ผลกระทบทางด้านเศรษฐกิจต่อบัณฑิตที่มาจากครอบครัวชนชั้นกลาง และสำเร็จการศึกษาจากมหาวิทยาลัยเปิดในประเทศไทย

นาย โยชิโนบุ โอนิชิ

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาครุศาสตรดุษฎีบัณฑิต
สาขาวิชาอุดมศึกษา ภาควิชานโยบาย การจัดการ และความเป็นผู้นำทางการศึกษา
คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย
ปีการศึกษา 2547

ISBN 974 – 17 –6251 – 8

THE IMPACT OF MIDDLE CLASS AND OPEN UNIVERSITY GRADUATES IN THAILAND ON ITS ECONOMY

Mr. Yoshinobu Onishi

A Dissertation Submitted in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy in Higher Education
Department of Educational Policy, Management and Leadership
Faculty of Education
Chulalongkorn University
Academic Year 2004

ISBN: 974-17-6251-8

Thesis Title	The Impact of Middle Class and Open University Graduates in Thailand on its Economy
By	Mr. Yoshinobu Onishi
Field of Study	Higher Education
Thesis Advisor	Professor Pateep Methakunavudhi, Ph.D.
Thesis Co-advisor	Associate Professor Kitti Limskul, Ph.D.

Accepted by the Faculty of Education, Chulalongkorn University in Partial Fulfillment of the Requirements for the Doctor's Degree

.....Dean of Faculty of Education
(Associate Professor Paitoon Sinlarat, Ph.D.)

THESIS COMMITTEE

.....Chairman
(Assistant Professor Pansak Polsaram, Ph.D.)

.....Thesis Advisor
(Professor Pateep Methakunavudhi, Ph.D.)

.....Thesis Co-advisor
(Associate Professor Kitti Limskul, Ph.D.)

.....Member
(Associate Professor Tong-in Wongsothorn, Ph.D.)

.....Member
(Associate Professor Varaporn Bovornsiri, Ph.D.)

.....Member
(Associate Professor Chuta Thianthai, D.B.A.)

โยชิโนบุ โอนิชิ: ผลกระทบทางด้านเศรษฐกิจต่อบัณฑิตที่มาจากครอบครัวชนชั้นกลางและสำเร็จการศึกษาจากมหาวิทยาลัยเปิดในประเทศไทย (THE IMPACT OF MIDDLE CLASS AND OPEN UNIVERSITY GRADUATES IN THAILAND ON ITS ECONOMY) อ.ที่ปรึกษา: ศ.ดร.ปทีป เมธาคุณวุฒิ, อ.ที่ปรึกษาร่วม: รศ.ดร.กิตติ ลิ่มสกุล, 158 หน้า. ISBN 974-17-6251-8

ได้มีความพยายามอย่างมากจากนักการศึกษาที่จะแสดงให้เห็นถึงบทบาทของมหาวิทยาลัยเปิดสองแห่งในประเทศไทย คือ มหาวิทยาลัยรามคำแหง และมหาวิทยาลัยสุโขทัยธรรมาธิราช ในการมีส่วนต่อการเจริญเติบโตทางเศรษฐกิจในช่วง 30 ปีที่ผ่านมา การวิจัยนี้มีวัตถุประสงค์เพื่อ (1) ศึกษาถึงสาเหตุของการเข้าศึกษาในมหาวิทยาลัยเปิด และความเห็นของนักศึกษาที่มีต่อคุณภาพของการศึกษา (2) เปรียบเทียบสถานภาพทางสังคมของบัณฑิตที่จบการศึกษาจากมหาวิทยาลัยรามคำแหง และมหาวิทยาลัยสุโขทัยธรรมาธิราช กับบัณฑิตที่จบการศึกษาจากจุฬาลงกรณ์มหาวิทยาลัย และ (3) ศึกษาถึงประสิทธิภาพการลงทุนอันเนื่องมาจากการศึกษาในมหาวิทยาลัยรามคำแหงและมหาวิทยาลัยสุโขทัยธรรมาธิราช เก็บข้อมูลโดยใช้แบบสอบถามเพื่อสำรวจความคิดเห็นของบัณฑิตจำนวน 972 คน จากคณะบริหารธุกิจ คณะนิติศาสตร์ คณะรัฐศาสตร์ และคณะเศรษฐศาสตร์ มหาวิทยาลัยรามคำแหง มหาวิทยาลัยสุโขทัยธรรมาธิราช และจุฬาลงกรณ์มหาวิทยาลัย แบบสอบถามประกอบด้วย (1) พฤติกรรมการเลือกมหาวิทยาลัยที่จะศึกษา (2) คุณภาพของการศึกษา และ (3) ฐานะทางการเงิน เช่น เงินเดือนขั้นต้นและเงินเดือนปัจจุบันที่เป็นตัวบ่งชี้สำคัญถึงสถานภาพทางสังคมของบัณฑิต

