POLYGRAPH - ASSESSMENT TEST
FOR PRE EMPLOYMENT OF INFORMATION
TECHNOLOGY PERSONNEL

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Dedicated To My Beloved Wife,

Hjh Noor Siah Bte Hj Sihes

And

My Beloved Children:

Ahmad Fairuz Syarin

Haslina

Ahmad Faizal

Noor Liana

Marina

Amir Hassan

Amir Hamzah

My Late Parents:

Hj Yusoff Bin Hj Abdul Rahman

Hjh Tik Bte Hj Yacob

My Parents In-Law:

Hj Sihes Bin Hj Kastawi

Hjh Marsidah Bte Hj Tahir

My Dream Come True...

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ABSTRAK

Kemajuan teknologi maklumat dan komunikasi, matlamat bagi persaingan sihat akan menjadi kenyataan. Tenaga kerja yang mahir, cekap dan berpengetahuan merupakan satu keperluan asas bagi mencapai status negara membangun. Keperluan kepada personel yang cekap dan pengetahuan dalam teknologi maklumat di Malaysia adalah sangat besar. Lebih ramai graduan yang mahir dalam bidang teknikal dan profesional sangat diperlukan. Kajian ini menumpukan perhatian kepada ujian pra pekerjaan menggunakan poligraf ke atas personel teknologi maklumat Universiti Teknologi Malaysia. Kajian ini menumpukan perhatian kepada pemahaman dan tanggapan serta hubungan di antaranya untuk membuat keputusan pemilihan pekerjaan yang lebih tepat. Poligraf dapat memberikan maklumat tambahan yang tidak dapat diperolehi oleh proses temuduga konvensional. Ia sebagai alat bantuan untuk mengenalpasti ketepatan pendedahan maklumat data peribadi yang diberi oleh pemohon dan bagi menyingkap perbuatan salahlaku yang telah dilakukan dan mendedahkan kebenaran kenyataan pemohon. Kebanyakan majikan gemar menggunakan ujian pra pekerjaan sebagai cara untuk mengenalpasti calon berpotensi atau sebaliknya. Semakin sukar untuk melantik dan mengekalkan personel yang mempunyai kelayakan teknologi maklumat, tetapi ia boleh dicapai melalui ujian pra pekerjaan menggunakan poligraf. Majikan memerlukan seseorang untuk mengisi tahap yang tinggi atau mempunyai kemahiran khusus dan mungkin mahu mengembangkan proses penapisan dengan memasukkan ujian kecekapan, ujian kesepaduan dan ujian poligraf terutamanya dengan kemajuan sistem dan teknologi maklumat. Penyelidikan ini meneroka kegunaan dan penggunaan peralatan teknologi maklumat dan instrumen poligraf sebagai alat untuk ujian pra pekerjaan personel teknologi maklumat dengan mengukur kadar ancaman pelakuan mencuri , salahguna dadah, penggunaan alkohol, sejarah kerja, sikap pekerjaan, khidmat pelanggan, kredibiliti dan data asas. Kajian ini menunjukkan terdapat respons yang significant terhadap pemahaman, tanggapan dan penggunaan poligraf sebagai satu alat pemilihan untuk pra pekerjaan.

