

MODEL TO PREDICT THE DECISION IN CHOOSING CAREER OF SCIENCE GRADUATES IN THAILAND

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Abstract: *The purpose of this study is to find the influential variables about decision making in choosing a career of science graduates through practical data. By using the factor analysis, the data is collected from 308 science graduates in academic year of 2013 from Srinakharinwirot University. The discriminant analysis method is used to model in this study. The result shows that five variables: major of study, GPA, family burden, retirement pension and private company job have influenced the science graduates in choosing their careers.*

Keywords: *choosing career, discriminant analysis, factor analysis, reliability*

INTRODUCTION

Choosing a career path is a huge part of a graduate's life. The career path that graduates choose will affect how they will live the rest of their life. Choosing the right career path is becoming more and more important for graduates today. Graduates choose their job fields from many reasons such as family, passion, salary and major of study. In addition to these factors, the company job and career progression can also have effect on their decisions.

Over time the job market has seen many changes. The economic growths, improvement in technology, demographic shifts and changes in consumer taste have all affected employment both positively and negatively. Both the number and the type of jobs that are available have been affected. As our country evolves and grows, our job fields will continue to grow and change (Su, 2004; Bandmir, & Mehrpouyan, 2015). The economy is one of the fundamental parts of the job market. The economic growth leads to higher employment rates and increased spending. The growth of business leads to possible expansions, which create more job opportunities in the workforce. A growth in the economy of some fields can attract graduates to those fields (Blair, 1999; Suhaili, Ahmad & Ainah, 2015).

Presently, Thailand's employment market is in demand. There has been a growth in the traditional sectors such as consumer, manufacturing and industrial. However, the significant growth is the steep rise in the service sector, which has

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created jobs for professionals in the areas of banking, sales and business development, online, advertising and marketing. A growing economy means a high demand for employment.

Currently in Thailand, there are more demanding of skilled professionals. Therefore, those with the required skills are able to choose and acquire the job that they desire. Since the skilled professionals are in demand, the employers offer a significant increase in salary in order to attract the skilled professionals to work for them. The skilled professional can expect a raise from 10% to 20% when they change to a new job. In addition, the highly sought after sales professionals can expect a raise over 25%. This job-swapping culture is creating issues for employers, who struggle to hold on to their top employees (Cooper, 2014).

From Srinakharinwirot University, there are about 500 graduates that graduate from Faculty of Science in each year. In 2010, 371 of 532 science graduates were employed. In 2011, 375 of 553 science graduates were also employed within six months after the graduation. Therefore, the aim of this paper is to find the influential variables about decision making in choosing a career of science graduates in Thailand.

LITERATURE REVIEW

In 2009, Waisriseang found factors affecting decision making of 276 undergraduate students from public and private university in Bangkok, Thailand. The results found that students selected private company or private enterprise in the first rank followed by private practice or freelance, government service, state enterprise, international organization and other occupation such as service sector. In addition, factors affecting decision making of undergraduate students in public and private university in Bangkok were faculty, domicile and expectation on student's occupation from father, mother or parents.

Numkham and Raungdessuwon (2014) studied the factors influencing the choice of job for bachelor graduates, Far Eastern university in Thailand. The study was a survey research and the sample consisted of 218 fourth year students in Far Eastern university. The result showed wages and earnings factor that is 1) the need to earn enough for cost of living 2) size of organization that is large size organization (more than 500 employees) 3) opportunity of work process factor that was the chance to be accepted as full time staff 4) job description factor that is the need of work stability 5) the job environment factor that was the need for safety 6) the organization stability factor that was the need of credibility 7) distance for journey factor that was the need for ease of journey and 8) reputable organization factor's. Moreover, the testing of relationship between personal factors with external factor affecting in the choice of work found that 1) gender factor had positive correlation with need of obvious work sequence process 2) Age factor had positive

correlation with decision to work in small size organization (less than 50 employees) 3) work experience factor had positive correlation with choice of the work must be equitable and have justified rules for promoting 4) gender factor had positive correlation with organization stability and 5) work experience had correlation with the standardized work place.

Bakar, Ismail and Hanzah (2014) examined the combination of intrinsic, altruistic motivations, perception, expectation, satisfaction, gender and academic program which influence career choice and retention of teachers. The study involved 300 students from four public universities in Malaysia and the results from the discriminant analysis showed that the student teachers who intend to pursue a teaching career mentioned that motivation factors namely intrinsic, extrinsic and altruistic are the best combination of variables that best explain their choice.

Therefore, this research investigates factor related to the choosing career of science graduates of Srinakharinwirot University in Thailand. The model to predict decision in choosing a career of science graduates is then later modeled by discriminant analysis.