ผลการวิจัยพบว่า พฤติกรรมการเลือกเข้าศึกษาในจุฬาลงกรณ์มหาวิทยาลัยของผู้สำเร็จการศึกษานั้น เนื่องมาจากความมีชื่อเสียงของมหาวิทยาลัย สถานภาพทางสังคม และการแนะนำจากบุคคลอื่น ในขณะที่การเลือกเข้าศึกษาในมหาวิทยาลัยเปิดนั้น เนื่องมาจากคุณลักษณะเฉพาะของความเป็นมหาวิทยาลัยเปิด เช่น ระบบการรับนักศึกษาที่เป็นแบบเปิด ค่าธรรมเนียมการศึกษาที่เหมาะสม และความเข้ากันได้ของการเรียนและการทำงาน ส่วนข้อค้นพบเรื่องคุณภาพการศึกษานั้นเป็นสิ่งที่แตกต่างจากความเชื่อทั่วไป จากผลการสำรวจความคิดเห็นของผู้ตอบแบบสอบถาม พบว่า บัณฑิต ที่จบจากมหาวิทยาลัยรามคำแหงและมหาวิทยาลัยสุโขทัยธรรมาธิราช ประเมินว่าการศึกษานั้นเป็นไปเพื่อปรัชญา การดำเนินชีวิต การทำงาน และ ทำให้เกิดการทำงานเป็นทีมสูงกว่าการประเมินของบัณฑิตที่จบจากจุฬาลงกรณ์ มหาวิทยาลัย โดยมีความเห็นแตกต่างกันไม่มากนักในประเด็นอื่น ๆ ส่วนการเปรียบเทียบสถานภาพทางการเงินและ สถานภาพทางสังคมนั้น พบว่าบัณฑิตรุ่นกลางและบัณฑิตรุ่นใหม่ที่จบจากมหาวิทยาลัยเปิดมีเงินเดือนเริ่มต้นและเงินเดือนปัจจุบัน น้อยกว่าบัณฑิตที่จบจากจุฬาลงกรณ์มหาวิทยาลัย สำหรับบัณฑิตที่จบมานานแล้วนั้นพบว่า มีความแตกต่างน้อยมากหรือไม่มีความแตกต่างกันทั้งเงินเดือนเริ่มต้นและเงินเดือนปัจจุบันเมื่อเปรียบเทียบเป็นคณะต่อคณะในแต่ละสถาบัน สรุปได้ว่ามหาวิทยาลัยรามคำแหง และมหาวิทยาลัยสุโขทัยธรรมาธิราชประสบความสำเร็จในการผลิตชนชั้นกลางได้เช่นเดียวกับจุฬาลงกรณ์มหาวิทยาลัย ซึ่งเป็นมหาวิทยาลัยชั้นนำของประเทศไทย

สำหรับประสิทธิภาพในการลงทุนที่ศึกษาโดยพิจารณาจากการวิเคราะห์อัตราผลตอบแทนภายในนั้น พบได้อย่างชัดเจนว่า การศึกษาในมหาวิทยาลัยเปิดนั้นเป็นการลงทุนที่ดี

ภาควิชา นโยบาย การจัดการ และความเป็นผู้นำทางการศึกษา ลายมือชื่อนิสิต……..

สาขาวิชา อุดมศึกษา ลายมือชื่ออาจารย์ที่ปรึกษา……...

ปีการศึกษา 2547 ลายมือชื่ออาจารย์ที่ปรึกษาร่วม……....

##4484613027 MAJOR: HIGHER EDUCATION
KEY WORDS: ECONOMIC DEVELOPMENT/ MIDDLE CLASS/ OPEN UNIVERSITY/ HUMAN CAPITAL THEORY/ RATE OF RETURN/
YOSHINOBU ONISHI: THE IMPACT OF MIDDLE CLASS AND OPEN UNIVERSITY GRADUATES IN THAILAND ON ITS ECONOMY
THESIS ADVISOR: PROF. PATEEP METHAKUNAVUDHI, Ph.D., THESIS CO-ADVISOR: ASSOC. PROF. KITTI LIMSKUL, Ph.D. 158 PP. ISBN 974-17-6251-8

Numerous attempts have been made so far by scholars to demonstrate the positive role of the two open universities in Thailand, namely, Ramkhamhaeng University (RU) and Sukhothai Thammathirat Open University (STOU), in its miraculous economic growth for the last thirty years. What is lacking, however, is a comparative study between these open universities and traditional universities with high social valuation, based on relevant numerical data.

