

# **Career Anchors of MIS Undergraduates and IS Professionals in Taiwan: A Longitudinal Comparative Study**

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## **Abstract**

The career anchors of IS professionals play an important role in affecting the selection of occupations. MIS students are one of the principal sources for IS employees. Insight in the career anchors of MIS students provides information that can help MIS students to plan their careers and assist organizations in recruiting IS labor that better matches their needs and reduces turnover. A longitudinal study was undertaken to provide for the long-term nature of both MIS undergraduate and IS professional careers. The comparisons were done using longitudinal data collected at four points in time to determine patterns and similarities. Judgment sampling was used to select nine universities in the south, north, and centre of Taiwan for the MIS undergraduate samples and random sampling was used to mail questionnaires to IS professionals on two occasions. According to the longitudinal analysis, MIS undergraduates needed higher organizational stability, service, and autonomy but lower geographical security and technical competence. The dominant career anchors of MIS undergraduates show the shift away from geographical security, creativity, and autonomy toward organizational stability. Female undergraduates indicated significantly lower levels of technical competence. Male students put more emphasis on variety in 2002 and geographical security in 2008. MIS undergraduates in technology-oriented universities put more emphasis on organizational stability, creativity, and autonomy anchors than students in general universities. For 2002, the means of creativity, geographical security, identity, and technical competence career anchors of

MIS undergraduates were significantly higher than IS professionals. For 2008, only the mean of technical competence of MIS undergraduates was significantly higher than IS professionals.

**Key words :** Career Anchors, MIS Undergraduates, Career Management, IS Professionals, Longitudinal Research

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## 台灣MIS學生與資訊專業人員生涯錨的比較： 一個長期性的比較分析

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### 摘要

生涯錨在資訊人員職業的選擇過程中扮演著舉足輕重的角色，MIS學生是資訊專業人力主要來源之一，若能洞悉MIS學生生涯錨的差異，將有助於MIS學生規劃自己的專業生涯，也有助於企業在資訊專業人力的聘任過程中找到更適合的專才，以此將有助於解決組織資訊人員離職的問題。本研究採用長期性調查法，在四個不同時間點蒐集MIS學生與資訊專業人員的資料，進行趨勢分析與差異比較。本研究以判斷抽樣的方式，針對台灣北、中、南共九所公私立大學，進行兩次資管系應屆畢業生的問卷調查；另外，在資訊專業人員方面，採用大樣本隨機抽樣的方式，進行兩次不同時間點的郵寄問卷。根據長期性的分析，發現MIS學生對組織穩定性、服務性、與自主性具有較高的需求，對於地域與安全性及技術能力提升呈現較低的需求。在生涯決策中具支配地位的生涯錨也出現明顯的改變，支配性生涯錨有從地域與安全性、創造性、自主性等生涯錨移轉到重視組織穩定性的現象。在MIS學生的比較中，女生比男生較不重視職業是否能提供自己技術能力的提升，而男生在前期較重視工作的多樣性，但是在後期卻較重視工作的地域與安全性；另外，科技大學的MIS學生比在一般大學就學的MIS學生較重視組織穩定性、創造性、與自主性等生涯錨。本研究發現在前期學生比專業人員重視職業的創造性、地域與安全性、身份地位、與技術能力提升等生涯錨，但到後期彼此生涯錨的差異有縮小的現象，MIS學生只有在技術能力提升上的需求明顯高於資訊專業人員。

**關鍵字：**生涯錨、MIS學生、生涯管理、資訊專業人員、長期性研究

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## 1. INTRODUCTION

The responses to the 2007 Society for Information Management (SIM) survey showed that “Attracting, developing, retraining the IT professionals” is the top managerial concern. The issue has consistently been major IT management concern and has been in the top 10 since 1994. It is an important issue for MIS managers in Taiwan. One reason is the high cost of recruiting and training these specialized employees. The other reason is that the high IS employee turnover rate. It was shown in the empirical study by Igbaria and Siegel (1992) that IS personnel have significantly higher turnover levels than the general industry average. In order to recruit and retain IS employees, MIS managers have to review their basic pay structure, introduce bonuses, and try to make other changes related to salary. These policies ignore other aspects like career satisfaction in retention and recruitment of qualified employees. Empirical finding recognizes that, even without offering high salaries, the companies which adopt suitable career development are capable of enhancing internal job satisfaction levels (Leavitt 1996; Chen et al. 2003). From an alternative perspective, career management can also help to reduce the very significant costs that are directly incurred through high turnover while helping to prevent the deterioration of staff capabilities as a whole (Chen et al. 2003). Researchers need to focus on what may determine IS employee career satisfaction to help MIS managers better understand IS career management (Jiang & Klein 2000).

Furthermore, managing IS activities becomes more difficult when IT innovations and products emerge rapidly and unpredictably. It is important that the initial steps of hiring and training IS personnel are more carefully studied for entry-level employees. An important issue that has been neglected in human resource management literature is the role of career anchors in influencing work satisfaction, turnover expectations and career outcome (Bigliardi et al. 2005; Simpson 2005; Mallon et al. 2005; Danziger & Valency 2006; Hudson & Inkson 2006; Yamamoto 2006). A career anchor has been described as a pattern of self-perceived talents and abilities, values, and motives that influence an individual's career related decisions (DeLong 1982; Igbaria et al. 1991; Ramakrishna & Potosky 2002). The career anchors of employees play an important role in the selection of specific occupations and work settings and employees' reactions to their job experience (Igbaria & McCloskey 1996; Danziger & Valency 2006; Yamamoto 2006). A measure of career anchoring enables an organization to restructure jobs according to an employee's needs, thus providing more career satisfaction. It also serves as a useful information base for individuals contemplating a career change and for organizations

seeking to help individuals plan their careers (Igarria et al. 1991; Igarria & McCloskey 1996). The career management of IS professionals and the strategies used to realize their career aspirations are critical for success in the MIS area (Ginzberg & Baroudi 1992; Igarria & McCloskey 1996; Jiang & Klein 2000).

According to research, IS professionals are motivated differently from other professionals. They have a greater need for responsibility for own their work and a lower need for socialization (Couger et al. 1994). There are significant differences between information and communication technology professionals in comparison to other business sectors (Heilmann 2006). In order to be able to attract and retain IS professionals, the internal needs of MIS students and entry-level employees have to be examined. MIS students are one of the principal sources for IS workers. Insight into the career anchors of MIS students while they are still at school or about to start looking for a job can provide information that can help MIS students to plan their careers and assist organizations in recruiting IS labor that better matches their needs and reduces the turnover (Chang et al. 2007). Although a substantial amount of research into the career of the IS professional has been done, however, mostly cross-section data have been used. Unfortunately, longitudinal studies of careers are rare. According to some researchers, the stability of individuals' career anchors over time needs to be assessed (Igarria et al. 1991; Carlson & Rotondo 2001). However, little attention has been given to the role of career anchors in MIS students. "Do MIS students and IS professionals differ as to their career anchors?" This is an important issue for entry-level hiring decisions as well as for business schools that train IS professionals. This study investigated the career anchor progression of MIS undergraduates and compared them with IS professionals over several years in Taiwan. The research reported here is the result of a longitudinal study of 542 MIS undergraduates (from 9 universities surveyed for 2002 and 2008) and 256 IS personnel (from 1500 companies surveyed for two different periods of time).

The career anchors of IS employees can have important implications for their job satisfaction, commitment, and retention within organizations. However, there is little empirical research on the correlates of career anchors held by students and professionals in MIS field. This study sought to examine the career anchors of MIS undergraduates. A longitudinal study was undertaken to take into consideration the long-term dynamic nature of MIS undergraduates and IS professionals. The career anchors were identified and the dynamics of MIS undergraduates were compared with those of IS professionals in Taiwan. In order to understand the migration of career anchors of MIS undergraduates, this study investigated the impact of gender and education system on career anchors. There were three research objectives. The first was to identify the career anchors of MIS undergraduates and to explore their development over

a six year period. Secondly, a comparison was done between MIS undergraduates and IS professionals in Taiwan. Thirdly, the results were compared with similar prior research. Finally, the career anchors of MIS undergraduates in Taiwan were explored according to gender and education system. This paper is organized into four major sections. First, some relevant theoretical perspectives are reviewed. The methodology is then described, followed by the presentation of the data analysis. The paper concludes with the discussion of the implications and limitations in the research and in practice.

## 2. RESEARCH BACKGROUND

### 2.1 Career Anchors

A career anchor or career orientation refers to an individual's self-perceived needs, values and talents that shape the person's career decisions. It is similar to a person's self-concept which he or she is unwilling to relinquish, even when forced to make a difficult choice (Jiang & Klein 2000). Career anchors influence the selection of specific occupations and work settings, and they affect the employee's reaction to his or her work experience (Igbaria 1991; Suutari & Taka 2004).