METHODOLOGY

Participants

A large group of 308 science graduates in academic year of 2013 from the Faculty of Science of Srinakharinwirot University is participated in this study. There are 221 female and 87 male participants with an age range from 21 to 26 years with a mean of 23.38 years.

Instruments

The questionnaires of this study is consist of 2 parts: (1) General data of science graduates such as sex, age, GPA, major, family burden and current working status (2) Choosing Career items are composed of 33 questions. Each item of Choosing Career is a five-point Likert scale questionnaire that ranged from 1- strongly disagree to 5- strongly agree.

Statistical analysis

The data are analyzed using R software. There are two steps in the data analysis; (1) factor analysis and reliability (2) discriminant analysis. Choosing Career items can be factor analyzed into factors. The data are analyzed using the principal components analysis and varimax rotation from R software. Factors are formed by including those items with factor loading 0.40 or greater. Eigenvalue of each factor should be 1 or greater. Cronbach's alpha as an estimate of reliability of items forming each factor should be .65 or greater (Johnson & Wichern, 1999).

Discriminant function analysis is a statistical technique used for classifying observations (Klecka, 1980). The independent variables need to be interval while the dependent variables, which are the groups that the observations are classified into, need to be nominal. Multivariate normality is assumed, but discriminant function analysis is robust to violations due to the skewness rather than the outliers. However, discriminant function analysis does include a technique that can be used to identify outliers, Mahalanobis distances, as a built-in option. Homogeneity of variance-covariance matrices is another assumption of discriminant function analysis. But like multivariate normality, discriminant function analysis is robust to violations. Finally, violations of multicollinearity may make the underlying matrix calculations unstable and must be avoided. However, it can be controlled with an option in the program. Generally, violations of these assumptions are conservative. That is, the power of the test is reduced, thereby lessening the chance of finding significance (Klecka, 1980; Tabachnick & Fidell, 1989).

Discriminant function analysis produces functions that help define the groups; the maximum number of functions that can be defined is one less than the number of groups. The functions first seek to distinguish the first group from the others, then the second group from the rest, and so on. These are identified by the Eigenvalues on the output. The eigenvalues also show what percentage of variance is accounted for with each function. In addition, Wilks lambda tests the significance of each function.

RESULTS

The data is collected from 308 science graduates in academic year of 2013 from Srinakharinwirot University. Most of the science graduates are female (71.8%), currently working (71.1%) and no family burden (52.3%). Means of age and GPA of science graduates are 23.38 and 2.90, respectively. Science graduates in academic year of 2013 from Srinakharinwirot University are consisted of 14 majors in bachelor degrees (see Table 1).

In Table 2, all of the 33 items of the Choosing Career scale are entered into factor analysis using the maximum likelihood extraction method with varimax orthogonal rotation. The Kaiser-Meyer-Olkin measure of sampling adequacy is 0.897 (>0.70), which indicates that the sample data are suitable for the undergoing of factor analysis. The Bartlett's test of sphericity ($p=0.000<0.05$) prove that the principal component analysis has a sense. The coefficient of internal consistency (reliability) Cronbach's alpha is statistically significant and equals to 0.94 for the total number of questions of the Decision in Choosing Career.

This analysis resulted in six factors accounting for 66.04% of variance in the solution. Factor 1 has an eigenvalue of 12.06, accounting for 34.46% of the variance, Factor 2 has an eigenvalue of 3.53, accounting for another 10.07% of the variance.

Table 1
Characteristics of science graduates

<i>Characteristic</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Sex		
Male	87	28.2
Female	221	71.8
Age, mean (sd)	23.38 (0.73)	
Current work status		
Work	219	71.1
Not work	89	28.9
Family Burden		
No	161	52.3
Yes	147	47.7
Major		
Bachelor of Science in Mathematics	10	3.2
Bachelor of Science in Statistics	23	7.5
Bachelor of Science in Computer Science	37	12.0
Bachelor of Science in Home Economics	24	7.8
Bachelor of Science in Chemistry	33	10.7
Bachelor of Science in Physics	31	10.1
Bachelor of Science in Biology	33	10.7
Bachelor of Science in Microbiology	25	8.1
Bachelor of Science in Gems and Jewelry	27	8.8
Bachelor of Education in Mathematics	14	4.5
Bachelor of Education in Chemistry	12	3.9
Bachelor of Education in Physics	15	4.9
Bachelor of Education in Biology	14	4.5
Bachelor of Education in General Science	10	3.2
GPA, mean (sd)	2.90 (0.41)	

