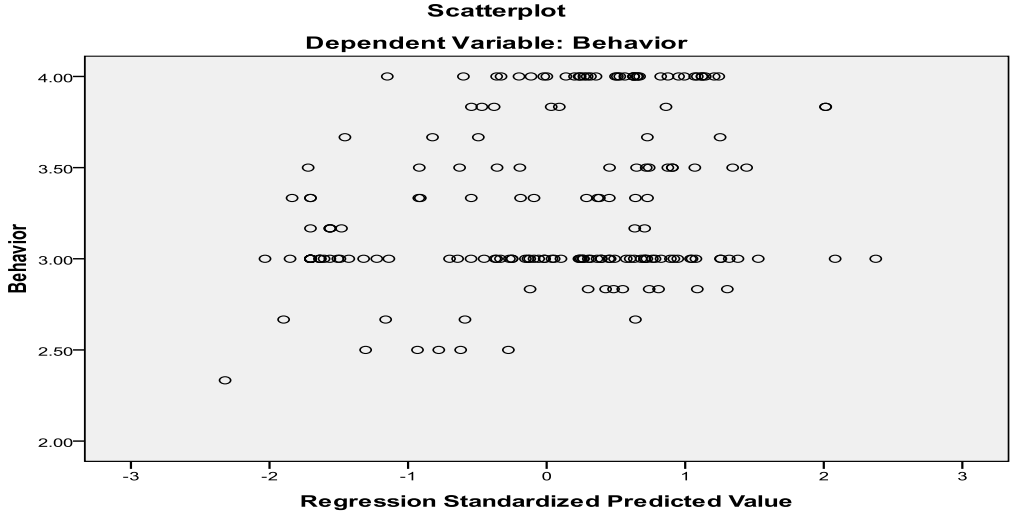

Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Learning
Expected Cum Prob
Observed Cum Prob


Scatterplot
Dependent Variable: Learning
Learning
Regression Standardized Predicted Value

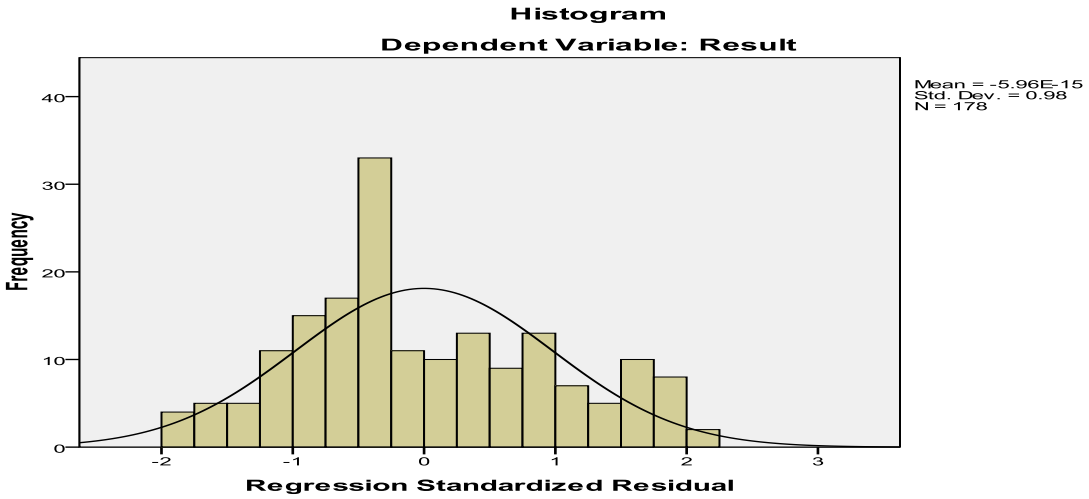
3. Behavior

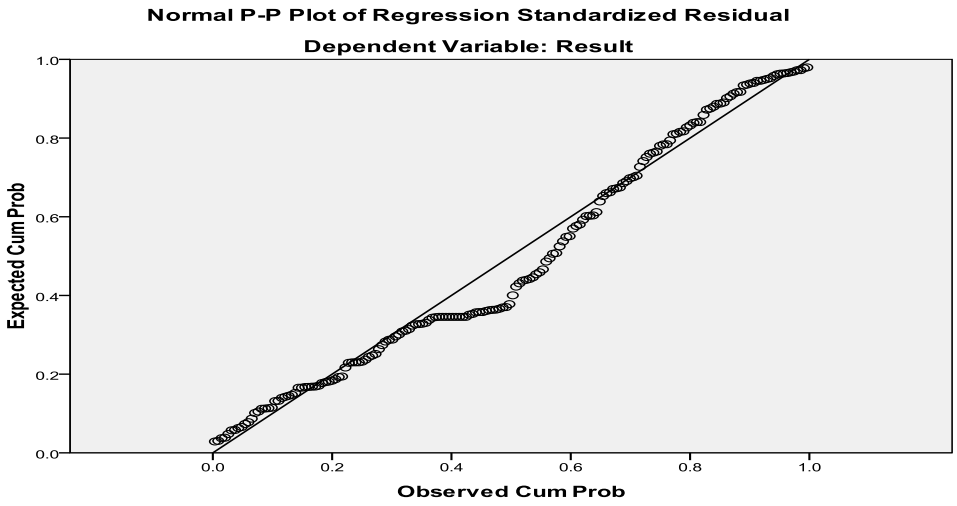

Histogram
Dependent Variable: Behavior
Mean = -1.90E-15
Std. Dev. = 0.98
N = 182
Frequency
Regression Standardized Residual

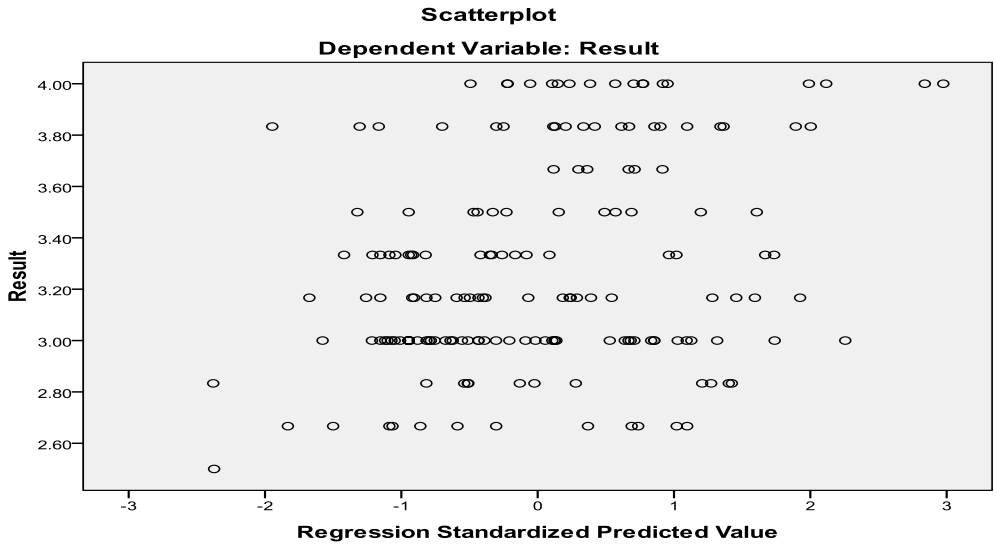

Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Behavior
Expected Cum Prob
Observed Cum Prob


Scatterplot
Dependent Variable: Behavior
Behavior
Regression Standardized Predicted Value

4. Result


Histogram
Dependent Variable: Result
Mean = -5.96E-15
Std. Dev. = 0.98
N = 178
Frequency
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: Result
Expected Cum Prob
Observed Cum Prob


Scatterplot
Dependent Variable: Result
Result
Regression Standardized Predicted Value