ABSTRACT

With the advent of information and communication technologies, the vision of perfect competition is becoming a reality. A skilled, efficient and knowledgeable labor force is a prerequisite towards achieving developed nation status. The need for Information Technology (IT) knowledge and competent personnel in Malaysia is very great. This research study focuses on the pre employment testing using polygraph instrument on information technology (IT) personnel of Universiti Teknologi Malaysia. It also focuses on their understanding and perception on polygraph testing as a pre employment tool for hiring decision. Polygraph pre employment testing can provide additional piece of valuable information that can help to make a more accurate hiring decision. The polygraph is an investigative tool to determine the accuracy of the submitted Personnel Data Questionnaire, to uncover undisclosed misdeeds, and to reveal false statements. It has proven very effective in these tasks. Many employers like to use pre-employment tests as a way to screen out applicants who are not suitable for the job and to screen in potential employees. It has increasingly difficult to recruit and retain qualified workers information technology personnel but with new knowledge and skills of personnel selection process through pre employment testing, this can be met. This information can also provide a basis for accessing IT employment policy alternatives. Employers seeking persons to fill high level or skill specific positions may want to extend their screening process to include competency testing, integrity testing and polygraph test especially with the advancement of information system and information technology. This research explores the use of information technology tools and polygraph instrument as a tool for pre employment testing of information technology personnel assessing measurement of behavioral traits of theft propensity, illegal drug use, alcohol use, work history, work attitudes, customer service, fundamental data and credibility. It provides a database on the IT personnel tested. The study indicate that there is a significant response towards understanding, perception and application of polygraph testing for pre employment.

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CHAPTER I

INTRODUCTION

This research study focuses on the pre employment testing using polygraph instrument on information technology (IT) personnel of Universiti Teknologi Malaysia. It also focuses on their understanding and perception on polygraph testing as a pre employment tool for hiring decision. Polygraph pre employment testing can provide additional piece of valuable information that can help to make a more accurate hiring decision.

Competent and highly skilled information technology personnel with desirable traits plays a very important roles in the development and progress of information and communication technology in Malaysia. IT personnel are IT human capitals. Understanding IT human capitals and pre selection of them with desirable traits prevents future liabilities to any organization.

There are many types of personnel selection process. It includes structured interviews or behavioral interviews. Structured interviews or behavioral interviews is a very subjective process. Polygraph pre employment testing is one of the many types of personnel selection process. Polygraph pre employment testing combined with the structured interviews or behavioral interviews will greatly enhanced the hiring decision.

The polygraph is being widely used by the Law Enforcement Department and for pre employment in the United States as an investigative tool to determine the accuracy of the submitted Personnel Data Questionnaire, to uncover undisclosed misdeeds, and to reveal false statements. It has proven very effective in these tasks. In Malaysia, only Anti Corruption Agency (ACA) utilize polygraph instruments for pre employment testing for new recruitment of its personnel.

No research study has been done on pre employment testing in Malaysia. This research study tries to look into possible use of polygraph pre employment testing for IT personnel an enhancement to the conventional method of personnel selection hiring process.

1.1   Human Capital

Since the 1980s, investments in new information technologies have been recognized as an important element of business strategy. Such investment in information systems motivate practitioners and research alike to study the relationship among various IT investment and firm performance (Brynjolfsson and Hitt 1998; Strassman 1997) including hardware (Gurbaxani and Mendelson 1992),software (Slaughter, Harter, and Krishnan 1998), networks (Mukhopadhyway, Kekre, and Kalathur 1995), tools (Banker and Kauffman 1991), and methodologies (Apte et. al. 1990). Yet in competitive markets, a firm's ability to successfully employ competent and knowledgeable information technology personnel determine the success or downfall of the organization This capability springs from the need to reap the best information technology personnel as a human capital.

Countries that have encouraged their people through education and life-long learning and by investing heavily in research and development (*R&D*) are well positioned to take advantage of new global markets. A skilled, efficient and knowledgeable labor force is a prerequisite towards achieving developed nation status. The need for Information Technology knowledge and competent personnel in Malaysia is very great. A much larger pool of graduates who are proficient in both technical as well as professional work skills are much needed. It has increasingly difficult to recruit and retain qualified workers information technology personnel but with new knowledge and skills of personnel selection process through pre employment testing, this can be met.

To succeed on an increasingly global competitive arena, organizations will have to make the concepts of 'the learning organization' and 'the knowledge worker' as an integral part of daily decision making and task execution.

Recent research highlights the role that investments in new information technology (IT) play in creating business value and executing business strategy. Successful implementation of this IT-enabled strategy rests on the performance of information systems (IS) professionals. Consequently, understanding "IT human capitals" and the behavior of IS professionals within the employment relationships is crucial to organization performance.