The objectives of this research are: (1) to grasp why students go to open/traditional universities and how they see the universities' quality of education, (2) to describe the social status of RU and STOU graduates in comparison with graduates of Chulalongkorn University (CU), and (3) to find out if higher education at RU and STOU is a good investment. Questionnaires used in a survey of 972 graduates from the Faculty of Business, Law, Economics, and Political Science of the three universities named above included questions about: (1) university-choice behavior, (2) quality of education, and (3) financial situation such as beginning and current salary, both of which are the crucial indicators to determine the social status of graduates.

For university-choice behavior, results of the study indicated that, while CU graduates liked the university mostly because of its reputation, social status and third-party recommendations, open university graduates chose their universities because of the unique characteristics as open universities such as open admission systems, reasonable tuition, and compatibility of work and study. With respect to the quality of education, contrary to common belief, according to the perception of the respondents, open university graduates give higher scores to the education for life/working philosophy and team work provided by RU and STOU than CU graduates, although there is not much difference for other categories. A comparison of the financial situation or social status of the graduates indicated that, although there were significant differences in beginning and current salaries for the middle and younger generations and CU graduates earn more than those of RU and STOU, there were no differences for the senior generation, according to a faculty-wise comparison between different types of universities, both at the time of graduation and at the present moment. Therefore, one can safely say that RU and STOU have succeeded in generating middle class people just like CU, the top traditional university in Thailand.

From an examination of investment efficiency, based on an internal rate of return analysis, it is clear that it was a good investment to go to open universities.

Department Educational Policy, Management and Leadership Student's signature...
Field of study Higher Education Advisor's signature...
Academic year 2004 Co-advisor's signature...

Acknowledgements

This dissertation could not have been completed successfully without the invaluable help of my main advisor, Professor Dr. Pateep Methakunavudhi. I would like to extend my deepest and sincerest gratitude for her guidance, encouragement, kindness and support throughout this research.

I would also like to express my gratitude to my co-advisor, Associate Professor Dr. Kitti Limskul, for his inspiration, helpful suggestions and support. My heartfelt thanks goes to the former President of Sukhothai Thammathirat Open University, Dr. Tong-in Wongsothorn, and Associate Professor of Ramkhamhaeng University, Dr. Chuta Thianthai, who helped me very much by providing me not only with valuable information of his university but also with crucial suggestions to my research.

I am indebted to my dissertation committee, Assistant Professor Dr. Pansak Polsaram, and Associate Professor Dr. Varaporn Bovornsiri, whose tireless efforts kept me on the right track. I am deeply grateful to Associate Professor Dr. Panya Siriroj, Ramkhamhaeng University, who gave me valuable information of his university, and, furthermore, the graduates of Sukhothai Thammathirat Open University, Ramkhamhaeng University and Chulalongkorn University, who have kindly responded to my questions. Without their cooperation, this research could not have been possible.

In addition, I owe much to the many experts, Thai/Japanese coordinators and policy-makers of various companies, organizations, and institutions that helped my research by providing me with materials.

My personal thanks should also go to my parents and my parents-in-law, Mr. Mitsuru Onishi, Ms. Harumi Onishi, Mr. Goro Murase, and Ms. Eiko Murase, for their kind words and support. Also, my appreciation goes to the former and the current colleague at the Sasakawa Peace Foundation and the United Nations University for valuable comments and criticisms.

Finally, I would like to thank my wife, Ms. Miwa Onishi, and my son Mr. Takuma Onishi, for their kind support and heartfelt encouragement throughout my study both at home and overseas.

Table of Contents

Page

Page

List of Tables

List of Tables (cont.)

Page

List of Figures

Page

CHAPTER 1

INTRODUCTION

1. Rationale

During the mid-1980s and mid-1990s, the number of university students in Thailand increased as by much as six times, say Umakoshi (1996) and Altback et al (1989). This would not have been possible, they say, without Ramkhamhaeng University (RU) and Sukhothai Thammathirat Open University (STOU). RU is an open admission university, while STOU is a tele-learning university with the assistance of radio and TV broadcasting. In terms of the student population, the former is the largest among 74 universities and colleges in Thailand, and the latter is the second largest. National statistics issued by the Ministry of University Affairs, Thailand (2000) show that RU has as many as 355,352 students and STOU has 209,680, while Kasetsart University, the third largest and one of the traditional universities in Thailand, has only 27,366.