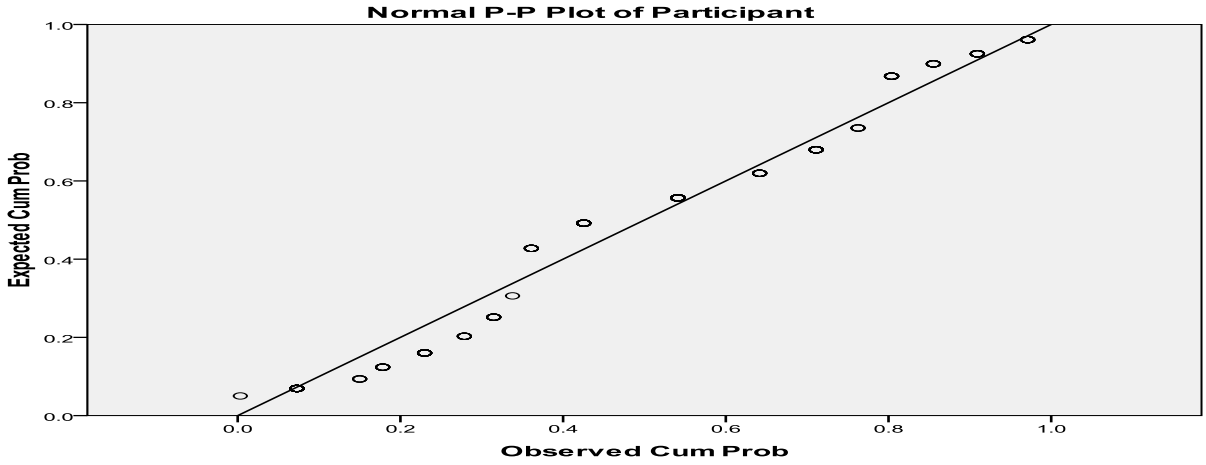
LINEARITY

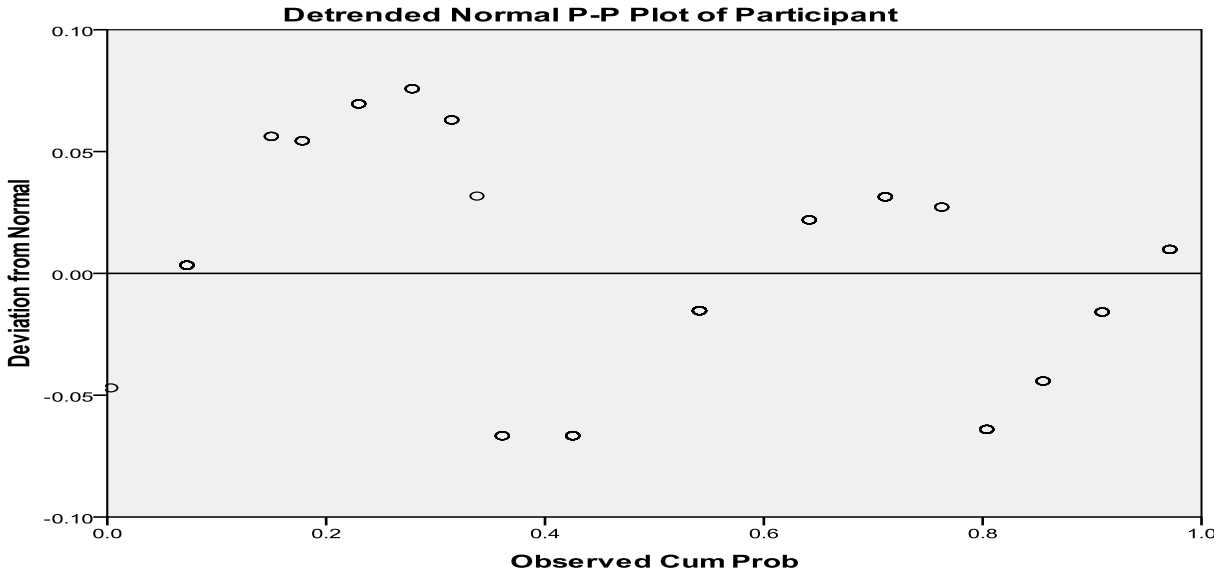
P-PLOT

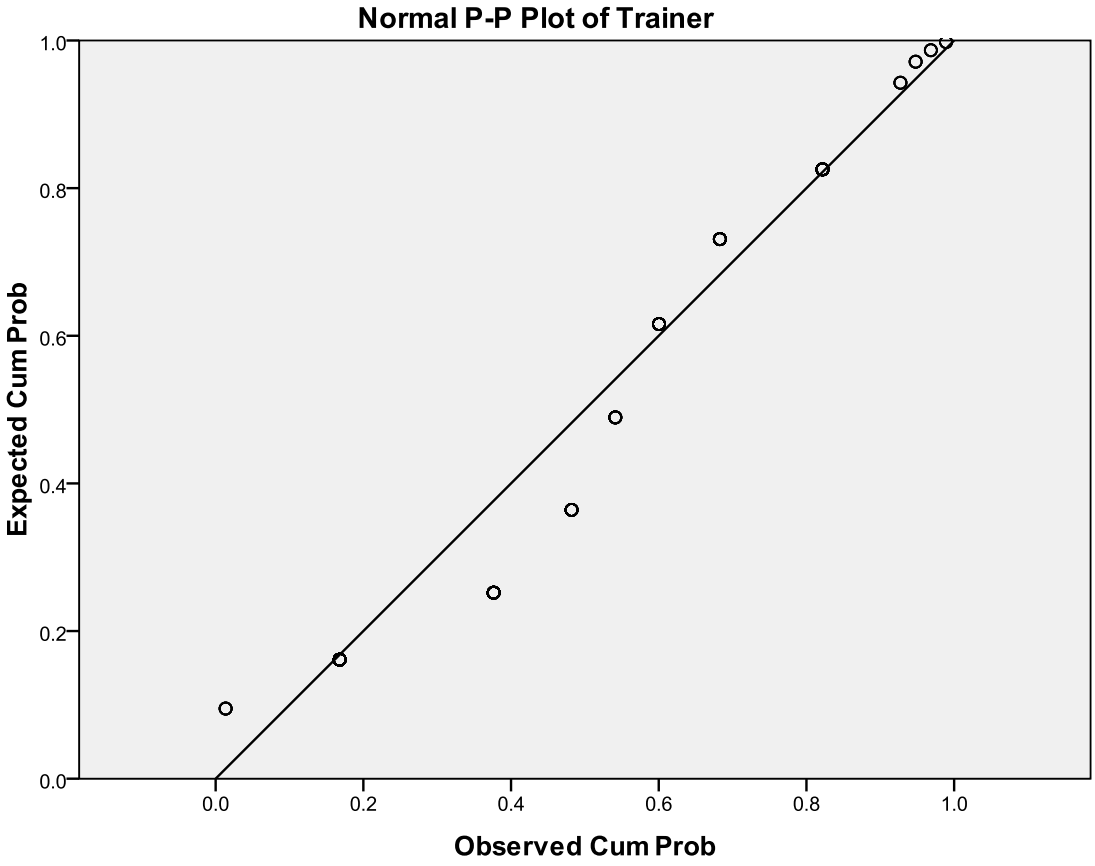
Estimated Distribution Parameters

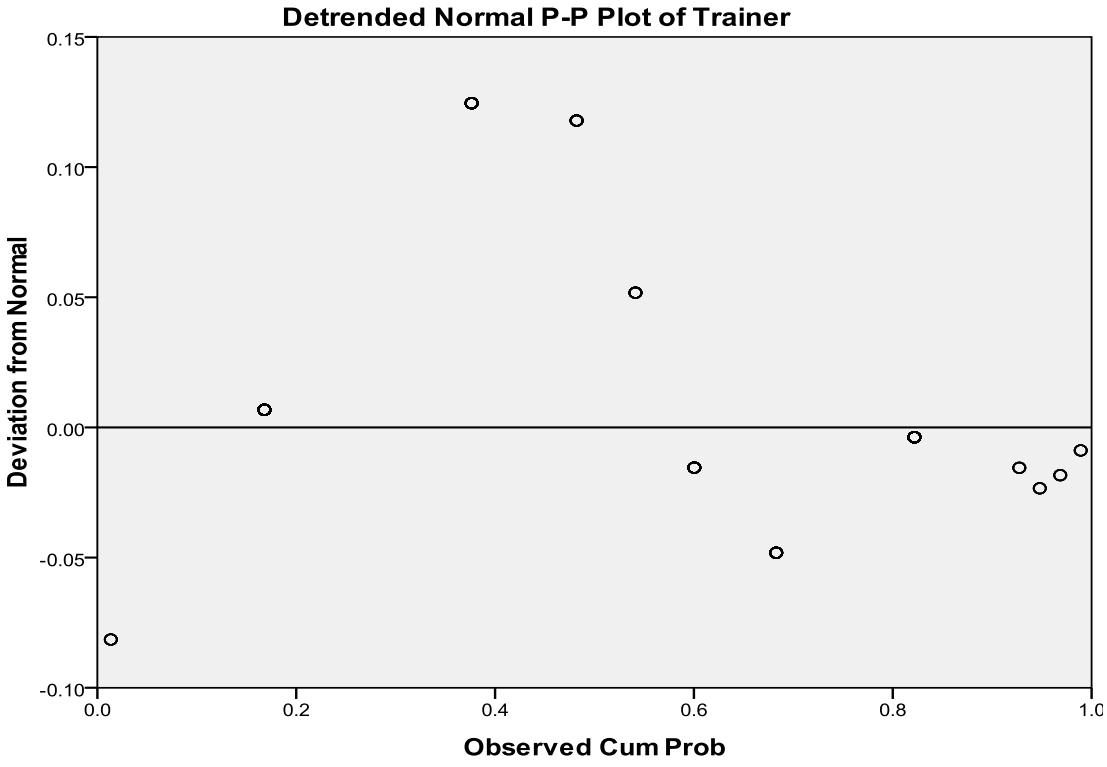
		Participant	Trainer	Training_Material	Yield_management	Company	Working_environment	Technology	Reaction	Learning	Behavior	Result
Normal Distribution	Location	3.9124	3.5137	3.9149	3.6887	3.8144	3.7887	3.4416	3.5928	3.5766	3.3436	3.2723
	Scale	.61623	.51916	.62248	.58120	.67690	.66407	.40616	.56498	.55821	.51841	.44712

