

# **A survey of affecting factors for student's innovation ability at President University**

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## **I Introduction**

Throughout the history of human development, pace of social development, competition between countries, companies, even during the human beings, innovation plays an invaluable role. Human developing actually is ongoing process of innovation. In the contemporary, with the science and technology advances, new inventions, new technologies, new materials, new techniques spawning, society, driven by the rapid development of science and technology, and innovation and make the speed continues to accelerate. There is no doubt that technological innovation has become a contemporary theme. As the new generation of high-tech talent in the 21st century, the wheels of the times push young generation people into the information economy. Students' innovation ability has become the country's developing needs, society developing needs and the times needs(Sun, 2006) .

As international competition intensifies, how to cultivate and improve student's innovation ability has always been educational institutions and government agencies a top priority(Xu, 2010). What is the innovative ability of university students? Comprehensive academic point of view, the innovation ability of university students is a kind of comprehensive ability, the specific performance in the students' innovation consciousness in the learning process, self-learning ability, information ability of knowledge acquisition, information technology application ability, knowledge creation and knowledge exchange materialized, etc. At present the study of factors affecting university students' innovation ability mainly stays on the level of empirical research, mainly on qualitative research, relatively few quantitative studies(Ye, 2011).

Foreign research on university students' innovation ability is quite limited; most of the researchers pay more attention to the innovation education of primary and secondary schools(Pei, 2011). Some literature analyzed the influence on university students' creativity; teachers think that teachers play an important role in college students' creativity training(Zhong, 2011). Some literature found writing undergraduate course graduation thesis can largely improve the students' scientific research ability, innovation ability, independent analysis and ability to solve practical problems(Gong, 2011).

It is generally believed that the cultivation of innovation ability under the influence of environmental factors, individual intelligence factors and non-intelligence factors influence each other, the process of between interactions(Dong, 2011). In view of the mental development of college students has been relatively mature, so the cultivation of innovation ability should be pay more attention to non-intelligence factors and environmental

factors. Innovation consciousness, innovation knowledge, skills and innovation environment, are the influence factors of the innovation ability, only guarantee the quality of each factor to ensure the quality of the whole innovation ability. Therefore, cultivation of college students' innovation ability is a systems engineering, and its influence factors are divided into two aspects of internal and external. Internal factors refer to the student's own innovation ability, external factors including education idea, the teacher factor, school factor, social factor(Liliana, 2012).

This research mainly adopts the method of questionnaire survey, the researcher will series of research results --- President University Students' Innovation Ability to measure results as the dependent variable in factor analysis, based on the students' innovative ability will affect the various factors for regression testing, in order to explore more effective influencing factors, and propose targeted educational countermeasures.

## **II Review of Literature**

### **2. 1. Utilitarian organization affecting university students' innovation ability**

Utilitarian organization in terms of money, material interests induction as the authoritative basis for utilitarian or material rewards as a way to manage and control the primary means of deployment(Qiang, 2009). A variety of industrial and commercial enterprises are of this type of organization, such as the various types of banks, corporations, insurance companies, co-operatives and so on. Mainly through economic means, such as the increase or decrease in salary, adjusted bonuses, prizes and other ways to control its members means of social organization; such as industrial and commercial enterprises, banks and so on. Like mandatory organization, normative organization relative. With the brilliant of the business and economic, it will need a huge demand on talents and high ability university students. In some of the view, it result the students held utilitarian attitude towards study, can make is to the individual body and mind is healthy or not ignorance non-inductive, for others and society ignored "tools, rubber". In addition, utilitarian learning lead to college students' lack of curiosity for knowledge will largely influence the contemporary university students' innovative spirit.

H1: Utilitarian organization has a big affecting on university students' innovation ability growing.

### **2.2. Social atmosphere and education.**

Social atmosphere is the influence and determine people's values and conduct social and cultural environment, and to create a positive social atmosphere of technological innovation need to rely on government through active public opinion, policy advocacy, institutional arrangements and other measures to advance(Liang, 2008).