Schein (1978) developed a career anchor model identifying the following five anchors: (1) autonomy: the need to be free of organizational constraints to pursue professional competence; (2) creativity: the need to create something on one's own; (3) management/managerial competence: the need to supervise, lead, or influence others from a management position; (4) security/stability: the need for job security and geographical security (need to remain in a particular geographical location); and (5) technical competence/skill: the need to be able to face the challenge of the technical field, functional area, or content of the work. According to Schein's career anchor theory, one of the basic theoretical premises is that an individual's career values, motivations and attitudes are consistent throughout his or her career after an initial adjustment following the first three years or so of workplace experience. A person's abilities, motives and values are mutually interactive and inseparable. Schein's career anchor theory has been widely used in career research area, despite numerous researchers seeking to refute the theory, the basic typology has held fast. Schein's theory of career anchors is continually being tested and remains consistent in its basic premises (Wilson & Davies 1999; Marshall & Bonner 2003).

Delong (1982) operationalized Schein's anchors and added three additional career anchors: identity, service, and variety. Identify refers to the individual's need to gain status and prestige

by belonging to a certain organization. Service deals with the individual's concern for others and making the world a better place to live. Variety was identified as a career anchor that exemplifies an individual's need for different types of challenges. Finally, Schein (1987) identifies eight career anchors/orientations that guide an employee's career decisions: (1) security/stability; (2) autonomy/independence; (3) managerial competence; (4) technical or functional competence; (5) entrepreneurial creativity; (6) sense of service/dedication; (7) pure challenge; and (8) lifestyle integration. Using these anchors, some researchers found that security/stability exhibited two separate orientations, geographical security and organizational stability (Igbaria & Baroudi 1993; Crepeau et al. 1992). These confirmed Schein's original anchor of security/stability and geographical security. Geographical security refers to the individual's desire to remain in a particular geographical area when confronted with career decisions, and organizational stability emphasizes an individual's need to accept the organization's career paths when making career decisions.

Careers are not stable entities. They evolve over time in many dimensions. First, career anchors or anchors change (Ginzberg & Baroudi 1988). Schein (1978) suggests that orientations are not formed until the individual is well settled in an organization; the orientation develops from self-discovery through actual work experience. Career transitions are defined by Louis (1980) as changes in roles or in orientations towards roles already held. Two types of career transitions are a change of organization and a change of profession, which she identifies as increasingly common occurrences during an individual's career. Chen et al. (2003) indicate that the career needs of R&D personnel at different stages are significantly different. Marshall and Bonner (2003) also indicate the same.

## 2.2 Career Anchors in MIS Literature

Ginzberg and Baroudi (1988) noted MIS careers problems and outlined the ten propositions of career management for MIS research. Internal career aspects of IS personnel has received attention in the IS human resources management literature in the last decade. Internal career considerations focus on the individual's self-concept and career value. An important element of an employee's internal career is the career anchor or career orientation (DeLong 1982; Jiang & Klein 2000). Early research on IS career management focused on defining career paths for IS employees. Career paths are organizationally defined career advancements and fall into a class of "external" career opportunities. It is typically recommended that organizations develop a dual career path for IS employees (Carlyle 1989; Chesebrough & Davis 1983).

Other researchers examined another aspect of careers— "internal careers" . Several

studies have investigated the significance of career anchors for IS professionals (Igbaria & McCloskey 1996; Igbaria & Baroudi 1993; Crepeau et al. 1992; Igbaria et al. 1991; Baroudi 1988). All studies recognize the significance of career anchors as an indication of the IS personnel's career needs. Ferratt and Short's (1986) research focused on the difference between IS and non-IS orientations. Igbaria et al. (1991) assessed the eight career anchors of 464 MIS employees and indicate that employees whose career anchors are compatible with their job setting report high job satisfaction, high career satisfaction, strong commitment to their organization, and low intentions to leave their organization. This study revealed a rich diversity of career anchors held by MIS employees. Managerially, career oriented employees score low on technical interests and technically oriented employees score low on managerial interests.

Igbaria and McCloskey (1996) represent an important step in examining the career anchors of IS professionals particularly in non-North American cultures. They explored the differences between the orientations of MIS employees in Taiwan and the United States. The highest anchor was job security, followed by service, challenge and life-style. The lowest anchor was technical competence, followed by autonomy and entrepreneurship. The data used in this study came from a convenient sample (90 MIS employees in Taiwan) of three companies, so caution should be used in generalizing these findings to a broader cross-section of organizations in Taiwan. Also, career anchors are thought to change over time. The IS personnel can change their dominant career anchors to suit the environmental conditions. Ramakrishna and Potosky (2002) found a significant structural shift in the dominant anchors of IS personnel by administering the Career anchors Inventory (COI) to 163 IS employees. The percentages of the dominant career anchors show a shift away from managerial or technical competence and toward geographic security, organizational stability and variety.

MIS students are one of the principal sources of IS employees. Understanding the career anchors of MIS students while they are still in school or about to start looking for a job can provide information that can help MIS students to plan their careers and assist organizations in recruiting IS labor that better matches their needs and reduces turnover (Chang et al. 2007). Cook and Crepeau (1997) examined the differences between IS professionals and IS students. They provide the first empirical investigation showing that IS students and professionals are different. Some differences exist between several of the career anchors. In particular, autonomy, managerial competence, service, technical competence and variety rated higher for the students than for professionals. While this study investigated differences in career anchors of IS students and professionals, it was limited to one US geographical area.

Chang et al. (2007) explored the nine career anchors of 145 IS students (including undergraduate, graduate, and executive MBA students) from three universities in Taiwan. For all



the IS students, the most important career anchors were job security, lifestyle, and service. The technical competence and geographic security scores were the lowest two. For undergraduate students, the most important career anchors were service, job security, and autonomy. The lowest ones were the same for all students. Huang (2008) conducted a longitudinal study to investigate the career anchors of IS professionals in Taiwan. The results of the study show that there was no difference between 2002 and 2006. The IS professionals' career anchors had stayed stable. They tended to have high needs for organizational stability, service, and variety while technical competence was rated the lowest.

Previous studies of career anchors of IS professionals or IS students are depicted in Table 1a and Table 1b. All of the studies used questionnaires to collect data. Most of the studies used cross-sectional empirical data rather than longitudinal data. Researchers put more emphasis on the career anchors of IS professionals than IS students. A longitudinal study was undertaken to allow for the long-term nature of the career anchors' migration of MIS undergraduates and IS professionals. The career anchor dynamics of MIS undergraduates were identified and compared to those of IS professionals.

Table 1: Ranking Comparison of Career Anchors of IS Professionals/IS Students (Taiwan)

| <i>Country</i>                               | <i>Taiwan</i>                                                                                                                                                          |                                                                                                                                                                                         |                                                                                                                                                                                              |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Subjects</i>                              | <b>Professionals</b>                                                                                                                                                   |                                                                                                                                                                                         | <b>Students</b>                                                                                                                                                                              |
| <i>Authors</i>                               | Igarria and McCloskey (1996)                                                                                                                                           | Huang (2008)                                                                                                                                                                            | Chang, et al. (2007)                                                                                                                                                                         |
| <i>Rank Order of Career Anchor (by mean)</i> | 1. Job security<br>2. Service<br>3. Pure challenge<br>4. Life-style<br>5. Geographical security<br>6. Managerial<br>7. Technical<br>8. Autonomy<br>9. Entrepreneurship | 1. Organization stability<br>2. Variety<br>3. Service<br>4. Managerial competence<br>5. Autonomy<br>6. Creativity<br>7. Identity<br>8. Geographical security<br>9. Technical competence | 1. Job security<br>2. Life-style<br>3. Service<br>4. Entrepreneurship<br>5. Autonomy<br>6. Pure challenge<br>7. Managerial competence<br>8. Technical competence<br>9. Geographical security |
| <i>Respondents number</i>                    | 90<br>MIS employees                                                                                                                                                    | 256<br>IS professionals                                                                                                                                                                 | 145<br>IS students                                                                                                                                                                           |
| <i>Sampling strategy</i>                     | Convenient Sampling from 3 companies                                                                                                                                   | Random Sampling from 1000 companies                                                                                                                                                     | Judgmental Sampling from 3 universities                                                                                                                                                      |
| <i>Measurement</i>                           | 25 items by Igarria and Baroudi (1993)                                                                                                                                 | 41 COI by DeLong (1982)                                                                                                                                                                 | 25 items by Igarria and Baroudi (1993)                                                                                                                                                       |