A skilled, efficient and knowledgeable labor force is a prerequisite towards achieving developed nation status. In this regard, the Malaysian Government continues to place emphasis on the supply of skilled manpower so that we are equipped to face the challenges associated with an era of rapid changes in Information and Communication Technology (ICT) and the move towards a knowledge-based economy. For this purpose, a sum of RM1.2 billion is provided to build 14 Industrial Training Institutes and four Advanced Technology Training Centers as well as increase the Skills Development Loan Fund (Budget Speech 2001).

1.2 Pre-Employment Screening

Employee selection process can help improve the quality of hiring decisions making. It will definitely increase organization competitive advantage when hiring high-caliber employees who can help organization:

- Strengthen customer service

- Increase productivity

- Decrease employee theft

- Expand repeat business

- Improve company profitability

- Minimize work-related accidents

- Cut costs caused by counter productivity

- Reduce turnover

There are many challenges associated with the development of appropriate pre-employment screening procedures. Managers know it makes sense to use screening procedures but pre-employment screening takes time, talent, and money. Moreover, in times of a labor shortage, screening activities may require an inordinate amount of patience.

The pressure to "hire in a hurry" is, in fact, present at this time. Unemployment stands at a 28-year low of 4.3% (Fox, 1998) and some organizations, like the Hudson Institute, suggest that labor shortages will actually worsen as baby-boomers begin to retire after the year 2000 (Fisher, 1997). The U.S. Dept. of Labor, for example, estimates that 17.6 million new nonagricultural jobs will be created by the year 2006 (Schriner, 1998). Although economists disagree about the effects of these unemployment figures on the economy, the pressure to hire employees in a hurry is intense and is not expected to improve for some time (Fisher, 1997).

Patience is not the only virtue to be tested in the current labor market. The screening procedures that a business chooses are also under scrutiny. However, employers who undertake pre-employment screening and investigation efforts to choose the best employees or to avoid later liability may "stumble unwittingly into liability from other sources because of those very efforts." (Befort, 1997). Increasingly, employers must show that their selection and placement procedures are related to employee success on the job and do not have a disparate impact on any protected class.

Pre-employment screening can be separated into two categories: "screening-in" and "screening-out" (Befort, 1997). Obviously, "screening-in" is an attempt to get the best employees and "screening-out" is an attempt to exclude those applicants believed to have potential problems. It is generally accepted that the demand for highly skilled workers has increased and will continue to increase as the use of technology continues to expand. This demand necessitates that employers identify the best employees (Befort, 1997).

Just which types of pre-employment screening methods should be used? Which ones are good predictors of job success? Which ones will help avoid hiring mistakes? The issue was first addressed years ago (Philbrick, Hass & Hahn, 1988); however, changes in the legal environment and in the availability of screening devices that use more sophisticated computer technology to create "virtual reality testing systems" (Befort, 1997) suggested the need for an update. Therefore, the author of this paper propose to explore the use of polygraph for pre employment testing. Finally, it will provide literature on the subject of pre-employment screening in an effort to provide a more relevant guideline for human resource managers.