In education part, many teachers lack of understanding of students' innovative ability training, pay less attention to cultivate students' innovation ability, in the teaching, generally there is a professional set up behind the change of the social demand for talents, some professional Settings such as unreasonable phenomenon. Classroom teaching is completely on the traditional way of teaching, only pay attention to imparting knowledge, for knowledge learning as the main content. Like teaching method form monotonous, rigid, the lack of new idea and means to develop innovation ability of students. Part of the teacher to the students' innovative activities is not active, insufficient energy input(Rui, 2006). Another limitation of school creative learning

conditions, the students still are not good at creating and using the existing conditions of the school, did not receive the correct guidance, they often cannot grasp the latest development of this discipline dynamic and transverse relationship of related subjects, it will directly decrease the university students innovation ability(Hong, 2012).

H2. Social atmosphere and education play an important role in affect the university student's innovation ability.

### 2.3. Social encourages young innovative material conditions and social mechanisms.

Encourage young innovative material conditions and social mechanisms are not yet perfect. In the U.S, a third of young students on the course are in the museum, planetarium and libraries are a good place for them to learn, and computer online teaching. According to reports, the United States is now over 12 years old children will operate a computer, on the Internet, known as the "Internet generation." Both government and schools, or social and family, for the cultivation of the younger generation are facing educational goals reposition education re-select, re-evaluate issues such as educational results(Li, 2012). These deep-seated problems are not resolved, innovative incentives to encourage young people and social environment is difficult to form. Also the personalized, everyone is a special real existence different from the others. In a sense, personalization is synonymous with innovation, no personality, they did not create.(Zhang, 2010) Therefore, the ability to develop innovative youth must follow the principles of personalized, individualized, focusing inspire youth initiative and originality, to develop their self-awareness, independent personality and critical spirit.

H3. The conditions of encourage young innovative material and social mechanisms will have an important affect on university students' innovation ability.

### 2.4. Systematic

Systematic, the so-called system refers to composed of interconnected and interacting several elements to a certain structure and composition, with a certain overall function of the organic whole. According to principles of general system theory, on the one hand, fosters innovation is a sense of innovation, including culture, innovation, creative thinking, innovative approach to various factors such as an organic whole, must not be cut off from; hand, fosters innovation, is a huge social systems engineering, the government, schools, families, participate in all aspects of society, closed education is no way out(Hua, 2011). Practicality, nurturing young innovative ability, regardless of the purpose is to develop, approaches, or the end result, are inseparable from practice. Follow practical principles, adhere to innovation is a creative practice, adhere to the practice as the ability to test and evaluate innovative youth sole criterion.

H4. Own the good innovation ability is not easy; it is a long term process. Systematic will affect university students' innovation ability.

### 2.5. Collaboration

Collaboration is called by several people or several units together with the completion of a task. The innovation is not just young people with their intellectual factors; non-intelligence factors also significantly influenced their creative potential of the play. Someone Nobel laureate 's work attitude and approach to a

comprehensive analysis, found in the 1901 to 1972 period 286 winners, nearly one-third of the people because the work in collaboration with others and awards. In contrast, scientists are not winning, only a few people active cooperation with others. The results show that working with others one can increase creativity (Zheng, 2009). There is a basic fact is that the development of modern science has been unable to make any one person involved in the lifetime of science and technology aspects. To the existing science and technology based on the creations, and we must learn to live with others to carry out "information sharing." Seen in this light, human creativity is both a personal quality, but also social characteristics (Da, 2008). Cultivate a spirit of collaboration, social must first cultivate their childhood optimistic, open-minded, cheerful personality; learn to get along with others, caring for others. The second is to allow them to participate in a variety of multi- group activities, learn to compete in a collective work, and learn to cooperate with others for the creation.

H5. The collaboration habit will affect the University Student's innovation ability. The current social developing product cannot innovate by the personality; it's a wise choice to innovation by improve their collaboration ability.

### **III Research Methodology**

This chapter will cover the methodology of the research. And procedures will be applied in this research methodology and procedures will be used in determining the sampling design, selecting respondent, and also measuring the validity and reliability of the collected data. In addition, combination of SPSS version 20 and Microsoft Excel are used processing statistical data. Furthermore the methodology and procedures will lead the whole contain of this chapter. This chapter will include the research design, data collection procedures and the subject and settings of the study.