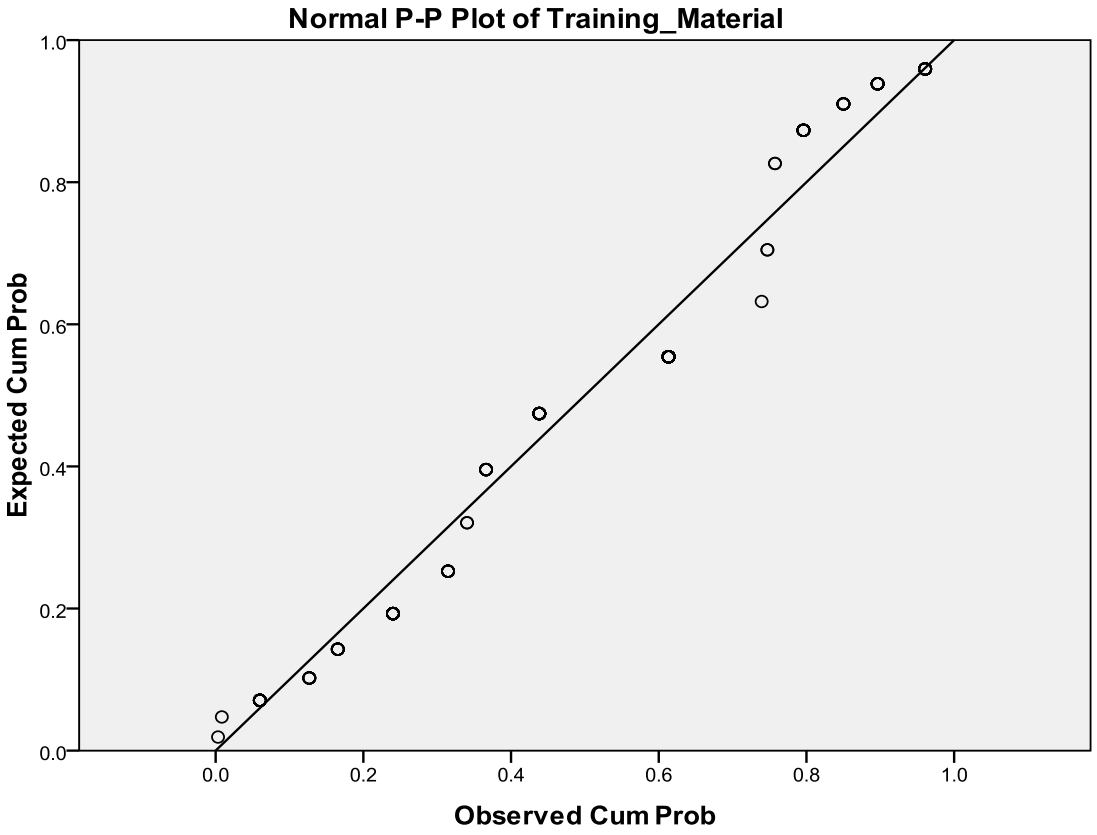
The cases are unweighted.