Table 1: Ranking Comparison of Career Anchors of IS Professionals/IS Students (USA)

| <i>Country</i>                       | <i>USA</i>                                                                                                                                                   |                                                                                                                                                                                         |                                                                                                                                                            |                                                                                                                                                                                         |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Subjects</i>                      | <b>Professionals</b>                                                                                                                                         |                                                                                                                                                                                         |                                                                                                                                                            | <b>Students</b>                                                                                                                                                                         |
| <i>Authors</i>                       | Igaria, et al. (1991)                                                                                                                                        | Cook and Crepeau (1997)                                                                                                                                                                 | Ramakrishna and Potosky (2002)                                                                                                                             | Cook & Crepeau (1997)                                                                                                                                                                   |
| <i>Ranking by mean or percentage</i> | percentage of dominant career anchor                                                                                                                         | mean                                                                                                                                                                                    | percentage of dominant career anchor                                                                                                                       | mean                                                                                                                                                                                    |
| <i>Rank Order Of Career Anchor</i>   | 1. Managerial competence<br>2. Technical competence<br>3. Autonomy<br>4. Life-style<br>5. Service<br>6. Pure challenge<br>7. Security<br>8. Entrepreneurship | 1. Organization stability<br>2. Variety<br>3. Service<br>4. Geographical security<br>5. Managerial competence<br>6. Creativity<br>7. Autonomy<br>8. Identity<br>9. Technical competence | 1. Geographical security<br>2. Variety<br>3. Service<br>4. Managerial competence<br>5. Autonomy<br>6. Identify<br>7. Technical competence<br>8. Creativity | 1. Organization stability<br>2. Variety<br>3. Service<br>4. Managerial competence<br>5. Autonomy<br>6. Creativity<br>7. Geographical security<br>8. Technical competence<br>9. Identity |
| <i>Respondents number</i>            | 464<br>IS employees                                                                                                                                          | 292<br>IS professionals                                                                                                                                                                 | 163<br>IS professionals                                                                                                                                    | 63<br>IS students                                                                                                                                                                       |
| <i>Sampling strategy</i>             | Judgmental Sampling from ACM members                                                                                                                         | Judgmental Sampling from 12 companies                                                                                                                                                   | Stratified random sampling                                                                                                                                 | Convenient Sampling from 2 universities                                                                                                                                                 |
| <i>Measurement</i>                   | 41 items by Schein (1987)                                                                                                                                    | 41 COI by DeLong (1982)                                                                                                                                                                 | 41 COI by DeLong (1982)                                                                                                                                    | 41 COI by DeLong (1982)                                                                                                                                                                 |

### 3. RESEARCH METHODOLOGY

#### 3.1 Sample and Procedure

##### 1. IS Professionals

This longitudinal research began in 2002. Survey data were collected from IS professionals by traditional mail at two different occasions. Beginning in 2002, the first questionnaire survey was randomly mailed to 1000 subjects from a sample frame of Commonwealth magazine's annual Most Admired Company Survey. The survey consisted of the scale items under investigation and a cover letter stating the purpose of the study. One hundred and six of the

mailed questionnaires were returned with a response rate of 10.7%. The second survey was conducted in 2006. The sampling and questionnaire design followed the same procedure as the first time. The 150 questionnaires were returned with a response rate of 15%. The demographics of the respondents are profiled in Table 2. The majority of respondents majored in MIS or computer science. About half of the respondents had a Bachelor's degree. The two samples were taken from a variety of work settings that included manufacturing, finance, and customer service. Most of IS professions majored MIS or computer science. Non-response bias tests were conducted by t-test. The results showed no significant difference between the two samples of IS professionals (see Appendix Table A-1).

## 2. MIS Undergraduates

This study focused on the career anchors of MIS undergraduate students. Therefore, graduate students and EMBA students were not included in this study. Survey data were collected from 4th-year MIS students at two different occasions. Judgment sampling was used to select nine universities located in the south, north, and centre of Taiwan. Beginning in 2002, questionnaires were completed by 304 MIS undergraduates. Excluding the two deemed invalid, there were 302 valid questionnaires. The second survey was conducted in 2008. The sampling and questionnaire design followed the same procedure as the first time. The questionnaires completed were 238 and all of them were valid. The demographics of the MIS undergraduate respondents are profiled in Table 2. The majority of respondents were male. About half of the undergraduate students had work experience.

Table 2: Demographic Characteristics of the Respondents

| IS professionals                 |                 |                 | MIS undergraduates             |                 |                 |
|----------------------------------|-----------------|-----------------|--------------------------------|-----------------|-----------------|
|                                  | 2002<br>(N=106) | 2006<br>(N=150) |                                | 2002<br>(N=302) | 2008<br>(N=238) |
| <i>Gender:</i>                   |                 |                 | <i>Gender:</i>                 |                 |                 |
| Male                             | 67.6%           | 83.2%           | Male                           | 50.7%           | 65%             |
| Female                           | 32.4%           | 16.8%           | Female                         | 49.3%           | 35%             |
| <i>Age:</i>                      |                 |                 | <i>Age:</i>                    |                 |                 |
| 20~30                            | 21.5%           | 21.1%           | 20~24                          | 95%             | 64.3%           |
| 31~40                            | 50%             | 39.4%           | 25~30                          | 4.7%            | 25.3%           |
| 41~50                            | 24.5%           | 33.4%           | Over 30                        | 0.3%            | 10.4%           |
| Over 50                          | 4%              | 6.1%            |                                |                 |                 |
| <i>Education:</i>                |                 |                 | <i>Work Experience:</i>        |                 |                 |
| High school                      | 1%              | 1%              | Yes                            | 83.3%           | 76.8%           |
| Some college                     | 27.5%           | 27.5%           | No                             | 16.7%           | 23.2%           |
| Bachelor's degree                | 60.8%           | 60.8%           |                                |                 |                 |
| Graduate's degree                | 10.7%           | 10.7%           |                                |                 |                 |
| <i>Years in Present Company:</i> |                 |                 | <i>Work Experience Years:</i>  |                 |                 |
| 0~12 month                       | 6.9%            | 10.1%           | 0~12 month                     | 81.0%           | 13.1%           |
| 1~3 years                        | 19.6%           | 16.8%           | 1~3 years                      | 16.7%           | 60.2%           |
| 3~5 years                        | 43.2%           | 15.5%           | 3~5 years                      | 2.3%            | 16.5%           |
| Over 5 years                     | 30.3%           | 57.6%           | Over 5 years                   | 0%              | 10.2%           |
| <i>Work setting:</i>             |                 |                 | <i>University Types:</i>       |                 |                 |
| Manufacturing                    | 59%             | 59%             | General university             | 58%             | 48%             |
| Finance                          | 10.5%           | 10.5%           | Technology-oriented university | 42%             | 52%             |
| Customer service                 | 30.5%           | 30.5%           |                                |                 |                 |

### 3.2 Measurement

The initial career anchor instrument was constructed using the Career anchors Inventory (COI) developed by Delong (1982) which includes nine career anchors and contains 41 items. This instrument has been tested and validated by many researchers (Ramakrishna & Potosky 2002; Crook & Crepeau 1997; Ginzberg & Baroudi 1992). The instrument was translated into Chinese and verified by experts in the MIS field. Respondents indicated the importance of each item related to their career. Five-point Likert response scales were used to gather the data with a response of five indicating 'centrally important' or 'strongly agree' to one indicating 'of no importance' or 'strongly disagree'. Demographics are included in the background information section.

The pretesting was conducted to detect weaknesses in instrumentation. Sixty-seven respondents were chosen from MIS graduate students at the Chung-Hua University. In the pretesting, we discovered that some wording of questions were unintelligible to the students. The revised instrument used the respondents' suggestions to refine questions. After the measurement analysis, 40 items were obtained. Appendix Table A-2 lists the questions that measured related

career anchors. The data reliability and validity analysis of the constructs are shown in Appendix Table A-3. Internal consistency, as measured by Cronbach's alpha for nine anchors, ranges from 0.601 to 0.958. This showed a roughly acceptable internal consistency. Item-to-total correlation was used to assess the convergent validity of the measurement instruments<sup>1</sup>. Factor analysis for discriminate validity was conducted<sup>2</sup>. The validity of 40 items under career anchors also displayed good construct validity since all correlation coefficients were above 0.5 and 97.5% factor loadings were above 0.5 (see Appendix Table A-3).

## 4. RESULTS

### 4.1 Career Anchors of MIS Undergraduates in Taiwan

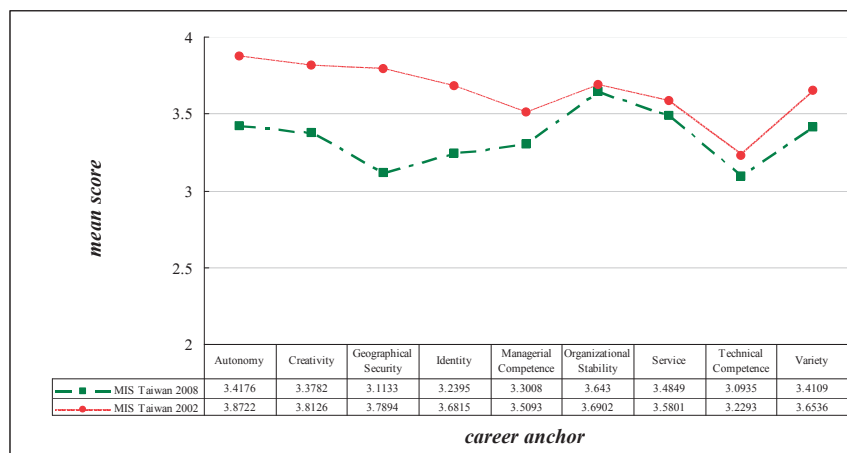


Figure 1: Career Anchor Trends of MIS Undergraduates of 2002 and 2008

In order to examine the dynamics of MIS undergraduates in Taiwan, our sample was divided into two groups, the 2002 participants and the 2008 participants. Firstly, the means of the nine career anchors were calculated. The results are graphically represented in Figure 1. For 2002, the means for each of the nine career anchors ranged from 3.23 to 3.87. Autonomy was the strongest anchor. At the other extreme, technical competence was the lowest anchor. For 2008, the means for each of the nine career anchors ranged from 3.09 to 3.64. Organizational stability was the strongest anchor and technical competence was the lowest one being the same

<sup>1</sup> Convergent validity is evaluated by measuring the correlation of each item representing the construct with the aggregate measure for that construct less the focal item. This approach assumes that the total score is valid; thus, the extent to which the item correlates with the total score is indicative of construct validity for the item (Kerlinger, 1986)

<sup>2</sup> Discriminate validity is the degree to which a construct differs from other constructs and is usually verified through factor analysis (Kerlinger, 1986).

as in 2002. The data showed that all means of the 2002 sample were higher than the means of the 2008 sample.