#### **3.1. Research Design**

This research adopts quantitative research method to analysis the data. And the research is used descriptive co-relational research also known as statistical research. This describes data and characteristics about the innovation and the influence factors. Also this method is employed because it easily assessed the factors influence students' innovation.

#### **3.2. Sampling design**

The sampling design shows the complete procedures used to determine the sample. It notifies a method being used to obtain the sample and respondents.

Snowball sampling, the first respondents are to determine the scope of the study and met the study criteria, more specifically purposive sampling. According to Patton (1990), the type of the sampling technique is snowball. In snowball sampling, it begins by identifying someone who meets the criteria for inclusion in your study.

### **3.3. Data Collection Procedure**

Data will be collected by using surveys. Researcher will use questionnaire method to get primary data from the respondents. The responses from the respondents based from the research instrument were tallied, analyzed and interpreted essential for the findings and conclusion of the study.

### **3.4 Research Instrument**

A survey was used to collect data in this proposal research. The questionnaire consists of an introduction to the respondent, which told about the purpose of the survey research, the objective of the study, the content of the survey, and appreciation. This part give respondents a generally ideas of what it was about and what they were expected to do to cooperate. It also includes the personal information included description of the gender, major, occupation, batch, and age group. The last part is about survey questions, which are 20 questions related to certain variables. This section is a general introduction of the questions and the rating methods. With 20 questions in total, respondents are asked to choose the rating from 1 to 5 which is from strongly disagree to strongly agree. This scale is the most frequently used variation of summated rating scale. Summated rating scale consists of statements that express either a favorable or unfavorable attitude toward the objective of interest. The participants are asked to agree or disagree with each statement.

### **3.5 Locale of the Study**

The subject of this study will be students in the President University. The researchers will get the respondents from the lecture and student at President University. In order to get the enough quantity validity information, using the Quantity =5\*variables +100 formal as the common methods, it will be 5\*20 plus 100 is 200 responses from the students and the lectures. And the locale of the study will be at President University.

### **3.6 Statistical Treatment of Data**

Validity refers to whether the questionnaire or survey measures what it intends to measure. In validity test, the researcher will use factor analysis to check variances of the "errors"  $\epsilon$  and get the factors.

### **3.7 Collect Measurements**

The researcher will collects all the respondents and summarize it in Microsoft Excel, after that the researcher uses IBM SPSS Statistics version 20 to conducting factor analysis.

## **IV ANALYSIS OF DATA AND INTERPRETATION OF RESULTS**

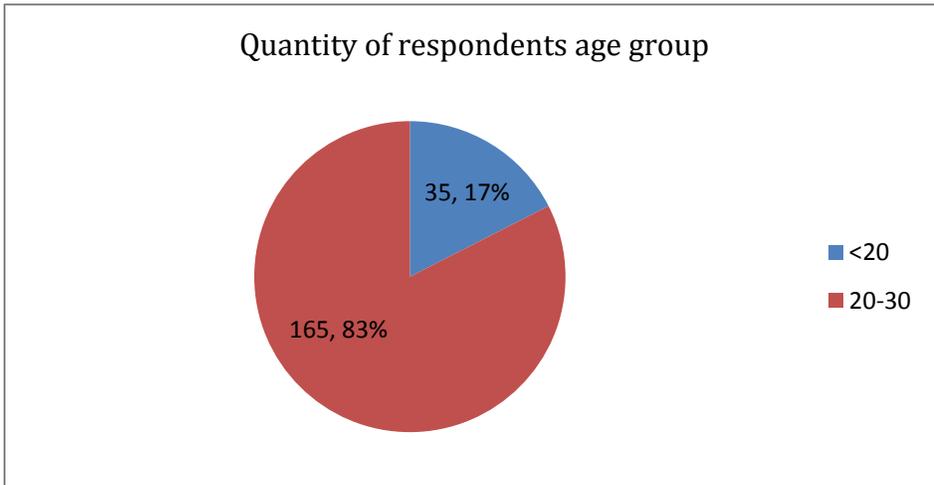
### **4.1 Demography**

The researchers collected and summaries data from 200 respondents which are students in President University. The demographic data of the respondents consists of gender, major, batch and age group.