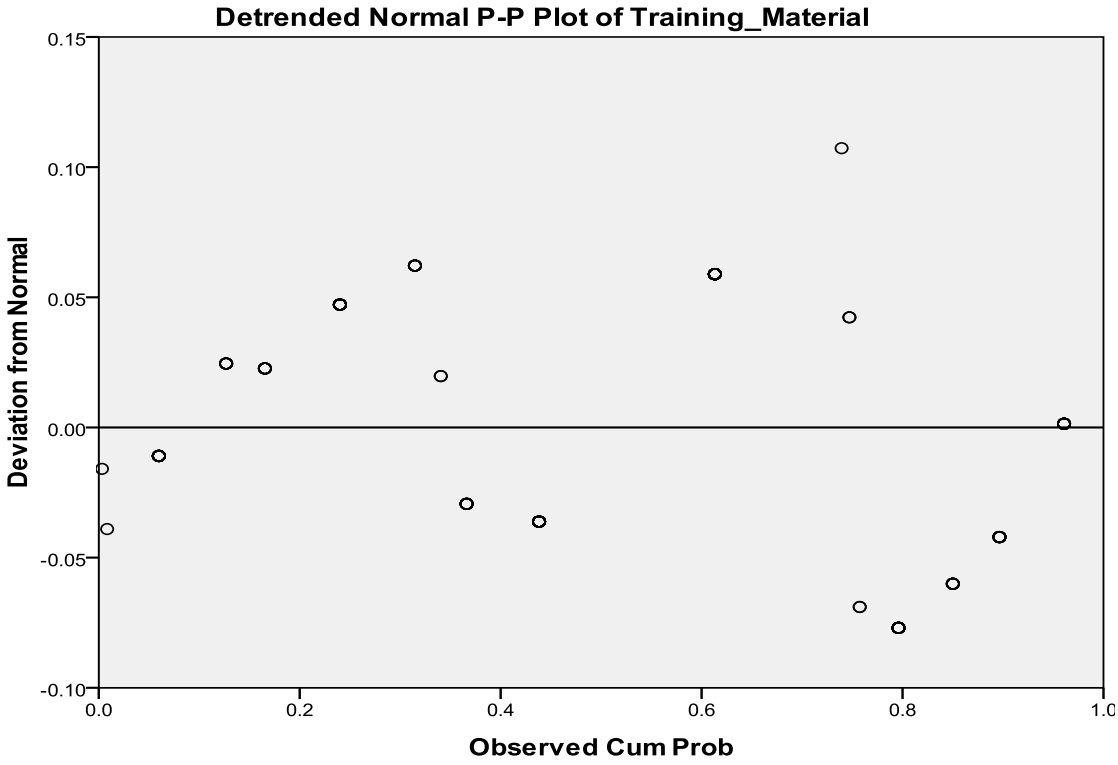


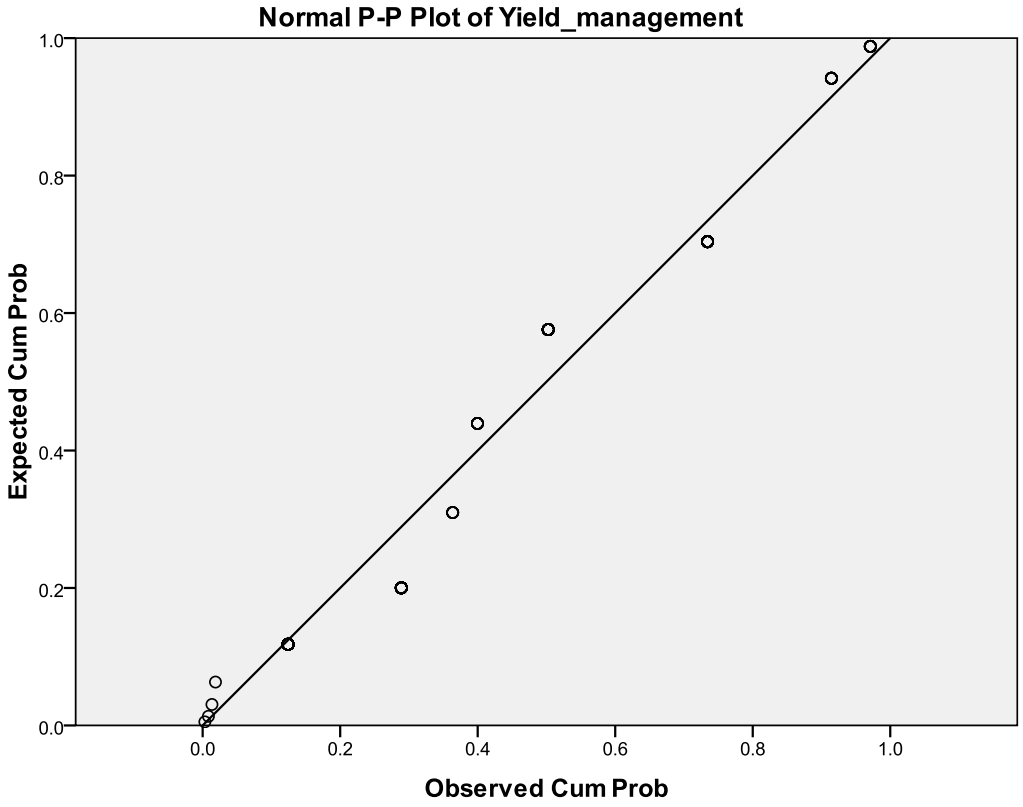


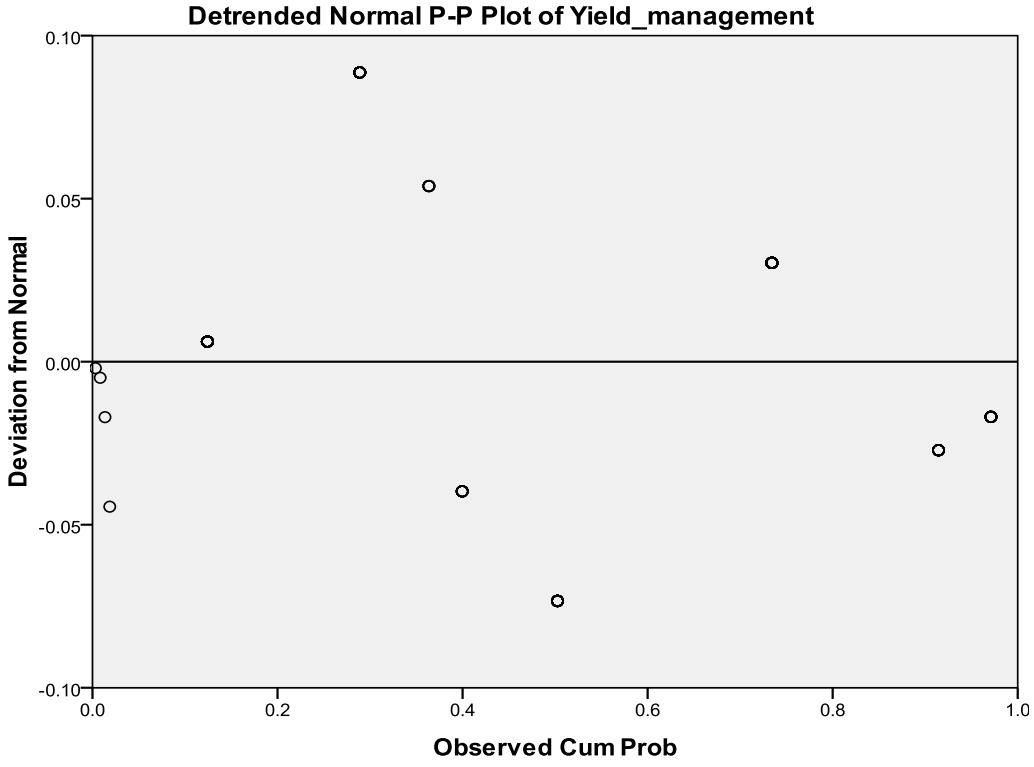

Normal P-P Plot of Trainer
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0

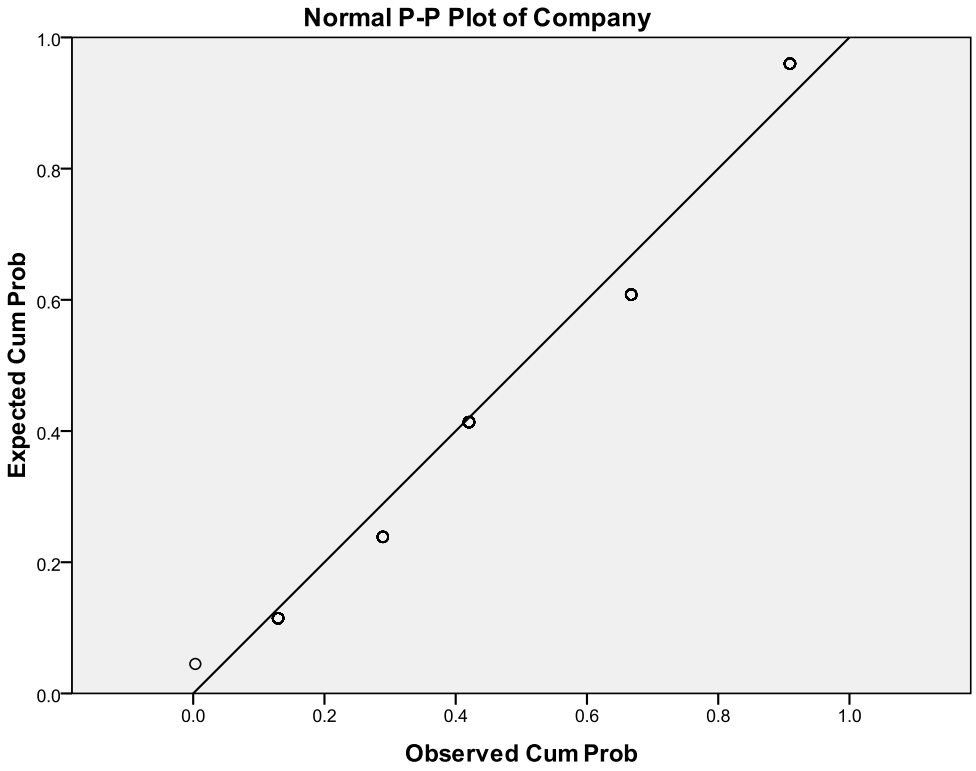

Detrended Normal P-P Plot of Trainer
Deviation from Normal
Observed Cum Prob
0.15
0.10
0.05
0.00
-0.05
-0.10
0.0
0.2
0.4
0.6
0.8
1.0

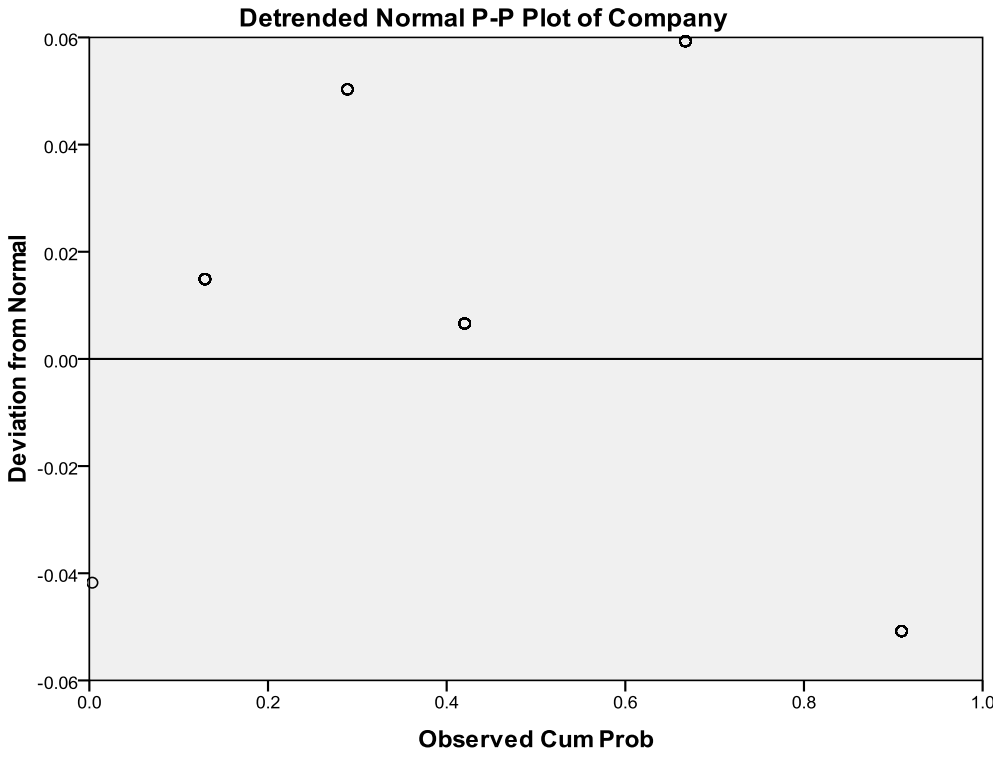

Normal P-P Plot of Training_Material
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0