Table 3: Rank Order, Means, Standard Deviation, and T Tests on Career Anchors of MIS Undergraduates

| Career Anchor            | 2002 Rank Order | 2008 Rank Order | 2002 Means (S.D.) | 2008 Means(S.D.) | t value   |
|--------------------------|-----------------|-----------------|-------------------|------------------|-----------|
| Autonomy                 | 1               | 3               | 3.87(0.42)        | 3.42(0.93)       | 6.987***  |
| Creativity               | 2               | 5               | 3.81(0.62)        | 3.38(0.88)       | 6.477***  |
| Geographical security    | 3               | 8               | 3.79(0.57)        | 3.11(0.83)       | 10.743*** |
| Identity                 | 5               | 7               | 3.68(0.46)        | 3.24(0.84)       | 7.342***  |
| Managerial Competence    | 8               | 6               | 3.51(0.46)        | 3.30(0.91)       | 3.236**   |
| Organizational Stability | 4               | 1               | 3.69(0.55)        | 3.64(1.31)       | 0.519     |
| Service                  | 7               | 2               | 3.58(0.50)        | 3.48(0.99)       | 1.349     |
| Technical competence     | 9               | 9               | 3.23(0.48)        | 3.09(0.77)       | 2.386*    |
| Variety                  | 6               | 4               | 3.65(0.56)        | 3.41(0.98)       | 3.408**   |

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

A statistical t-test was used to further investigate the differences between 2002 and 2008 for each anchor. The results presented in Table 3 show that, except for organizational stability and service, all means of the 2008 sample were significantly lower than the mean values of the 2002 sample.

According to the longitudinal analysis of the career anchors for MIS undergraduates of the 2002 and the 2008 sample, in both instances the same emphasis was put on organizational stability and service anchors. In 2008, the means of seven career anchors were lower than in 2002. The possible reasons may be economic conditions or other factors. Relative to the rank order of organizational stability and service anchors of 2002, the order was improving in 2008. Technical competence was the lowest for 2002 and 2008. In Table 4, the comparison between the study results and those of Chang et al. (2007), which is the most recent comparable study, is presented. Chang et al. (2007) collected data regarding the career anchors of 145 IS students (undergraduate, graduate, and the executive MBA students) from three universities in 2004. For IS undergraduates, the most important career anchors were service, job security, and autonomy, which were also in the top three of this study.

Table 4: Comparison Rank Order of Career Anchors of MIS Undergraduates

| Career Anchor            | 2008 Rank Order | 2002 Rank Order | 2004 Rank Order             |
|--------------------------|-----------------|-----------------|-----------------------------|
| <i>Author</i>            |                 |                 | <i>Chang, et al. (2007)</i> |
| Organizational Stability | 1               | 4               | NA                          |
| Service                  | 2               | 7               | 1                           |
| Autonomy                 | 3               | 1               | 3                           |
| Variety                  | 4               | 6               | NA                          |
| Creativity               | 5               | 2               | NA                          |
| Managerial Competence    | 6               | 8               | 7                           |
| Identity                 | 7               | 5               | NA                          |
| Geographical security    | 8               | 3               | 9                           |
| Technical competence     | 9               | 9               | 8                           |
| Job security             | NA              | NA              | 2                           |
| Entrepreneurship         | NA              | NA              | 5                           |
| Pure challenge           | NA              | NA              | 6                           |
| Life-Style               | NA              | NA              | 4                           |

NA: The anchor was not included in the study.

In order to reexamine the dynamics of MIS undergraduates in Taiwan, nine mean scores were transferred to ordinal scale for each subject. For a student, the highest raw score of the nine career anchors was coded 1 and the lowest raw score was coded 9. From the results of chi-square tests, except for the variety anchor, all the rank orders of eight anchors were significantly different between 2002 sample and 2008 sample (see Appendix Table A-4). Schein (1987) has observed that the most faithful representation of a person's career orientation is the anchor that is most salient to the person in relative terms. Therefore, each subject was assigned a dominant career orientation on the basis of the orientation that received the highest raw score by that subject. For example, a student whose highest raw score was autonomy was coded 1. It was this code (1=autonomy, 2= managerial competence, 3=creativity, 4=identity, 5= organizational stability, 6=technical competence, 7=geographical security, 8=service, 9=variety) that was used to identify the dominant career anchor of each member of our sample.

The dominant careers were investigated to determine any significant shifts in dominant career anchors from 2002 to 2008. In Figure 2 the percentages of the dominant careers for the 2002 sample and the 2008 sample are presented. We have also presented the results of the chi-square test of independence in Table 5. The data show that the percentages of MIS undergraduates holding autonomy, creativity, and geographical security as their dominant anchors have lowed from 2002 to 2008. On the other hand, the career dominant percentages of

organizational stability, managerial competence, and technical competence have shifted from 2002 to 2008. The results of the chi-square test demonstrated the significance of the shift. The percentages of the dominant career anchors of MIS undergraduates in Figure 2 show the shift away from geographical security, creativity, and autonomy toward organizational stability. The trend provided the important evidence that recent MIS undergraduates put more emphasis on organizational stability than before.

The relative frequency of the career anchors for IS employees provided by Igbaria et al. (1991) shows that the two most widely held were managerial (26.1 percent of the sample) and technical (22.6 percent of the sample). Comparing with the results of the two samples in this study, MIS undergraduates scored very low on managerial anchor (6.6 percent of the 2002 sample and 13 percent of the 2008 sample) and technical anchor (1.3 percent of the 2002 sample and 12.2 percent of the 2008 sample).

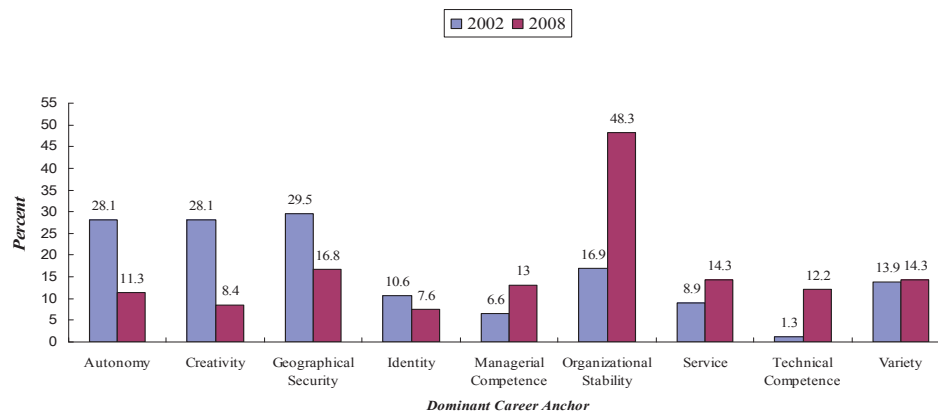


Figure 2: Dominant Career Anchors comparison between 2002 and 2008 of MIS Undergraduates in Taiwan

Table 5: Results of Chi-square Tests for Dominant Career Anchors of 2002 and 2008

| <i>Career Anchor</i>     | <i>2002<br/>Dominant number</i> | <i>2008<br/>Dominant number</i> | <i>Chi-square value</i> |
|--------------------------|---------------------------------|---------------------------------|-------------------------|
| Autonomy                 | 86                              | 27                              | 39.32***                |
| Creativity               | 86                              | 20                              | 69.46***                |
| Geographical security    | 89                              | 40                              | 92.74**                 |
| Identity                 | 33                              | 18                              | 16.25                   |
| Managerial Competence    | 21                              | 31                              | 21.25*                  |
| Organizational Stability | 50                              | 116                             | 99.90***                |
| Service                  | 27                              | 34                              | 35.790                  |
| Technical competence     | 4                               | 29                              | 66.43***                |
| Variety                  | 41                              | 35                              | 4.19                    |

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$



## 4.2 Gender Differences in the Career Anchors of MIS Undergraduates

The literature dealing with gender differences in the workforce points to a number of social and economic factors explaining differences in salary and position. Studies dealing with gender differences and IS professionals can be divided into research dealing with the representation of women in IT, research dealing with barriers to the recruitment and retention of women in IT, and research describing the career experiences of women in IT (Sumner & Niederman 2004). Prior studies indicate that women in IT experience social barriers much like women in other professions. Studies have reported that, regarding career anchors, men are more technically and managerially oriented than women (Crook et al. 1991; Igbaria et al. 1991; Igbaria & McCloskey 1996). For Taiwan IS professionals, Huang (2008) indicated significant gender differences in career anchors that were more oriented towards geographical security, organizational stability and technical skill/competence for men, and that they were also managerially oriented than women. Compared with prior research, the finding was consistent, namely that women are less managerially oriented than men.

This study also explored differences in career anchors according to gender, and results are presented in Table 6. Most of the means of career anchors show no difference between 2002 and 2008. Both 2002 and 2008 female MIS undergraduates indicated significantly lower levels of technical competence as an anchor. Additionally, male students put more emphasis on variety in 2002 and geographical security in 2008.