#### **4.11 Respondents of age group**

Age table

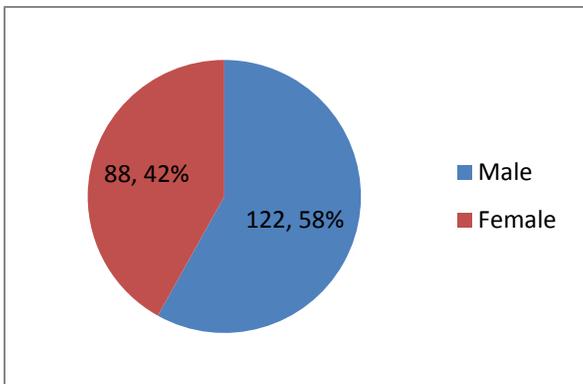
Age group	Quantity
<20	35
20-30	165



#### 4.12 Respondents of Gender

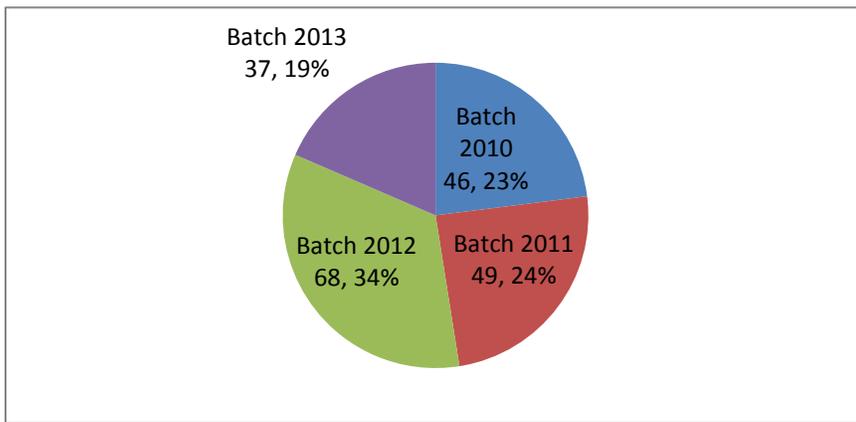
Gender table

Gender	Quantity
Male	88
Female	112



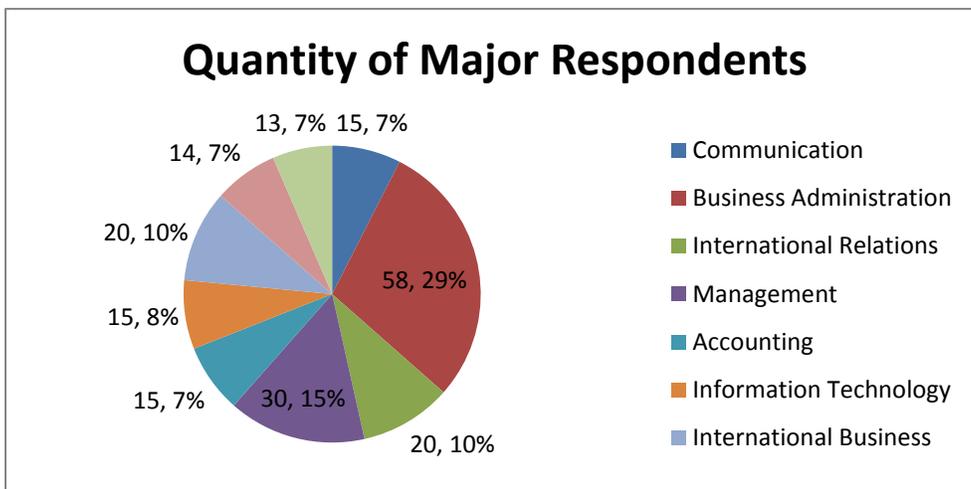
#### 4.13 Respondents batch

Batch	Quantity
2010	46
2011	49
2012	68
2013	37



#### 4.14 Major respondents

Major	Quantity
Communication	15
Business Administration	58
International Relations	20
Management	30
Accounting	15
Information Technology	15
International Business	20
Bank and Finance	14
Industrial Engineering	13