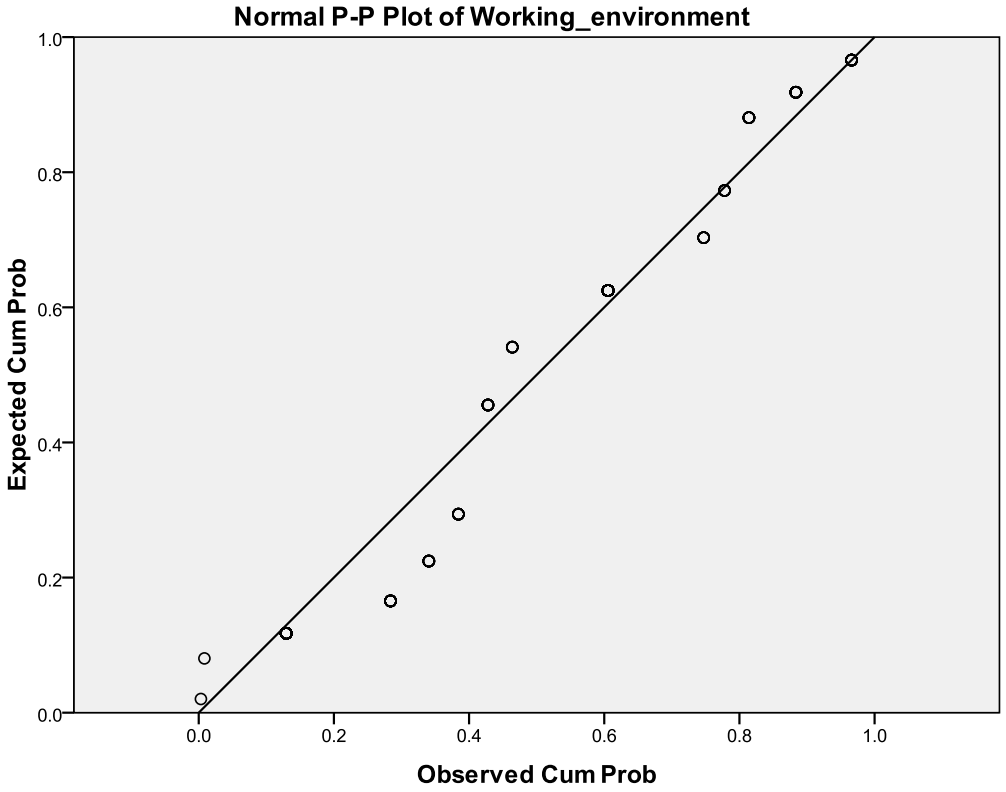

Detrended Normal P-P Plot of Training_Material
Deviation from Normal
Observed Cum Prob
0.15
0.10
0.05
0.00
-0.05
-0.10
0.0
0.2
0.4
0.6
0.8
1.0

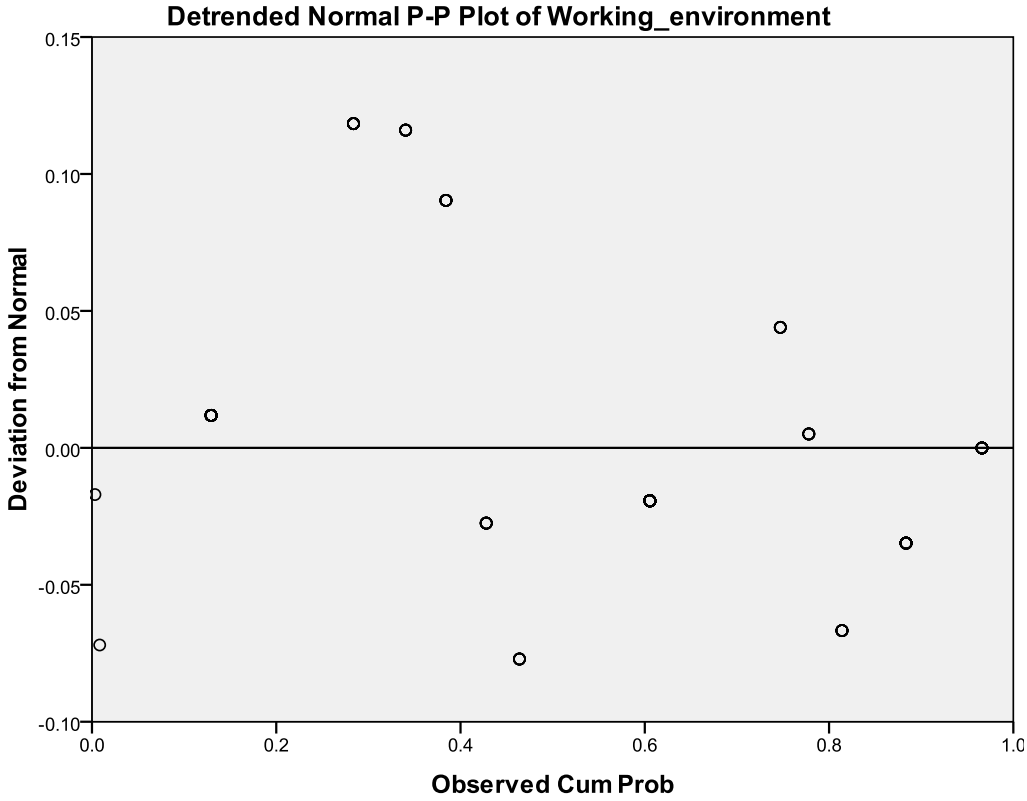

Normal P-P Plot of Yield_management
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0

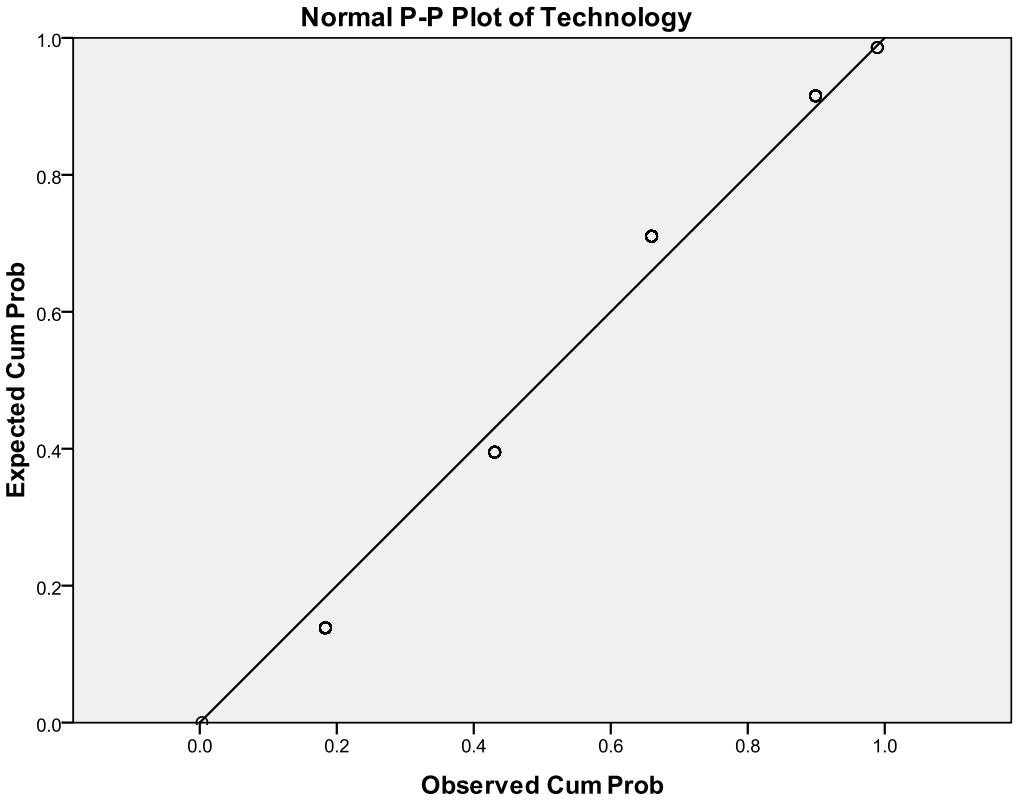

Detrended Normal P-P Plot of Yield_management
Deviation from Normal
Observed Cum Prob
0.10
0.05
0.00
-0.05
-0.10
0.0
0.2
0.4
0.6
0.8
1.0