PRE EMPLOYMENT SELECTION PROCESS

Figure 1.1 Pre Employment Selection Process
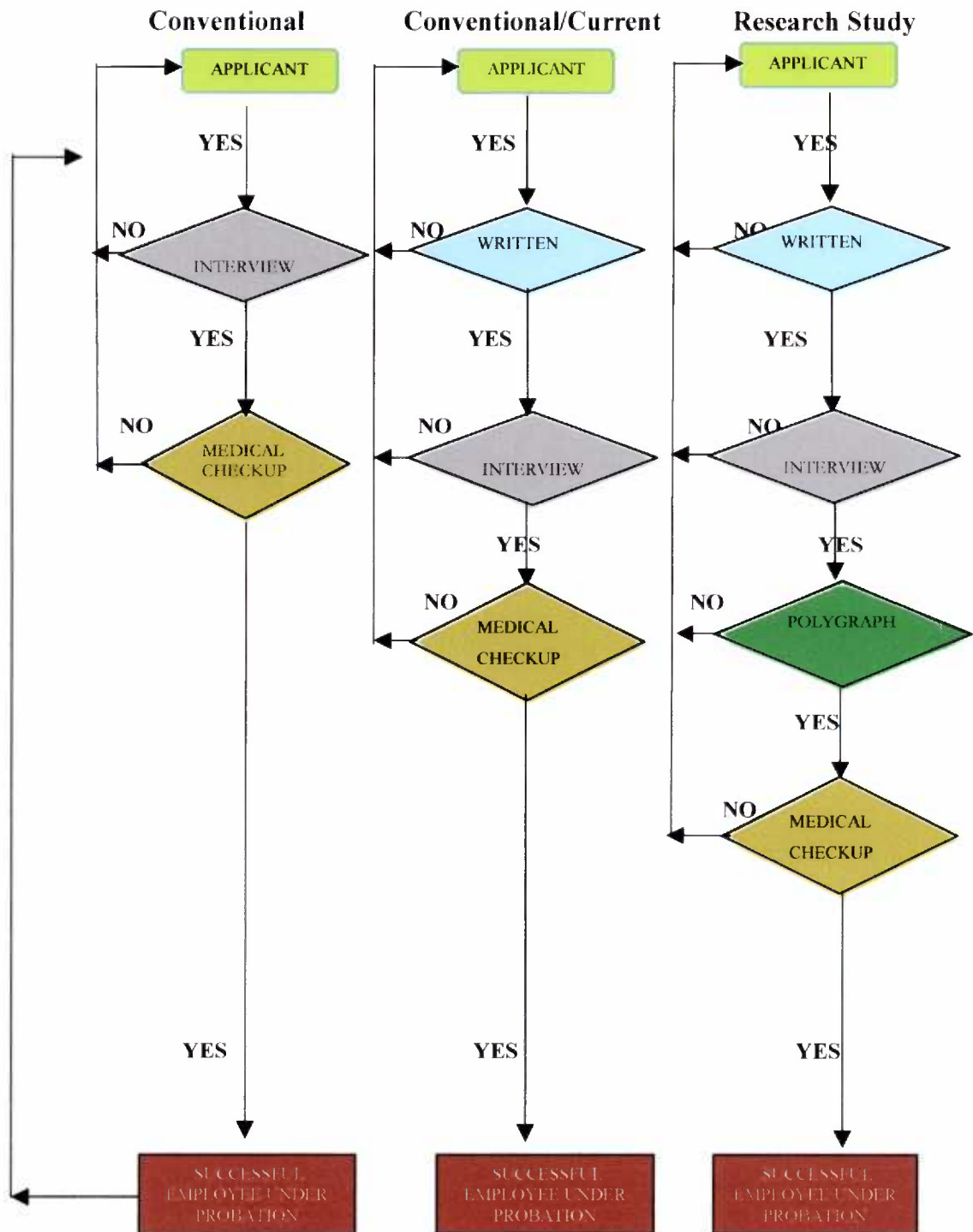
1.3 Polygraph Testing And Its Validity

In the past 75 years over 250 studies have been conducted on the accuracy of polygraph testing. There has been little research on pre employment polygraph testing. But polygraph examinations have been used to screen prospective employees for honesty for at least 70 years. The controversy over such use has continued unabated during that time. Opposition has focused mainly on either questions of ethics or of questions of validity. The ethical issues, the right of privacy of the employee versus the right of the employer to screen out persons likely to steal, are addressed in other forums, and will probably never be completely resolved.