## 4.2 Instrument test

### 4.21 Obtain Correlation Matrix

Base on Kaiser as cited in field (2005), KMO is used to measure the sampling adequacy. Small values of the KMO statistic shows that the correlation between pairs of variables cannot be explained by other variables and that factor analysis may not be appropriate. According to the Field (2005), the range of the value and ratings for

the value of KMO as the following shows, it is recommends accepting values greater than 0.5 as acceptable, and values between 0.50 and 0.59 are miserable, values between 0.60 and 0.69 are mediocre, values between 0.70 and 0.79 are middling, values between 0.80 and 0.89 are meritorious, and values more than 0.90 are marvelous. Besides if values below 0.5, that's means researcher need collect more data or rethink which variables to include (Field, 2005). After the researcher extract the invalid variables No.5, N.13, Q16, Q18, Q19 five variables, KMO values become 0.595, close mediocre, which for an appropriate statistical treatment. Also the significant value of Bartlett's Test of Sphericity in this research in 0.000. It shows the correlation matrix of manifest variables is not an identity matrix; it is continue analysis the data.

#### KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.595
Bartlett's Test of Sphericity	Approx. Chi-Square	697.631
	Df	105
	Sig.	.000

#### 4.22 Communalities

Base on the Field (2005) community defined the proportion of common variance present in a variable is known. It shows the relationship between manifest variables. The range of community values between 0 and 1. The values closer of 1, the better factor at explaining original data.

Below table presents the communalities:

Communalities		
	Initial	Extraction
Q1	1.000	.642
Q2	1.000	.586
Q3	1.000	.754
Q4	1.000	.558
Q6	1.000	.613
Q7	1.000	.642
Q8	1.000	.626
Q9	1.000	.611
Q10	1.000	.613
Q11	1.000	.603
Q12	1.000	.656
Q14	1.000	.547
Q15	1.000	.633
Q17	1.000	.639
Q20	1.000	.601
Extraction Method: Principal Component Analysis.		

#### 4.23 Total Variance Explained

Factor	Initial Eigen values
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	Total	% of Variance	Cumulative %	Total
Factor 1	2.865	19.101	19.101	2.865
Factor 2	2.218	14.788	33.889	2.218
Factor 3	1.610	10.731	44.621	1.610
Factor 4	1.372	9.147	53.767	1.372
Factor 5	1.258	8.387	62.155	1.258

#### 4.24 Rotated Component Matrix<sup>a</sup>

Bellowing shows the results of **Rotated Component Matrix**, from the below table, due to the number of respondents used in this research is 200, only variables that have coefficient correlation higher than 0.44 are included to the new factors formed.

**Rotated Component Matrix<sup>a</sup>**

Variables	Component				
	1	2	3	4	5
No. 7	.724				
No. 12	.719				
No. 14	.710				
No. 8	.704				
No. 3		.842			
No. 1		.778			
No. 2		.754			
No. 10			.780		
No. 11			.729		
No. 9			.622		
No. 20				.758	
No. 17				.656	
No. 6					.698
No. 4					.645

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 8 iterations.

#### 4.3 Interpretation of the result

After all steps of Factor Analysis finish, it is the time to interpret the result and relates it to the researches that have been done previously. The following researcher will details explain the factors base on the variables as loading.

The first factor has 19.101% of the total variance with total Eigen value of 2.865. It shows that the first factor becomes the biggest factor that affecting university students' innovation ability. The factor consists of four manifest variables which are variables No.7, No. 8, No.12, No.14.

The second factor has 14.788% of the total variance with the total Eigen value of 2.218. It shows the second factor become the second higher factors that affect university students' innovation ability. The factor consists of variable No.1, No.2, and No.3.

The third factor has 10.731% of the total variance with the Eigen value of 1.610. It shows the factor affecting university students' innovation ability. The factor consists of variable are variables No.9, No. 10, No.11.

The fourth factor has a small total variance percentage of 9.147%, the Eigen value is 1.372. It shows the factor affecting university students' innovation ability which consists of variable are variables No.17 and No. 20.