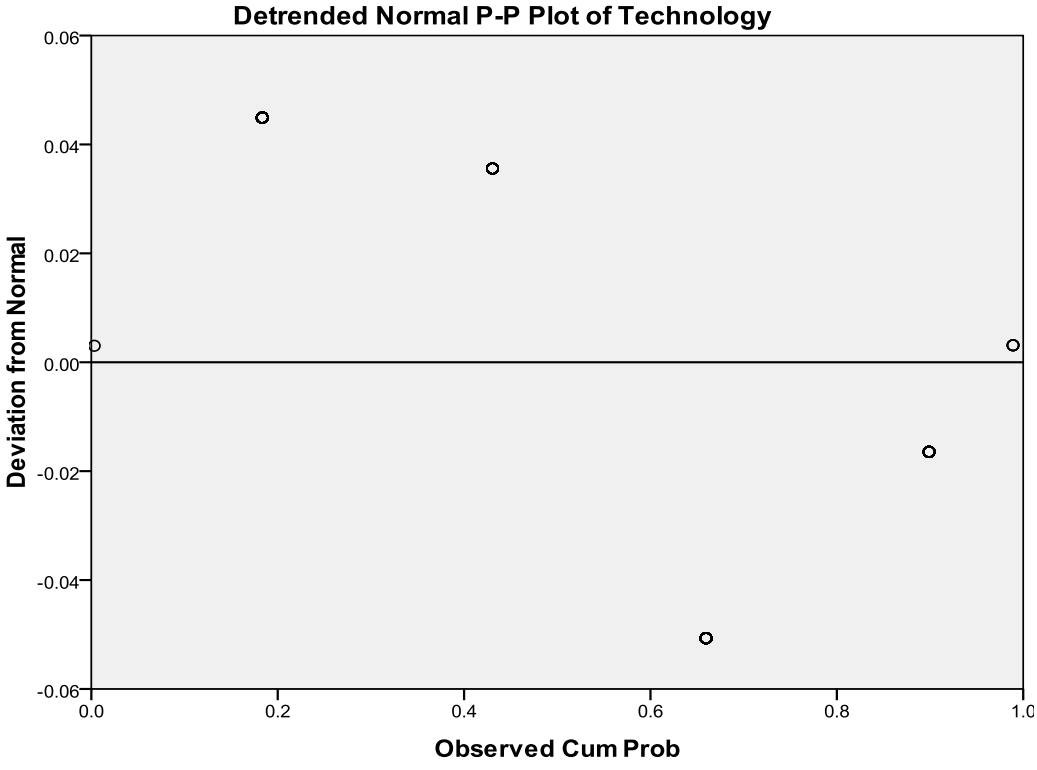

Normal P-P Plot of Company
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0

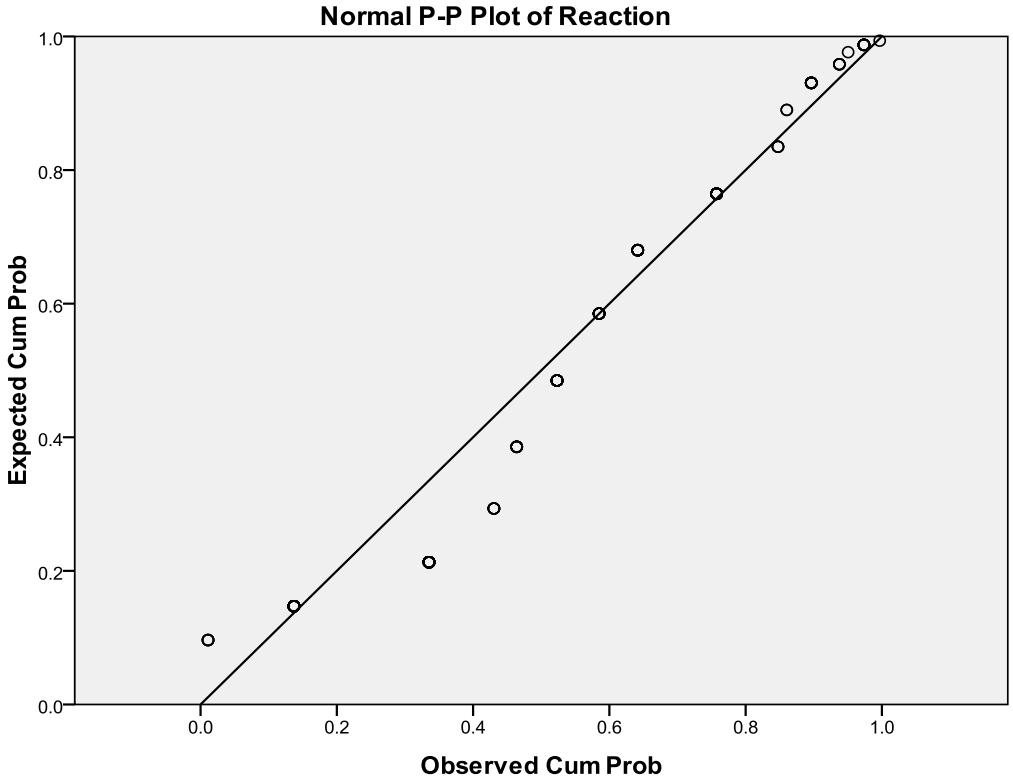

Detrended Normal P-P Plot of Company
Deviation from Normal
Observed Cum Prob
0.06
0.04
0.02
0.00
-0.02
-0.04
-0.06
0.0
0.2
0.4
0.6
0.8
1.0

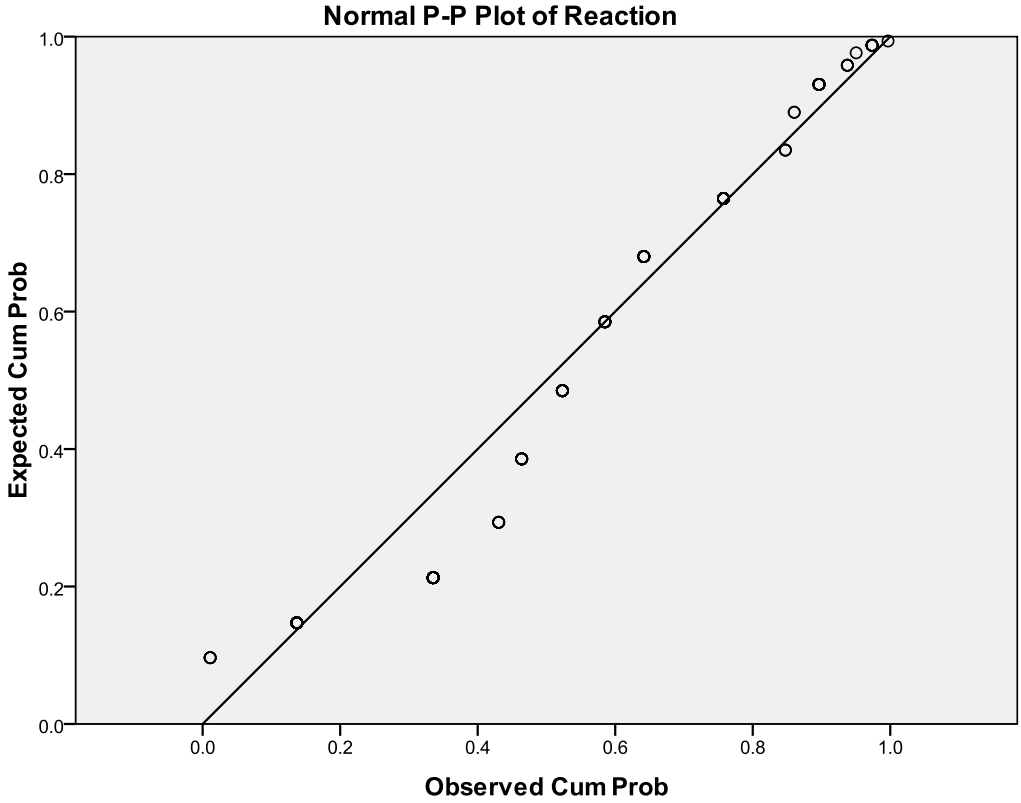

Normal P-P Plot of Working_environment
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0