The validity of polygraph examinations in specific criminal cases has been studied in many contexts. In contrast only two studies were found on polygraph validity in the pre employment setting. Correa and Adams (1981) used a laboratory design in which half the subjects were instructed by one experimenter to lie about nine facts listed on their background form. The second experimenter conducted the polygraph screening examinations, and classified each subject overall as either truthful or deceptive, and then tried to pinpoint specific areas of deception in those found to be lying. They found a 100% accuracy rate (p < .01) in overall classification as truthful or deceptive.

Many occupations in the twentieth century, including the polygraph field, are systematically attempting to gain professional status. The common theme surrounding these occupations seems to be a high degree of technical competence in the members of the occupation (Dingwall and Lewis, 1983).

When studying the polygraph field, the competency level of examiners is very important. Because of this, much emphasis needs to be placed on the qualities and characteristics of polygraph examiners. Almost all observers agree that the qualities and characteristics of polygraph examiners are the most important considerations in

assessing the accuracy of polygraph testing (Reid and Inbau, 1966; Graham, 1986; Nagle, 1993). Because the polygraph instrument cannot itself detect deception, a polygraph examination requires a competent examiner who infers deception or truthfulness based on the process and results of the polygraph examination. This clearly indicate polygraph examination can be used as a mean for pre employment testing.

The accuracy of polygraph testing can be influenced in a variety of ways. The competent polygraph examiner, however, is the most influential factor to an effective examination. Ferguson (1996) mentions that the success or failure of the examination does not depend on the actual polygraph instrument used. The polygraph, by itself, is said to account for an approximate 10% of the total examination effectiveness. Instead, the characteristics and qualities of the examiner and the testing process are estimated to be 90% responsible for a successful conclusion. With these points in mind, it is important that data be collected on polygraph examiners to gain more insight into this field.

To date there has been only a limited number of research projects on the accuracy of Polygraph testing in the pre-employment context, primarily because of the difficulty in establishing ground truth. However, since the same physiological measures we recorded and the same basic psychological principles may apply in both the specific issue and pre employment examinations, there is no reason to believe that there is a substantial decrease in the accuracy rate for the pre employment circumstance. The few studies that have been conducted on pre employment testing support this contention. While the Polygraph technique is not infallible, research clearly indicates that when administered by a competent examiner, the polygraph test is one of the most accurate means available to determine truth and deception (APA, 1999).

1.4 Background Of The Problem

Negeri Sembilan Anti-Corruption Agency (ACA) director Akhbar Satar who has a Master's degree in criminal justice from the University of Detroit is a US-trained forensic polygraph examiner and certified fraud examiner said that ACA has two polygraph machines and has been using them since 1997 to weed out undesirable new recruits. In a recent recruitment exercise, Akhbar says, 25 per cent of the recruits were rejected. After failing the polygraph test, four of them confessed that they were taking drugs, five were trafficking in drugs and three were thieves (ACA, 1999). Result of the pre employment testing for ACA as in Table 1.1 . Statistics of ACA's activities in combating corruption as in APPENDIX I. The statistics show public servant involving in corruption activities due to undesirable traits.

Table 1.1: Result Of Pre Employment Testing For ACA Personnel Grade 3/5 And 7 Anti Corruption Agency (ACA) Malaysia

No.	Year	Number Of Applicant	Passed	%	Failed	%	Absent	%
1	1997	101	76	74.26	25	24.75	0	0
2	1998	78	57	73.08	21	26.92	0	0
3	1999	151	100	66.23	23	15.23	28	18.54
4	2000	59	22	38.59	21	35.59	26	44.07

Source: Anti Corruption Agency (ACA)

On Mar 22 2000, Computer Security Institute (CSI) established in 1974, is a San Francisco based announced the results of its fifth annual "Computer Crime and Security Survey." The "Computer Crime and Security Survey" was conducted by CSI with the participation of the San Francisco Federal Bureau of Investigation's (FBI) Computer Intrusion Squad. The aim of this effort is to raise the level of security awareness, as well as help determine the scope of computer crime in the United States.