Table 6: Sample T Tests for Career Anchors by Gender

| Career Anchor            | 2002             |                  |           | 2008            |                  |         |
|--------------------------|------------------|------------------|-----------|-----------------|------------------|---------|
|                          | Female           | male             |           | Female          | Male             |         |
|                          | Means<br>(N=148) | Means<br>(N=152) | t value   | Means<br>(N=84) | Means<br>(N=154) | t value |
| Autonomy                 | 3.84             | 3.90             | -1.195    | 3.36            | 3.45             | -.710   |
| Creativity               | 3.75             | 3.87             | -1.699    | 3.28            | 3.43             | -1.264  |
| Geographical security    | 3.78             | 3.80             | -.259     | 2.96            | 3.20             | -2.133* |
| Identity                 | 3.66             | 3.70             | -.741     | 3.14            | 3.29             | -1.353  |
| Managerial Competence    | 3.48             | 3.54             | -1.086    | 3.24            | 3.34             | -.817   |
| Organizational Stability | 3.66             | 3.72             | -1.000    | 3.69            | 3.62             | .379    |
| Service                  | 3.55             | 3.61             | -1.036    | 3.59            | 3.43             | 1.158   |
| Technical competence     | 3.15             | 3.30             | -2.648**  | 2.96            | 3.17             | -2.019* |
| Variety                  | 3.54             | 3.77             | -3.761*** | 3.44            | 3.40             | .287    |

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

#### **4.3 Different Career Anchors of MIS Undergraduates between the General Universities and Technology-oriented Universities**

For the past few years, technological and vocational education (TVE) in Taiwan has been substantially developed. In accordance with government policy, many technology-oriented universities were established in order to provide Taiwan's industries with competent employees. Technology-oriented universities provide further education opportunities for graduates of vocational high schools and junior colleges. In the samples of this study, 248 respondents were from four technology-oriented universities located in the south, north, and centre of Taiwan.

The differences of career anchors between the two education systems were explored. For 2002, the means of career anchors for general universities ranged from 3.20 to 3.92 and (see Figure 3). Autonomy was the strongest anchor and the lowest was technical competence. For the MIS undergraduates at technology-oriented universities, the means for each of the nine career anchors ranged from 3.26 to 3.80. The strongest and lowest anchors were the same as for general university students.

For 2008, the means for general universities of each career anchors ranged from 2.89 to 3.39 and (see Figure 4). Organizational stability was the strongest anchor and the lowest anchor was technical competence. For technology-oriented universities MIS undergraduates, the means for each of the nine career anchors ranged from 3.15 to 3.88. The strongest anchor was organizational stability which was the same as general universities students. The lowest anchor was geographical security. A statistical t-test was used to further investigate the career anchors differences between the two education systems for each anchor. The results of the analysis are shown in Table 7. The data show that, for 2002, except for managerial competence, organizational stability, technical competence, and variety anchors, all means of the general universities were significantly higher than the mean values for the technology-oriented universities. For 2008, the means of organizational stability, creativity, and autonomy anchors in technology-oriented university students were significantly higher than that of general university students.



Figure 3: Career Anchors Comparison of MIS Undergraduates between Two Education Systems in 2002

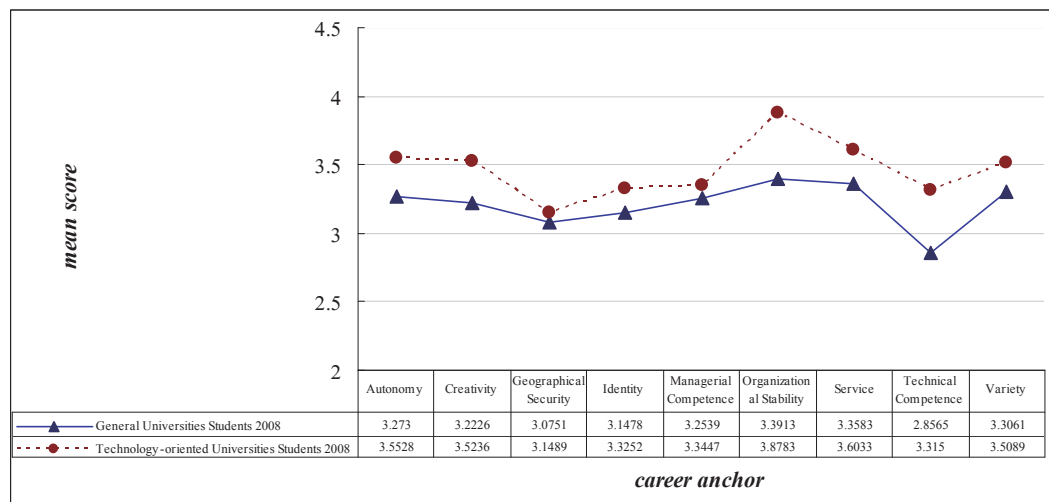


Figure 4: Career Anchors Comparison of MIS Undergraduates between Two Education Systems in 2008

Table 7: Sample T Tests for Two Education Systems

| Career Anchor            | 2002             |                  |         | 2008             |                  |           |
|--------------------------|------------------|------------------|---------|------------------|------------------|-----------|
|                          | G.U.             | T.U.             |         | G.U.             | T.U.             |           |
|                          | Means<br>(N=175) | Means<br>(N=125) | t value | Means<br>(N=115) | Means<br>(N=123) | t value   |
| Autonomy                 | 3.92             | 3.80             | 2.500*  | 3.27             | 3.55             | -2.337*   |
| Creativity               | 3.87             | 3.73             | 1.980*  | 3.22             | 3.52             | -2.679**  |
| Geographical security    | 3.861            | 3.69             | 2.478*  | 3.08             | 3.15             | -.687     |
| Identity                 | 3.74             | 3.60             | 2.599*  | 3.15             | 3.33             | -1.643    |
| Managerial Competence    | 3.52             | 3.49             | .604    | 3.25             | 3.35             | -.771     |
| Organizational Stability | 3.72             | 3.65             | 1.183   | 3.39             | 3.88             | -2.900**  |
| Service                  | 3.63             | 3.51             | 1.989*  | 3.36             | 3.60             | -1.912    |
| Technical                | 3.20             | 3.26             | -1.111  | 2.86             | 3.32             | -4.817*** |

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

#### 4.4 Career Anchors Comparison between MIS Undergraduates and IS Professionals in Taiwan

Huang (2008) indicates that IS professionals' career anchors are stable in Taiwan. They tend to possess high needs for organizational stability, service, and variety. The means of the career anchors of IS professionals are graphically represented in Figure 5. For 2002 and 2006 IS professionals samples, organizational stability was the strongest anchor and the lowest anchor was technical competence. A statistical t-test was used to explore the career anchor differences for IS professionals between 2002 and 2006 for each anchor. No statistical difference (all  $p$  values  $> 0.05$ ) was observed in the t-test results (see Appendix Table A-5). Organizational stability was the strongest orientation. At the other extreme, technical competence was the lowest orientation for IS professionals. Consistent with prior research (Ramakrishna & Potosky 2002), organizational stability and variety orientations were the core values of most IS professionals. Identity, geographical security, and technical competence were lower needs compared with other anchors for IS professionals in Taiwan.

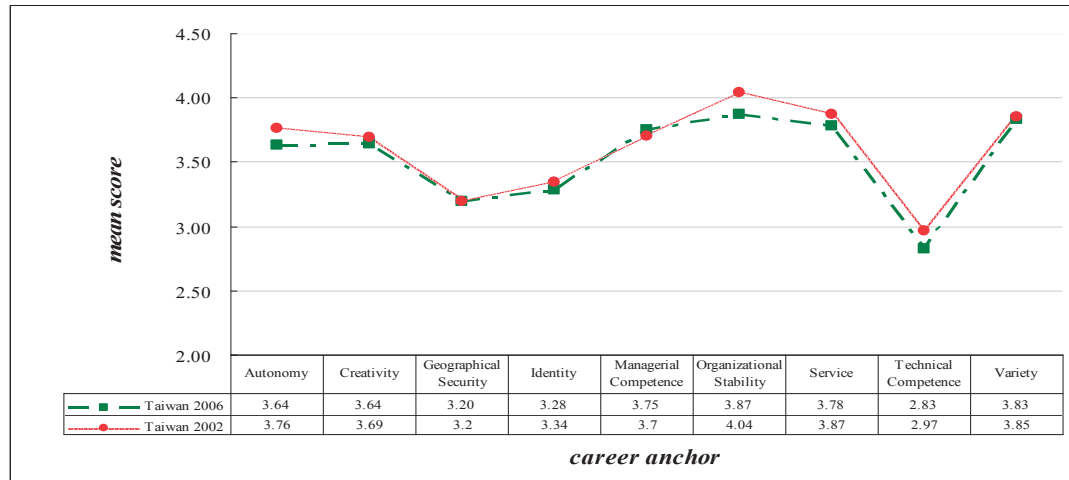


Figure 5: Career anchors Dynamics of IS Professionals in Taiwan between 2002 and 2006