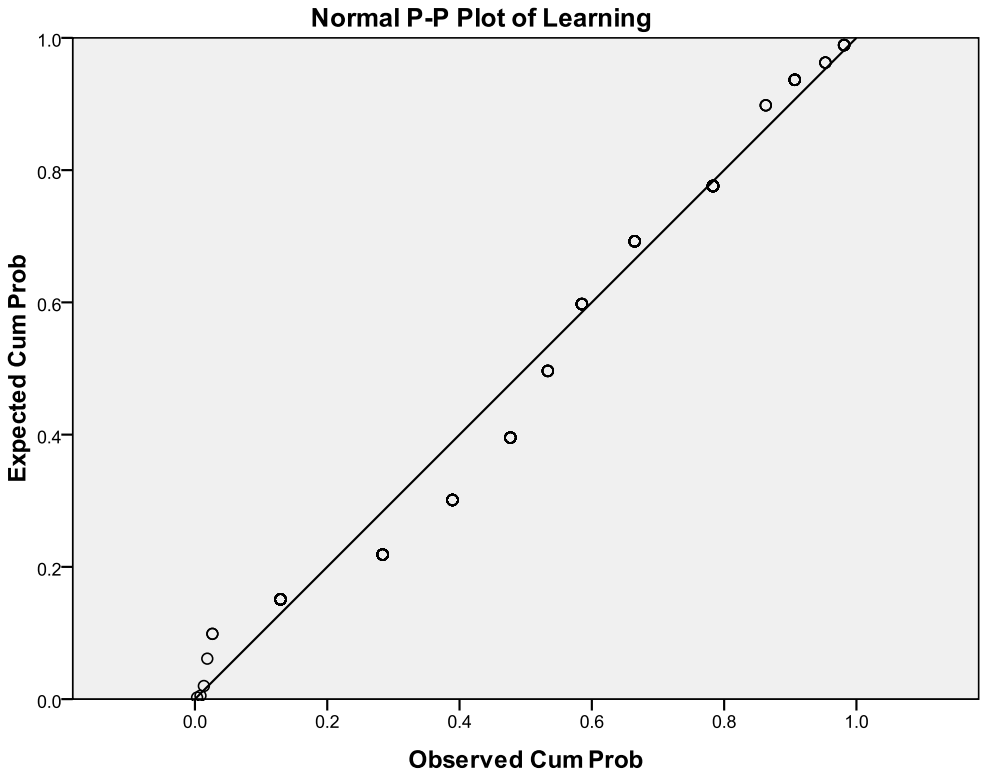

Detrended Normal P-P Plot of Working_environment
Deviation from Normal
Observed Cum Prob
0.15
0.10
0.05
0.00
-0.05
-0.10
0.0
0.2
0.4
0.6
0.8
1.0

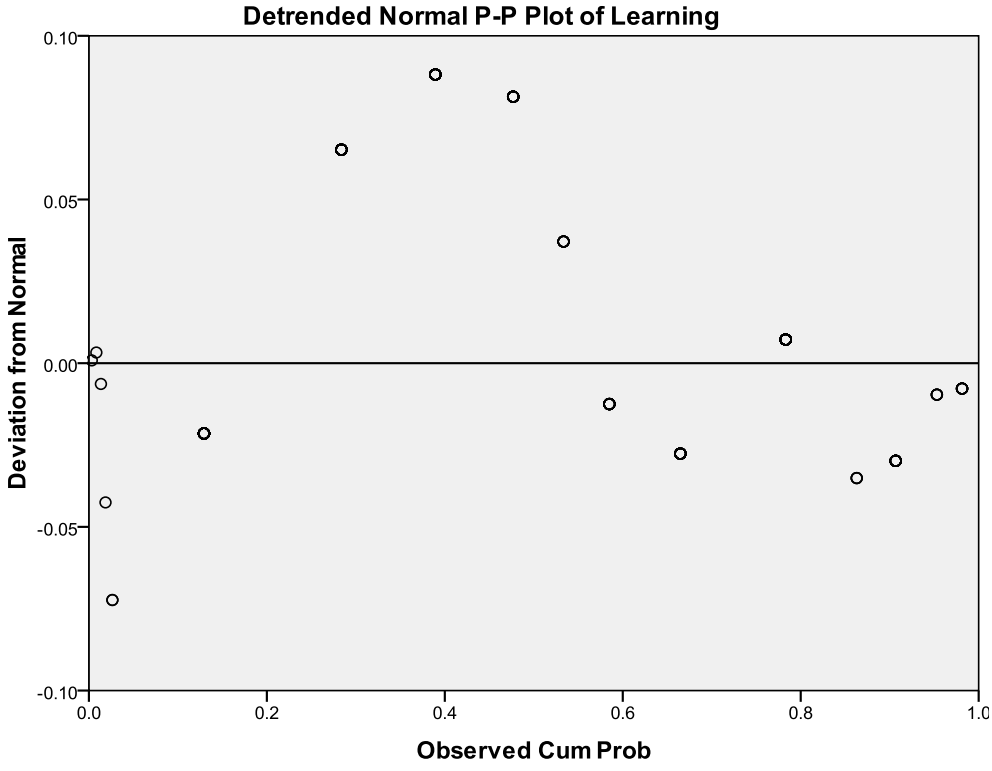

Normal P-P Plot of Technology
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0

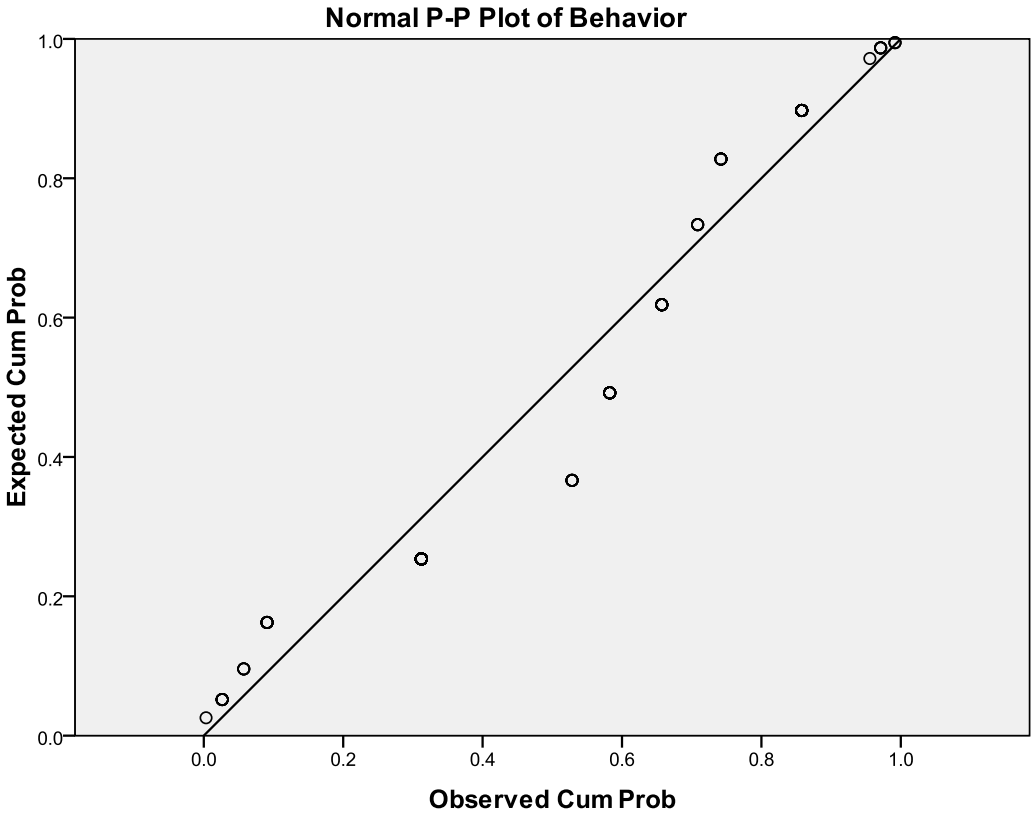

Detrended Normal P-P Plot of Technology
Deviation from Normal
Observed Cum Prob
0.06
0.04
0.02
0.00
-0.02
-0.04
-0.06
0.0
0.2
0.4
0.6
0.8
1.0