Highlights of the "2000 Computer Crime and Security Survey" include the following:

- 90% of respondents (primarily large corporations and government agencies) detected computer security breaches within the last twelve months.

- 85% detected computer viruses.

- 79% detected employee abuse of Internet access privileges (for example, downloading pornography or pirated software, or inappropriate use of e-mail systems).

- 74% acknowledged financial losses due to computer breaches.

- 71% of respondents detected unauthorized access by insiders. But for the third year in a row, more respondents (59%) cited their Internet connection as a frequent point of attack than cited their internal systems as a frequent point of attack (38%).

- 70% reported a variety of serious computer security breaches other than the most common ones of computer viruses, laptop theft or employee "net abuse"- for example, theft of proprietary information, financial fraud, system penetration from outsiders, denial of service attacks and sabotage of data or networks.

- 42% were willing and/or able to quantify their financial losses. The losses from these 273 respondents totaled USD 265,589,940 (the average annual total over the last three years was USD120,240,180).

- 27% of respondents detected denial of service attacks.

- 25% of respondents detected system penetration from the outside.

Financial losses in eight of twelve categories were larger than in any previous year. Furthermore, financial losses in four categories were higher than the combined total of the three previous years. For example, 6I respondents quantified losses due to sabotage of data or networks for a total of USD 27,148,000. The total financial losses due to sabotage for the previous years combined totaled only USD 10,848,850.

As in previous years, the most serious financial losses occurred through theft of proprietary information (66 respondents reported USD 66,708,000) and financial fraud (53 respondents reported USD 55,996,000).

Malaysia has not carried out this type of survey on computer break-ins and other cyber crimes. As the number of computer users increases, it ought to do similar surveys regularly, in order to detect the incidence and the seriousness of attacks on computers by hackers.

Granted there are tens of millions of Internet users in America and Europe. Hence, more computer intrusions are expected. Nevertheless, as the number of computer and Internet users increases in Malaysia, more computer crimes will occur. Even then, the 770,000 Internet users in Malaysia must be protected.

The most significant result that triggers researchers is 71% of respondents detected unauthorized access by insiders. Insiders are employees of the organization. The one who have most access to the computer system in any organizations are the information technology personnel. Information technology personnel who are not screened thoroughly during pre employment selection process poses potential threats to the organization.

1.5 Statement of the Problem

Perhaps the most critical phase of business operations and loss prevention of any organization is the personnel selection process. It is easier to prevent problem employees from getting on your payroll than it is to get them off. As stated earlier, 25% of ACA applicants were rejected due to undesirable traits and 71% of respondents detected unauthorized access by insiders through survey by CSI. Structured or

behavioral interview cannot detect effectively undesirable traits or uncover unclosed misdeeds.

Therefore pre employment test for information technology personnel selection is very crucial in quality decision making of hiring. Just which types of pre-employment screening methods should be used? Which ones are good predictors of job success? Which ones will help avoid hiring mistakes?

1.6 Objective Of The Study

The objective of this study are five folds:

(i) To explore polygraph instrument as an investigative tools into areas of possible traits of theft propensity, illegal drug use, alcohol use, work history, work attitudes, customer service, fundamental data and credibility.

(ii) To describe the personal and professional characteristics of information technology personnel in University Of Technology Malaysia in the findings on the polygraph test taken.

(iii) To describe the perception of information technology personnel on pre employment testing using polygraph.

(iv) To describe the relationship between respondent's experience towards polygraph examination in relation to sex and age.

(v) To describe the relationship between respondent's perception towards application of polygraph in relation to sex and age.

1.7 Hypotheses

The hypotheses for this research study are as follows:

(i) **Hypothesis I**: There is no relationship between understanding of polygraph based on polygraph examination taken with perception on the application of polygraph.

(ii) **Hypothesis II**: There is no difference of respondent's experience towards polygraph examination in relation to sex.