The last factor has a small total variance percentage of 8.387% with the 1.258 Eigen value. It shows the factor affecting university students' innovation ability which consists of variable is variable No.6 and No.4.

Briefly to say, there are five factors affecting university students' innovation ability as the following:

No.	Factor	Statement
1	1 <sup>st</sup> Factor	Utilitarian organization
2	2 <sup>nd</sup> Factor	Social atmosphere and education
3	3 <sup>rd</sup> Factor	Social innovative material conditions and social mechanisms
4	4 <sup>th</sup> Factor	Systematic
5	5 <sup>th</sup> Factor	Collaboration

## V CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Conclusions

As the analysis of investigation, the results showing that the student is generally accepted that external innovation individuals and groups, innovation incentive mechanism, innovation practice training and the social atmosphere impact on college students' innovation ability plays a major role. Relative to character, school education innovation system, teachers' innovation quality education of college students the influence of ability was not significant.

Recommendations:

In view of this, to cultivate innovation ability of university students, the government and educational institution should focus on the following several aspects work:

- Strengthen the university students' innovation practice training.

Practical training for university students in nation generally includes social practice and comprehensive practice two parts. The two ways for cultivating the innovation ability of college students is not enough, the educational institution should increase the professional practice Training.

Firstly, through the theory into practice in the daily teaching, collection of practical problems in the industry scene simulation let the students more to face the future may encounter problems in the work, and find out the feasible solution; Secondly, establish help improve experiment training college students' innovative ability center. Experimental training center is one of the important platform to promote college students' innovative ability, is one of the bases of innovation ability training education, teaching a lot of cooperation education project can be done using the professional laboratory. Besides, for the business education institutions can cooperate with the enterprise together design courses, cultivate the innovative talents.

- Build a reasonable evaluation and incentive mechanism

Reasonable evaluation and incentive system is the system guarantee for training students' innovative ability. First, in the students' education evaluation, it is need to break the traditional pattern, avoid the test scores as the only standard to evaluate students, establishment a set of comprehensive evaluation system combine with the social condition base on student's test scores, class performance and the practice ability of students and so on. Secondly on the incentive mechanism, encourage the teachers and learn innovation group and individual interests by reward, let its innovations get social citizen recognition and corresponding return. Through constructing innovative entrepreneurial platform, set up a creative award fund to encourage and support students and teachers' innovative entrepreneurial activity. At the same time should create a good social atmosphere, change ideological concept of thinking, actively promotes the innovation ability of talent evaluation mechanism, the spirit of innovation, so as to promote the innovative ability of university students.

## **5.2 For the further research**

As well-known that there are many factors effecting university students' innovation ability, not only five factors. As researcher only doing the research in President University, Cikarang Education Park, Bekasi, West Java, Indonesia. According to the data from Global Business Guide Indonesia education sector overview the number of universities around 3000 (gbgindonesia, 2013). Next researcher should expand the scope of survey; increase the number of sample and the object of investigation to get the more detail education condition, find more effect actors on university students' innovation ability, and put forward more effective and efficient suggestion to the government, society, educational education institutions and also university students. Hopefully in the short future the level of university students' overall innovation will improve, there will be more excellent innovation people birth and growing. Indonesia will be more brilliant and thriving.

## **Appendix**

### **Abstract**

As it well-known that innovation is the soul of a nation's progress and an inexhaustible power, the national civilization developed driving force. A nation without innovation ability is hard to stand among the peoples of the world. Entering the 21st century, there is no doubt that innovation becomes the leading factor in the development and social progress. Also the cultivation of the college students' science and technology innovation ability is not only the needs of the country but also the needs of society and the era theme.

According the latest news, nowadays how to improve university students' innovative ability has become a difficult problem in front of all the colleges and universities. Most of the government and educational constitute consider how to increase the college students' innovation consciousness and innovation ability.

This study is conducted to analyze the factors affecting factors for student's innovation ability by doing investigation and analysis in President University, which locate in Cikarang Industry Education Park, Indonesia. By doing the quantitative study analysis the researcher found there are five factors effect student's innovation ability, which is utilitarian organization; social atmosphere and education; social innovative material conditions and social mechanisms; systematic and collaboration.

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