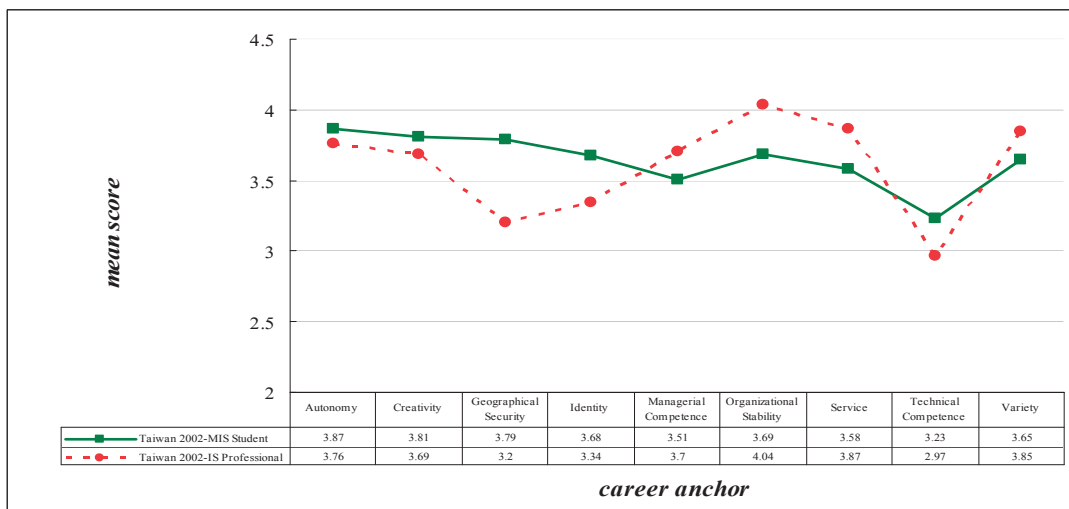


Figure 6: Career Anchors Comparison of MIS Undergraduates with IS Professionals in 2002

In this study, the nine career anchors of MIS undergraduates were compared with IS professionals which were surveyed at two occasions in Taiwan. For 2002, the means of creativity, geographical security, identity, and technical competence career anchors of MIS undergraduates were significantly higher than IS professionals. Contrast to students, the values of managerial competence, organizational stability, service, and variety anchors of IS professionals were significantly higher than MIS students (see Figure 6, Table 8).

For 2008, only the mean of technical competence of MIS undergraduates was significantly higher than IS professionals. The other career anchors of students were lower than IS

professionals. Except of geographical security, identity, and organizational stability career anchors, the mean values of autonomy, creativity, managerial competence, service, and variety career anchors were significantly higher than IS professionals (see Figure 7, Table 8).

Table 8: Sample T Tests for MIS Undergraduates and IS Professionals

| Career Anchor            | 2002          |                  |           | 2008          |                  |           |
|--------------------------|---------------|------------------|-----------|---------------|------------------|-----------|
|                          | MIS students  | IS professionals |           | MIS students  | IS professionals |           |
|                          | Means (N=302) | Means (N=106)    | t value   | Means (N=238) | Means (N=150)    | t value   |
| Autonomy                 | 3.87          | 3.76             | 1.955     | 3.42          | 3.64             | -2.336*   |
| Creativity               | 3.81          | 3.69             | 2.067*    | 3.38          | 3.64             | -3.595*** |
| Geographical security    | 3.79          | 3.20             | 7.406***  | 3.11          | 3.20             | -1.042    |
| Identity                 | 3.68          | 3.34             | 6.352***  | 3.24          | 3.28             | -.486     |
| Managerial Competence    | 3.51          | 3.70             | -3.183**  | 3.30          | 3.75             | -5.687*** |
| Organizational Stability | 3.69          | 4.04             | -4.648*** | 3.64          | 3.87             | -1.953    |
| Service                  | 3.58          | 3.87             | -5.209*** | 3.48          | 3.78             | -3.548*** |
| Technical                | 3.23          | 2.97             | 3.843***  | 3.09          | 2.83             | 3.208**   |
| Variety                  | 3.65          | 3.85             | -3.615*** | 3.41          | 3.83             | -5.398*** |

Note: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

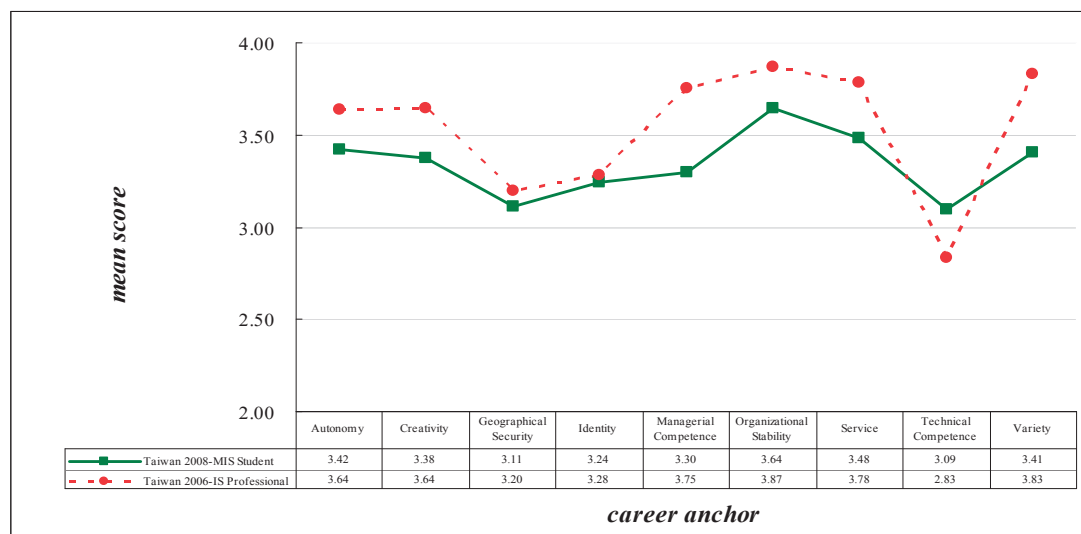


Figure 7: Career Anchors Comparison of MIS Undergraduates with IS Professionals in 2008

## 5. DISCUSSIONS AND TESESARCH LIMITATIONS

### 5.1 Discussions

In exploring and comparing the career anchor dynamics of MIS undergraduates in Taiwan, the sample was divided into two groups, the 2002 participants and the 2008 participants. The findings of this study revealed a rich diversity of career anchors held by MIS undergraduates. From the means of the nine career anchors, autonomy was the most important and technical competence was the lowest for the 2002 sample. For 2008, organizational stability was the most important anchor and technical competence was the least important compared to the same in 2002. The technical competence was the least important anchor for both MIS undergraduates and IS professionals. The finding was not consistent with our intuitive expectations and MIS literature. According to prior research, the most prevalent career anchors of MIS employees were found to be technical competence and managerial competence (Igbaria et al. 1991; Erdogmus 2004). From the data of dominant career anchor percentages, changes take place in the case of MIS undergraduates. The dominant career anchors shifted away from geographical security, creativity, and autonomy toward organizational stability. The possible reasons may be economic conditions. In 2008, the overall unemployment rate in Taiwan has increased up to five percent. Organizational security refers to the need to identify with one company. The high youth unemployment makes geographical security favorable for MIS students.

Additionally, all of the means of the career anchors of the 2008 sample were lower than for 2002. The possible reason may be due to MIS undergraduates favoring “new” career anchors over the traditional ones of long-term-based employment. In recent articles, researchers have critiqued the tendency of career scholars to overemphasize employee’s career self-management orientation (Mihail 2007; Baruch 2006). They propose that “new” careers have become less structured and controlled by organizations requiring individual employees to face a broader spectrum of career parameters than those sufficient in the organizational career path.

This study explored differences in career anchors according to gender and education systems. For female MIS undergraduates, less emphasis was put on technical competence. The result of this finding is consistent with prior studies which reported gender differences in career anchors with men being more technically and managerially oriented than women (Marshall & Bonner 2003; Crook et al. 1991; Igbaria et al. 1991; Igbaria & McCloskey 1996). In contrast to female MIS undergraduates, for women in IS professionals, Huang (2008) indicated significant gender differences in career anchors with women being more oriented towards geographical

security, organizational stability and technical skill/competence than men, and men more managerially oriented than women. There are some differences between female students and female IS professionals.

The general and technology-oriented universities represent two substantially different education systems in Taiwan. For 2002, the general university students scored high on autonomy, creativity, geographical security, identity, and service. On the other hand, the means of organizational stability, creativity, and autonomy anchors in technology-oriented university students were significantly higher than that of general university students. MIS students in technology-oriented universities did not put more emphasis on technical competence than general university students. The possible reason may be the same curriculum design for MIS in the two education systems. In order to explore the migration of career anchors, this study ran the t-test to verify the difference for each education system for 2002 and 2008. The results indicated that all the means of the career anchors of general university students for 2008 were lower than for 2002. On the other hand, for technology-oriented university students, the means of organizational stability, service, technical competence, and variety of the 2008 sample were not different from those of 2002. The possible reason is that the general universities in Taiwan have, substantially, been developed in the same way as technological and vocational education institutions.