(iii) **Hypothesis III**: There is no difference of respondent's perception towards application of polygraph in relation to sex.

(iv) **Hypothesis IV**: There is no difference of respondent's experience towards polygraph examination in relation to age.

(v) **Hypothesis V**: There is no difference on respondent's perception towards application of polygraph in relation to age.

Figure 1.2 Research Hypotheses
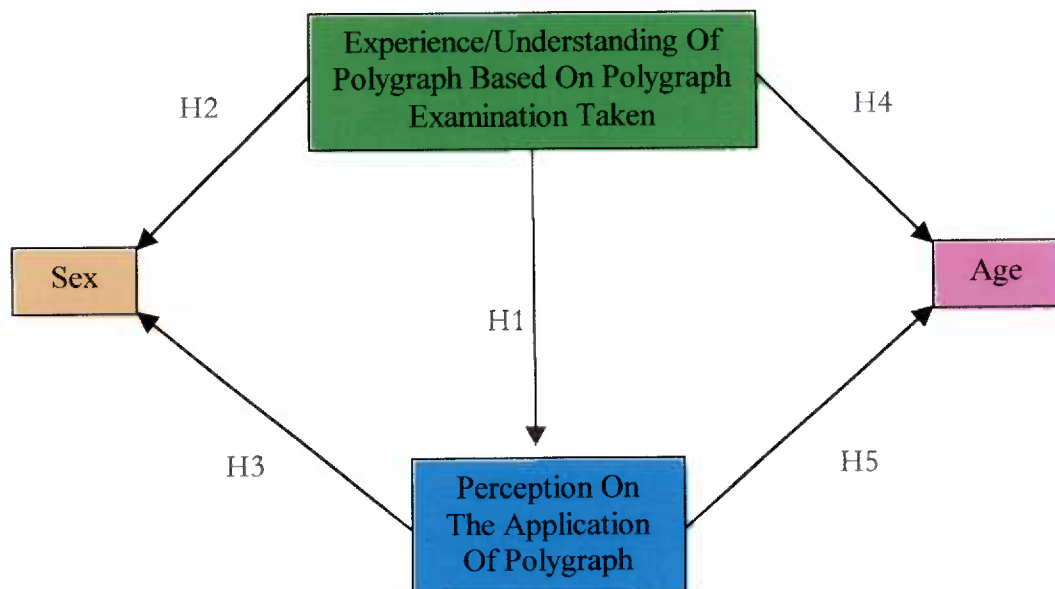
1.8   Scope Of The Study

The scope of this study is:

(i)   To explore polygraph instrument as an investigative tools into areas of possible traits of theft propensity, illegal drug use, alcohol use, work history, work attitudes, customer service, fundamental data and credibility of information technology personnel of Universiti Teknologi Malaysia.

(ii)   To do a research to determine how information technology personnel who actually undergone polygraph examination understands and perceive about the examination and its application.

1.9   Significance Of The Study

This research opens up a new body knowledge that is appropriate for the study of pre employment testing using polygraph for information technology personnel looking into areas of possible traits of theft propensity, illegal drug use, alcohol use, work history, work attitudes, customer service and credibility.

In particular, its presents results that answer questions about decision making of hiring quality and competent of information technology personnel. Such information may be used to assess the impact of managerial actions to use pre employment testing using polygraph in the future. In addition, this research introduces powerful data analysis methods not previously employed in the literature on IT professionals.

This knowledge is crucial in both understanding pre employment testing using polygraph looking into areas like skills and characteristics of an applicant which are not only applicable to information technology personnel but to any applicant in any job screening.

1.10 Definition Of Terms

Formal definitions of some basic human capital and other concepts in polygraph as used throughout this research will facilitate understanding.

- **APA**: The American Polygraph Association.

- **Cardiosphygmograph**: a component of a polygraph set designed to mechanically recorded in ink on paper, a subject's relative blood pressure and pulse rate variations.