While factors 3, 4, 5 and 6 have the eigenvalue of 2.61, 2.02, 1.51, 1.38 and accounting for 7.46%, 5.78%, 4.32%, 3.95%, respectively. Moreover, Cronbach's alpha coefficients of all factors are exceeded 0.70. Finally, the principal factor analysis totally arise six factor-composite variables, which are named:

- Factor 1 colleague and supervisor
- Factor 2 retirement pension
- Factor 3 workplace location and working guarantee
- Factor 4 private company job
- Factor 5 major of study
- Factor 6 salaries and welfare

Table 2
Factor analysis of the Choosing Career items with Science Graduates: Initial solution, rotated factor Matrix

<i>Items</i>	<i>Factor 1</i>	<i>Factor 2</i>	<i>Factor 3</i>	<i>Factor 4</i>	<i>Factor 5</i>	<i>Factor 6</i>
Colleague	0.777					
Life style	0.770					
Boss	0.741					
Subordinate	0.647					
Family	0.620					
Working environment	0.610					
Working with many amenities	0.593					
Fit your personality	0.551					
Working system	0.531					
Retirement payment		0.871				
Pension		0.867				
Post-employment remuneration		0.814				
Career progression		0.651				
Job security		0.607				
Bonus		0.538				
Workplace located in Bangkok metropolitan			0.730			
People are encouraged to get the job done			0.713			
Workplace located in big city			0.705			
Working with guarantors			0.690			
Working with guarantee funds			0.663			
Family's reputation			0.640			
Values			0.406			
Public company job				0.896		
Private company job				0.872		
International organizations				0.834		
State enterprises job				0.793		
According to my major					0.891	
Applying my knowledge					0.885	
Government job					0.493	
Salaries						0.667
Welfare						0.587
Career objective						0.482
Job satisfaction						0.456
Eigenvalue	12.06	3.53	2.61	2.02	1.51	1.38
Variance Explained (%)	34.46	10.07	7.46	5.78	4.32	3.95
Total Variance Explained (%)	66.04					
Cronbach's alpha	0.89	0.91	0.86	0.91	0.76	0.81
Total Reliability	0.94					
Cronbach's alpha						

When discriminant function analysis is applied to these data to distinguish between these groups (work/not work). The eigenvalue in Table 3 is 0.387 and the canonical correlation is 0.528. From Table 4, Fisher's linear discriminant function for the current work group is $\hat{Y}_1 = -25.681 - 0.12 Major + 17.24 GPA + 2.44 Burden - 0.267 Pension + 0.335 Job$ and Fisher's linear discriminant function for the current not work group is $\hat{Y}_2 = -27.785 - 0.259 Major + 18.418 GPA + 0.757 Burden - 0.791 Pension + 0.933 Job$.

In this study, the percentage correctly classified is 76.3% and the percentage correctly classified of the work group is 74.4%. The percentage correctly classified of the not work group is 80.9% whereas the percentage wrongly classified is 19.1% (see Table 5).

Table 3
Eigenvalues for discriminant functions

<i>Function</i>	<i>Eigenvalue</i>	<i>% of Variance</i>	<i>Cumulative%</i>	<i>Canonical Correlation</i>
1	0.387	100.0	100.0	0.528

a. First 1 canonical discriminant functions were used in the analysis.

Table 4
Classification Function Coefficients

	<i>Current work status</i>	
	<i>Work</i>	<i>Not work</i>
Major	-0.124	-0.259
GPA	17.240	18.418
Family burden	2.444	0.757
Retirement pension	-0.267	0.791
Private company job	0.335	0.933
(Constant)	-25.681	-27.785

CONCLUSION

The predictive models for decision in Choosing Career of Science Graduates in Thailand are researched by applying statistical theory through the actual data. In this research, Statistical analysis is used both basic and advanced statistics. Factor analysis is used to select the variables that are important or influence the decision in Choosing Career of Science Graduates. Then use those variables to generate a model by analyzing classified. The use of discriminant function analysis to classify data can be an extremely useful tool. The ability to develop a predictive model based on the model produced through the discriminant function analysis procedure the 76.3 percentage correctly classified for deciding in Choosing Career of Science Graduates in Thailand.

Table 5
Classification Results

		Current work status	Predicted Group Membership		Total
			Work	Not work	
Original	Count	Work	163	56	219
		Not work	17	72	89
	%	Work	74.4	25.6	100.0
		Not work	19.1	80.9	100.0
Cross- validated	Count	Work	162	57	219
		Not work	18	71	89
	%	Work	74.0	26.0	100.0
		Not work	20.2	79.8	100.0

a. 76.3% of original grouped cases correctly classified.

b. 75.6% of cross-validated grouped cases correctly classified.

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