This study revealed that MIS undergraduates tend to have a high need for organizational stability. Organizational stability was also one of the core values of most IS professionals in Taiwan (Huang 2008). One possible explanation for the dominance of organizational stability is that organizations are becoming more flexible and accommodating in defining career options for IS professionals in ways that suit the needs of the IS professionals and not necessarily only those of the organization. In this day of downsizing, outsourcing and globalization, the need to feel secure in making career decisions is important for all IS employees in Taiwan. Service is another high need for both IS professionals and MIS undergraduates. But according to this study, IS professionals score their work lower on the mean value than students do. Most IS professionals view their role as supportive and helpful in fulfilling other's needs and solving their problems. Changing this perception to a view of their role as one of service to the organization needs serious consideration.

However, identity, geographical security, and technical competence were lower needs compared with other anchors for MIS undergraduates in Taiwan. The finding is with the same as for IS professionals (Huang 2008). It is hardly surprising that technical competence is not an important orientation for both IS professionals and MIS undergraduates. Most literature indicates that IS employees need to progress their technical skills. According to Igbaria's (1991)



findings, technical orientation is important for nearly 50 percent of the MIS employees. MIS employees would be more likely to have a technical orientation than other orientations. This could be investigated in further study.

## 5.2 Implications

MIS students are one of the principal sources of IS employees. Understanding the career anchors of MIS students while they are still in school or about to start looking for a job can provide information that can help MIS students to plan their careers and assist organizations in recruiting IS labor that better matches their needs and reduces turnover (Chang et al. 2007). The results of this study provide interesting insights into the career anchors of MIS undergraduates in Taiwan. The results also demonstrated that MIS undergraduates needed higher organizational stability, but lower technical competence. The findings of the study can provide human resource management departments and MIS managers with valuable information regarding their new entry-level IS professionals' career anchors and can have important implications for the selection, placement, career development, and retention of MIS personnel. On the other hand, by comparing the career anchors with those of IS professionals, MIS department faculty can understand the differences between their students and IS professionals. They can introduce the anchor concept to their students and encourage them to explore their value and career needs and to recognize the importance of a match between career anchors and job setting. This study also has implications for university faculty preparing students to enter the MIS profession.

According to the gender investigation, except for technical competence, all the career anchors mean scores were similar. Generally, past IS workforce literature has tended to find significant differences between male and female IS workers. For the MIS undergraduates, however, there were more similarities between female and male MIS students in career need in this study. This finding would be significant for IS managers. In a dynamic and volatile labor market, gender no longer is an issue because of the great demand for qualified IS professionals.

Geographical security and technical competence were lower needs than others. Both undergraduate students as IS professionals tend to have high needs for organizational stability and service. One possible explanation for the dominance of organizational stability is that organizations are becoming more flexible and accommodating in defining career options for IS professionals in ways that suit the needs of the IS professionals and not necessarily only that of the organization. The results of this study suggested that organizations may be better served by human resource initiatives that are congruent with organizational stability, service, and perhaps variety orientations. Such initiatives may include organizational communication that reinforces job security, employment or relocation of spouses, and regular assessment of project assignment to ensure desirable levels of autonomy on the job. Organizations should not presuppose that the most prevalent dominant career anchors of IS professionals are managerial or technical. This

dual career path may not be the most effective one as a retention strategy or a career planning tool for IS professionals.

Another contribution of this study is the identifying of how important it is for MIS undergraduates to understand their own career anchors and know the differences between theirs and those of IS professionals. Most Taiwanese students are protected from practical work. In this way, students will learn how to satisfy their career needs and justify or develop their career path to match long-term job setting.

### 5.3 Limitations

This study used judgment sampling to select the MIS departments of nine universities located in the south, north, and centre Taiwan. Compared with prior research, this was a broader sample. The proportion of returned responses from the universities was not the same. Therefore, the respondents might not represent the population of the different areas satisfactorily. The second survey of MIS undergraduates was conducted in 2008, whereas the IS professionals was conducted in 2006. From the view point of sampling, collecting data at different time maybe cause a sampling bias. Additionally, in this study, the career anchors instrument was constructed using the Career anchors Inventory (COI) developed by Delong (1982) which includes nine career anchors. In recent research, “new” career anchors have been proposed to measure career needs. While this study investigated the career anchors of MIS undergraduates at two occasions, it was limited to Taiwan. Therefore, any generalizations from this study must recognize these limitations.

## 6. ACKNOWLEDGEMENT

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## APPENDIX

Table A-1 Results of T-Test for Non-response Bias

|                                | <i>Mean for<br/>respondents</i> | <i>Mean for<br/>non-respondents</i> | <i>t-test significance</i> |
|--------------------------------|---------------------------------|-------------------------------------|----------------------------|
| <b>2002</b>                    | (N=67)                          | (N=39)                              |                            |
| <i>Number of MIS employees</i> | 21.87                           | 14                                  | 1.133 (p=0.260) NS         |
| <i>Number of employees</i>     | 1119.63                         | 798.72                              | 0.828 (p=0.410) NS         |
| <b>2006</b>                    | (N=104)                         | (N=46)                              |                            |
| <i>Number of MIS employees</i> | 18.52                           | 18.20                               | 0.055 (p=0.956) NS         |
| <i>Number of employees</i>     | 1414.59                         | 1221.13                             | 0.324 (p=0.746) NS         |

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Table A-2 Question items

| <b>Anchors</b> | <b>Questions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Autonomy       | <ol style="list-style-type: none"> <li>1. The chance to pursue my own lifestyle and not be constrained by the rules of an organizations is</li> <li>2. A career which is free from organization restrictions is...</li> <li>3. A career which permits a maximum of freedom and autonomy to choose my own work, hours, etc., is...</li> <li>4. During my career I have been mainly concerned with my own sense of freedom and autonomy.</li> <li>5. I do not want to be constrained by either an organization or the business world.</li> </ol>       |
| Creativity     | <ol style="list-style-type: none"> <li>1. To be able to create or build something that is entirely my own produce or idea is...</li> <li>2. The use of my skills in building a new business enterprise is...</li> <li>3. I have been motivated throughout my career by the number of ideas or products which I have been directly involved in creating.</li> <li>4. To invent something on my own and create a new idea are important elements of my career.</li> <li>5. I have always wanted to start and build up a business of my own.</li> </ol> |

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Geographical security    | <ol style="list-style-type: none"> <li>1. Remaining in one geographical area rather than moving because of a promotion is...</li> <li>2. It is important for me to remain in my present geographical location rather than move because of a promotion or new job assignment.</li> <li>3. I prefer to work for an organization which will permit me to remain in one geographical area.</li> </ol>                                                                                                                                                             |
| Identity                 | <ol style="list-style-type: none"> <li>1. Being identified with and gaining status from my occupations is...</li> <li>2. To be recognized by my title and status is...</li> <li>3. Being identified with a powerful or prestigious employer or organization is...</li> <li>4. I like to be identified with a particular organization and the prestige accompanies that organization.</li> <li>5. I want others to identify me by my organization and my job title.</li> </ol>                                                                                 |
| Managerial Competence    | <ol style="list-style-type: none"> <li>1. The process of supervising, influencing, leading and controlling people at all levels is...</li> <li>2. To be in a position of leadership and influence is...</li> <li>3. To rise to a position in general management is...</li> <li>4. I would like to reach a level of responsibility in an organization where my decisions really make a difference.</li> <li>5. I want to achieve a position which gives me the opportunity to combine analytical competence with supervision of people.</li> </ol>             |
| Organizational Stability | <ol style="list-style-type: none"> <li>1. An organization which will provide security through guaranteed work, benefits, a good retirement program, etc. is...</li> <li>2. An organization which will give me long term stability is...</li> <li>3. I prefer to work for an organization which provides tenure (life-time employment).</li> </ol>                                                                                                                                                                                                             |
| Service                  | <ol style="list-style-type: none"> <li>1. The use of my interpersonal and helping skills in the service of others is...</li> <li>2. The process of seeing others change because of my effort is...</li> <li>3. Being able to use my skills and talents in the service of an important cause is...</li> <li>4. I have always sought a career in which I could be of service to others.</li> <li>5. I want a career in which I can be committed and devoted to an important cause.</li> </ol>                                                                   |
| Technical                | <ol style="list-style-type: none"> <li>1. To build my career around some specific functional or technical area of expertise is...*</li> <li>2. Remaining in my specialized area as opposed to being promoted out of my area of expertise is...</li> <li>3. Remaining in my area of expertise rather than being promoted into general management is...</li> <li>4. I will accept a management position only if it is in my area of expertise.</li> <li>5. I would leave my company rather than be promoted out of my area of expertise or interest.</li> </ol> |
| Variety                  | <ol style="list-style-type: none"> <li>1. An endless variety of challenges in my career is...</li> <li>2. A career which provides maximum variety of type of assignments and work project is...</li> <li>3. The excitement of participating in many areas of work has been the underlying motivation behind my career.</li> <li>4. An endless variety of challenges is what I really want from my career. *</li> <li>5. I have been motivated throughout my career by being able to use my talents in a variety of different areas of work.</li> </ol>        |