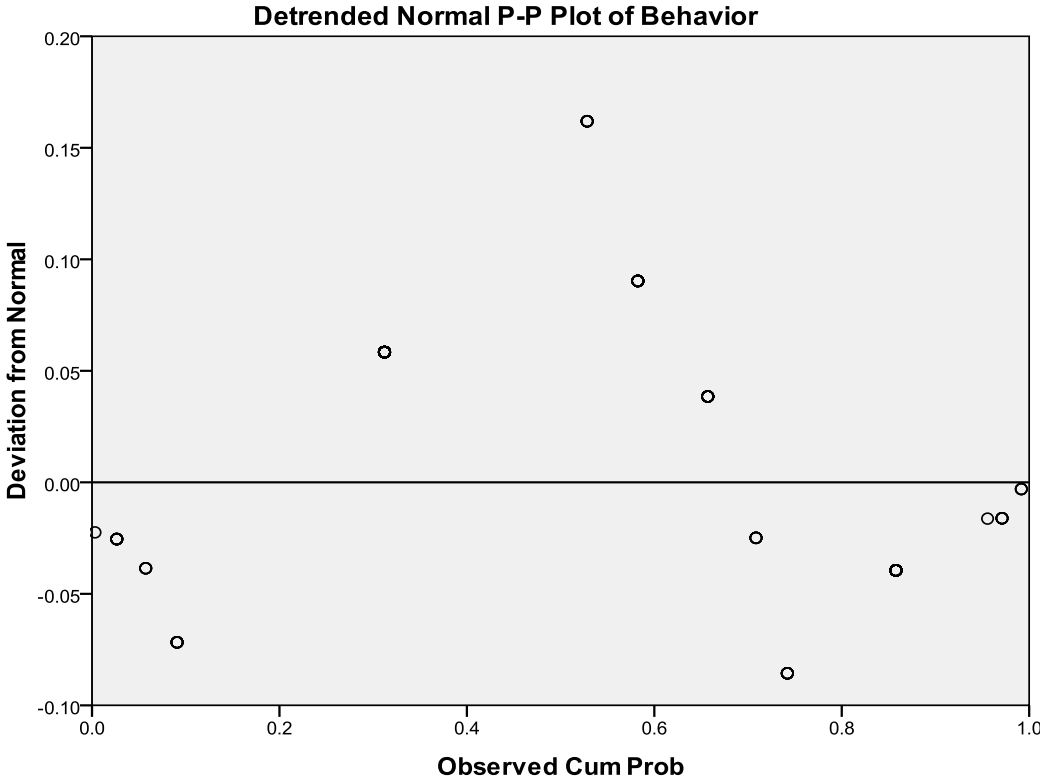

Normal P-P Plot of Reaction
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0

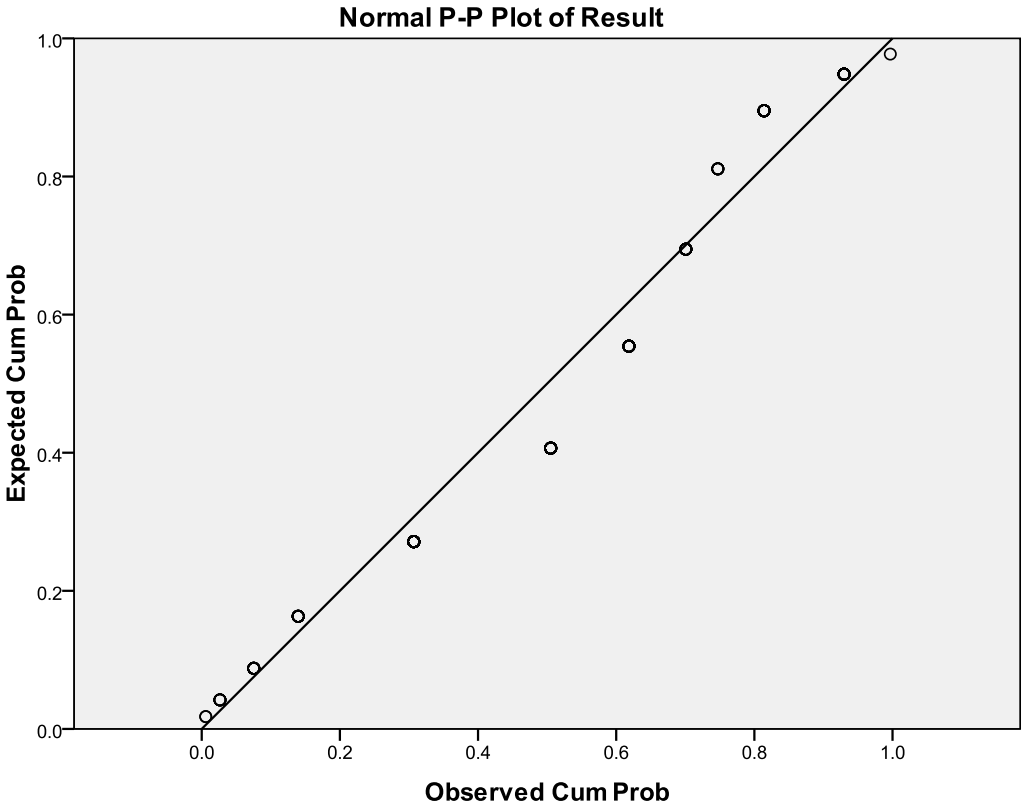

Normal P-P Plot of Reaction
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0

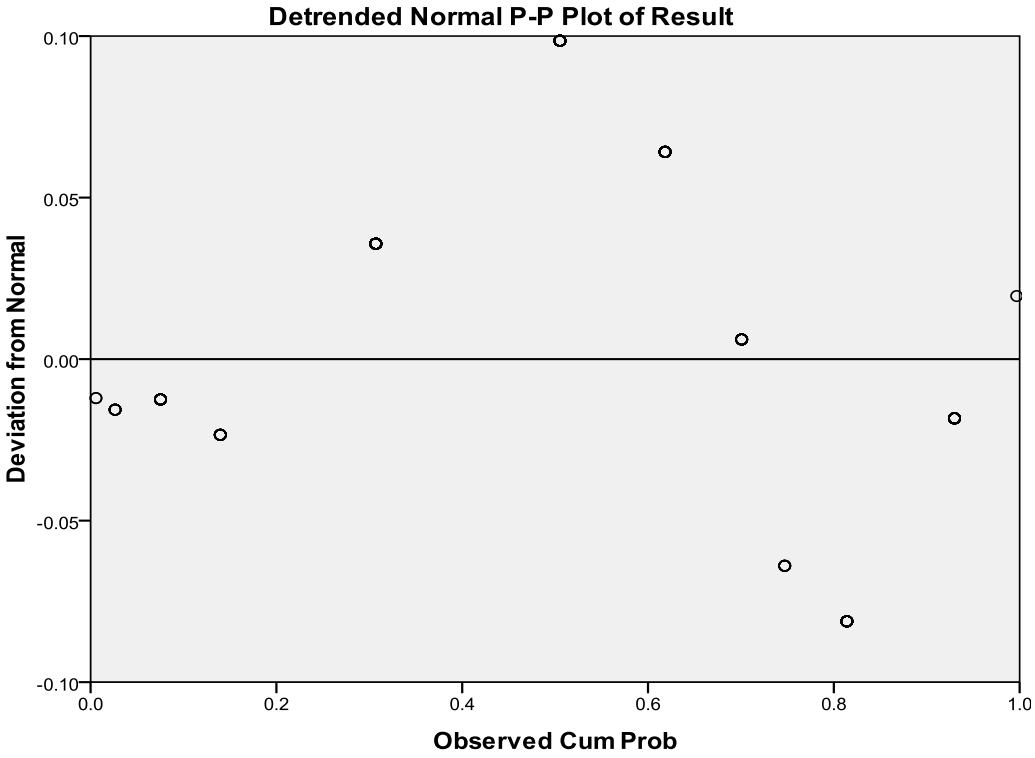

Normal P-P Plot of Learning
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Detrended Normal P-P Plot of Learning
Deviation from Normal
Observed Cum Prob
0.10
0.05
0.00
-0.05
-0.10
0.0
0.2
0.4
0.6
0.8
1.0


Normal P-P Plot of Behavior
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Detrended Normal P-P Plot of Behavior
Deviation from Normal
Observed Cum Prob
0.20
0.15
0.10
0.05
0.00
-0.05
-0.10
0.0
0.2
0.4
0.6
0.8
1.0


Normal P-P Plot of Result
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Detrended Normal P-P Plot of Result
Deviation from Normal
Observed Cum Prob
0.10
0.05
0.00
-0.05
-0.10
0.0
0.2
0.4
0.6
0.8
1.0