- **Chart**: the graphic recorded representations of a persons psychopysiological responses to a set of carefully controlled stimuli presented to him in the form of a valid and reliable question structure.

- **Control Question**: a question relative to a similar but unrelated offense utilized in general question tests and designed in such a manner that the examinee will probably lie in responding to it. Results are utilized by the examiners overall chart interpretation.

- **Dicrotic Notch**: a characteristic found in the cardio tracing resulting from a slight change of blood pressure caused by the closing of the semi-lunar valve in the heart. Also is referred to as an aortic regurgitation. Present in the descending leg of the cardio tracing.

- **Deception Response**: deviations from the norm in the tracings of any of the components of a polygraph instrument which are the result of emotions produced in the examinee as the result of a question may possibly be interpreted by the examiner as a deception response. Consideration must be given to the overall chart interpretation with emphasis on the nature and

position of the question as well as in the manner which the question was presented.

- **Examination Room**: a special sound proofed, air-conditioned room complete with sound equipment and apparatus used in administering polygraph tests.

- **Examination**: a term used by examiner to describe the entire polygraph testing situation to include, the pre test, test, post test interviews.

- **Examiner**: an individual who, by virtue of his education, training and experience, is capable of conducting a valid and reliable polygraph examination for the purpose of determining whether or not an examinee honestly believes that his own statements and answers concerning a questioned issue are in fact truthful.

- **Examinee**: an individual who has volunteered for and undergoes a polygraph examination.

- **Galvanograph**: a component of a polygraph designed to record the phenomenon of psychogalvanic skin reflex or electrodermal response. It is the record able changes of body tissue polarization, sweat gland activity or circulatory variations which occur as a result of work, emotion or a combination of either. In polygraph, these changes are recorded on a polygraph chart.

- **GENERAL HUMAN CAPITAL**: is human from which more than one employer can derive benefit.

- **HUMAN CAPITAL** : the stock of knowledge, skills, and abilities imbedded in an individuals that results from natural endowment and subsequent and investment in education, training, and experience; an economic asset.

- **IT HUMAN CAPITAL** : human capital that enables design, development, implementation, and maintenance of information technology-based systems.

- **Irelevant/Neutral/Comparison Question**: a question which does not pertain to the case for which a subject being tested on a polygraph. It is designed to elicit a minimum emotional response and to act as a criteria for establishing a norm in the subject. Also known as non-pertinent or irrelevant question.

- **NDI**: common usage abbreviation for "Non Deception Indicated."

- **Polygraph**: is derived from the Greek word "polygs" meaning many and "graphes" , to write. A generic term generally used to refer to the polygraph instrument or the polygraph technique.

- **Polygraph Instruments**: a commercial trade name for the Keeler instrument, General usage term for the several scientific detection of deception instruments. For the purpose of this research study, LX 3000SW*C Lafayette polygraph instrument with ASUS L8400 850 MHZ notebook computer was utilized.

- **Polygram**: is derived from the Greek word "polys" meaning many and "gramma" a writing. A parameter is a pattern or tracing resulting from the action of one component of the polygraph. A completed chart reflecting all three parameters is a polygram.

- **Polygraphist**: an individual who, by virtue of his education, training and experience, is capable of conducting a valid and reliable polygraph examination for the purpose of determining whether or not an examinee honestly believes that his own statements and answers concerning a questioned issue are in fact truthful.

- **Polygraph Examination**: the entire environment within which a qualifies polygraphist renders an expert opinion as to the veracity of an examinee's statements concerning the primary issue of the matter under investigation.

- **Pneumograph**: a component of a polygraph designed to mechanically record in ink, on a chart the inhalation/exhalation cycles of a person's breathing pattern.

- **Psychological Set**: the theory which holds that a person's fear, anxiety and apprehensions will be directed toward the situation which presents the greatest immediate threat to his self preservation or general well-being, generally to the exclusion of all other less threatening circumstances within his environment.

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