\*This item was deleted in formal questionnaire in this study

Table A-3 Reliability and Validity Analysis for Measures

| Variables                   | Reliability<br>(Cronbach's alpha)      |               | Convergent validity<br>(correlation of item with total score-item) |          | Discriminate validity<br>( factor loading <sup>a</sup> ) |          |
|-----------------------------|----------------------------------------|---------------|--------------------------------------------------------------------|----------|----------------------------------------------------------|----------|
| Autonomy                    | Pretest 2002 2006<br>0.779 0.741 0.700 | 2008<br>0.912 | IS                                                                 | MIS      | IS                                                       | MIS      |
|                             |                                        |               | Professionals                                                      | students | Professionals                                            | students |
|                             |                                        |               | 0.772**                                                            | 0.502**  | 0.751                                                    | 0.866    |
|                             |                                        |               | 0.666**                                                            | 0.637**  | 0.686                                                    | 0.865    |
|                             |                                        |               | 0.717**                                                            | 0.702**  | 0.762                                                    | 0.853    |
|                             |                                        |               | 0.810**                                                            | 0.837**  | 0.839                                                    | 0.872    |
| Creativity                  | 0.703 0.699 0.601                      | 0.879         | 0.697**                                                            | 0.916**  | 0.630                                                    | 0.858    |
|                             |                                        |               | 0.764**                                                            | 0.770**  | 0.794                                                    | 0.790    |
|                             |                                        |               | 0.716**                                                            | 0.891**  | 0.770                                                    | 0.890    |
|                             |                                        |               | 0.583**                                                            | 0.878**  | 0.611                                                    | 0.883    |
|                             |                                        |               | 0.608**                                                            | 0.857**  | 0.592                                                    | 0.859    |
|                             |                                        |               | 0.740**                                                            | 0.710**  | 0.660                                                    | 0.682    |
| Geographical<br>Security    | 0.667 0.720 0.678                      | 0.695         | 0.865**                                                            | 0.829**  | 0.887                                                    | 0.855    |
|                             |                                        |               | 0.815**                                                            | 0.861**  | 0.825                                                    | 0.894    |
|                             |                                        |               | 0.630**                                                            | 0.674**  | 0.588                                                    | 0.602    |
| Identity                    | 0.689 0.702 0.770                      | 0.877         | 0.703**                                                            | 0.851**  | 0.721                                                    | 0.858    |
|                             |                                        |               | 0.645**                                                            | 0.849**  | 0.640                                                    | 0.855    |
|                             |                                        |               | 0.763**                                                            | 0.764**  | 0.804                                                    | 0.763    |
|                             |                                        |               | 0.603**                                                            | 0.832**  | 0.527                                                    | 0.820    |
|                             |                                        |               | 0.642**                                                            | 0.783**  | 0.658                                                    | 0.797    |
| Managerial<br>Competence    | 0.787 0.792 0.860                      | 0.934         | 0.791**                                                            | 0.853**  | 0.792                                                    | 0.861    |
|                             |                                        |               | 0.719**                                                            | 0.898**  | 0.700                                                    | 0.907    |
|                             |                                        |               | 0.681**                                                            | 0.920**  | 0.684                                                    | 0.923    |
|                             |                                        |               | 0.727**                                                            | 0.895**  | 0.739                                                    | 0.898    |
|                             |                                        |               | 0.756**                                                            | 0.859**  | 0.760                                                    | 0.859    |
| Organizational<br>Stability | 0.831 0.826 0.682                      | 0.682         | 0.851**                                                            | 0.953**  | 0.848                                                    | 0.952    |
|                             |                                        |               | 0.848**                                                            | 0.972**  | 0.859                                                    | 0.972    |
|                             |                                        |               | 0.898**                                                            | 0.955**  | 0.891                                                    | 0.956    |
| Service                     | 0.722 0.745 0.705                      | 0.705         | 0.676**                                                            | 0.897**  | 0.681                                                    | 0.885    |
|                             |                                        |               | 0.578**                                                            | 0.917**  | 0.529                                                    | 0.909    |
|                             |                                        |               | 0.787**                                                            | 0.926**  | 0.804                                                    | 0.923    |
|                             |                                        |               | 0.683**                                                            | 0.847**  | 0.694                                                    | 0.861    |
|                             |                                        |               | 0.718**                                                            | 0.768**  | 0.727                                                    | 0.783    |
| Technical<br>Competence     | 0.667 0.716 0.747                      | 0.747         | 0.659**                                                            | 0.761**  | 0.676                                                    | 0.798    |
|                             |                                        |               | 0.786**                                                            | 0.736**  | 0.823                                                    | 0.798    |
|                             |                                        |               | 0.676**                                                            | 0.786**  | 0.658                                                    | 0.807    |
|                             |                                        |               | 0.798**                                                            | 0.557**  | 0.841                                                    | 0.624    |
| Variety                     | 0.741 0.733 0.798                      | 0.798         | 0.706**                                                            | 0.932**  | 0.779                                                    | 0.931    |
|                             |                                        |               | 0.669**                                                            | 0.911**  | 0.698                                                    | 0.859    |
|                             |                                        |               | 0.593**                                                            | 0.919**  | 0.418                                                    | 0.912    |
|                             |                                        |               | 0.819**                                                            | 0.894**  | 0.833                                                    | 0.920    |
|                             |                                        |               | 0.786**                                                            | 0.856**  | 0.835                                                    | 0.895    |

Note: \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Table A-4: Comparison Rank Order of Career Anchors of MIS Undergraduates

| <i>Career Anchor</i>     | <i>Rank Order</i> |          |          |          |          |          |          |          |          |          | Chi-Square Value<br>(Sig.2-sided) |
|--------------------------|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------------------------------|
|                          | <i>Year</i>       | <i>1</i> | <i>2</i> | <i>3</i> | <i>4</i> | <i>5</i> | <i>6</i> | <i>7</i> | <i>8</i> | <i>9</i> |                                   |
| Autonomy                 | 2002              | 86       | 54       | 53       | 32       | 24       | 24       | 15       | 7        | 7        | 39.320<br>(0.000)                 |
|                          | 2008              | 27       | 34       | 43       | 22       | 30       | 31       | 25       | 16       | 10       |                                   |
| Creativity               | 2002              | 86       | 59       | 32       | 27       | 23       | 19       | 21       | 20       | 14       | 69.458<br>(0.000)                 |
|                          | 2008              | 20       | 23       | 37       | 43       | 36       | 33       | 29       | 13       | 4        |                                   |
| Geographical security    | 2002              | 89       | 33       | 35       | 27       | 36       | 26       | 22       | 20       | 13       | 92.736<br>(0.000)                 |
|                          | 2008              | 40       | 33       | 11       | 8        | 16       | 7        | 20       | 43       | 60       |                                   |
| Identity                 | 2002              | 33       | 42       | 41       | 48       | 36       | 37       | 34       | 20       | 8        | 16.251<br>(0.038)                 |
|                          | 2008              | 18       | 21       | 36       | 28       | 23       | 35       | 32       | 28       | 15       |                                   |
| Managerial Competence    | 2002              | 21       | 23       | 30       | 46       | 30       | 41       | 32       | 47       | 29       | 21.245<br>(0.007)                 |
|                          | 2008              | 31       | 17       | 36       | 28       | 31       | 35       | 27       | 16       | 15       |                                   |
| Organizational Stability | 2002              | 50       | 37       | 32       | 37       | 43       | 36       | 25       | 25       | 14       | 99.898<br>(0.000)                 |
|                          | 2008              | 116      | 20       | 10       | 6        | 11       | 16       | 14       | 12       | 31       |                                   |
| Service                  | 2002              | 27       | 30       | 31       | 43       | 31       | 46       | 40       | 31       | 22       | 35.78<br>(0.000)                  |
|                          | 2008              | 34       | 38       | 44       | 38       | 22       | 23       | 26       | 11       | 2        |                                   |
| Technical                | 2002              | 4        | 12       | 5        | 13       | 21       | 27       | 41       | 53       | 126      | 66.431<br>(0.000)                 |
|                          | 2008              | 29       | 24       | 18       | 11       | 16       | 24       | 21       | 47       | 48       |                                   |
| Variety                  | 2002              | 41       | 40       | 41       | 33       | 33       | 32       | 36       | 30       | 15       | 4.185<br>(0.840)                  |
|                          | 2008              | 35       | 31       | 33       | 34       | 25       | 19       | 23       | 18       | 15       |                                   |

Note: numbers presented the total number of the subjects

Table A-5: Mean Differences between 2002 and 2006

| <b>Career Anchor</b>     | <b>2002</b> | <b>2006</b> | <b>Sig.(2-tailed)</b> | <b>p &lt; 0.05</b> |
|--------------------------|-------------|-------------|-----------------------|--------------------|
| Autonomy                 | 3.76        | 3.64        | 0.202                 | NS                 |
| Creativity               | 3.69        | 3.64        | 0.488                 | NS                 |
| Geographical security    | 3.20        | 3.20        | 0.976                 | NS                 |
| Identity                 | 3.34        | 3.28        | 0.532                 | NS                 |
| Managerial Competence    | 3.70        | 3.75        | 0.497                 | NS                 |
| Organizational Stability | 4.04        | 3.87        | 0.116                 | NS                 |
| Service                  | 3.87        | 3.78        | 0.241                 | NS                 |
| Technical                | 2.97        | 2.83        | 0.146                 | NS                 |
| Variety                  | 3.85        | 3.83        | 0.794                 | NS                 |

NS: not significant at  $p < 0.05$