Watson (1980) points out that, in 1971, the percentage of RU students out of all university students was 19.8% and, only after three years, it became as many as 44.6%. Kariya points out that, in 1987-1988, it became 56.1%, and, in terms of the number of graduates, the share of RU was 31.9% in the same academic years. Therefore, the fact is that these two open universities have been accepting a great many students, giving them higher education, and sending them into society after their successful completion of the study requirements. One realizes that these two universities still play a crucial role in Thailand's higher education if one looks at the number of students currently enrolled as well as the number of graduates in Thai society. Those are the facts people commonly know about these two open universities.

However, people do not know much about why many students went/go to these

universities, and how society has been treating the graduates of these universities. In addition, although it is well known that the Thai government has spent huge amounts of money for these two open universities, Thai people are not very sure if these universities' graduates have done good things for the society, as the elites from traditional universities like Chulalongkorn University (CU) have been leading the society. For example, Umakoshi above points out, after thorough investigation in other Asian countries, that among the countries in Southeast Asia only Thailand has succeeded in achieving smooth and rapid growth in higher education as well in its economy. He also believes that the number of graduates of the two open universities in Thailand helped its rapid economic growth, both as consumers and as workforce. On the other hand, however, regarding the mechanisms of this success, he has no evidence and does not know how they worked. In Thailand, Chira (1992), as an economist, points out that the success in higher education and human resource development in Thailand owes much to open universities, but has not provided evidence. With a few exceptions, including the research about STOU done by the Japanese scholars such as Yamanaka (1991) and Kariya (1991), almost no studies in this regard have been made so far, particularly about RU, and, therefore unfortunately few lessons can be drawn from the experience of Thailand for its neighboring countries.

Furthermore, history shows that so called "middle class" is generated as an economy grows. The middle class is both a cause and a result of economic growth, according to many sociologists, such as Funatsu and Kagoya (2002). They say that the generation of a middle class in a society also depends on the development of education, higher education in particular. Suehiro (1993), who has done a substantial number of studies on economic development in Thailand for over thirty years, pays special attention to the relationship between the generation of the Thai middle class and the increase of university students since the late 1970s. Again, however, he has not tried to prove that he was right in his hypothesis,

and so far no one has followed his suggestions.

Moreover, by econometrically analyzing the Thai economy during 1974-1984, Kitti (1992) argues that one of the factors of the increase of value added of some industries is the structural change of educational level of Thai workers, which will be mentioned again in Chapter 2. Summing up the discussions above, although there are some important efforts, suggestions, and hypotheses, with regard to the role of the two open universities in Thai rapid economic growth, there has not been any persuasive data and evidence so far, unfortunately. What is necessary, therefore, is to prove, which will be the major objective of this paper. What will be the major hypothesis to prove then? So far, there are four major arguments, as follows.

1.1 In Thailand, the recent economic development and the development of higher education would not have been possible without RU and STOU, the two big open universities (Umakoshi, Chira, and Altoback et al).

1.2 As far as economic development is concerned, the generation of a middle class may be its cause, a result, or both.

1.3 In Thailand, higher education played one of the key roles in the generation of the middle class for the last thirty years.

1.4 The economic growth of some industries attributes the structural change of education level of Thai workers at least during 1974-1984.

By combining these four assumptions, it could be interesting to hypothesize that ***just like such traditional universities as CU, RU and STOU were a cause, and a result of the generation of middle class, which was also a cause and a result of economic development in Thailand for the last thirty years.*** The method of proving it will be discussed in detail in Chapter 3.

2. Objectives of the study

Under such circumstances as mentioned above, it is necessary to make a clear analysis of the development of open universities in Thailand and their role in the rapid economic growth for the last thirty years. Such research will be useful not only for Thailand, but also for its neighboring countries where rapid economic growth is about to start. Therefore, the major objectives and goals of this research are as follows.

2.1 From a sociological point of view, to grasp why students go to open/traditional universities and how they see the universities' quality of education.

2.2 From a financial point of view, to describe the social status of the graduates of RU and STOU as middle class.

2.3 From a pure economic point of view, to find out if higher education at RU and STOU was and is a good investment.

For these purposes, it is necessary to compare open universities with universities of the traditional type such as CU. By such a comparison, one can relativize the utility of the open universities in Thailand. Many researchers have already studied economic development, economic history, and middle class issues in Thailand. It is very important to understand these aspects and issues as the foundation of this research and the issues in the three objectives above. In other words, because economic development and its history are the foundation of this research, it will be reviewed in Chapter 2, but will not be the major issue in other chapters.

Issues in Objectives 2.1, 2.2, and 2.3 are the core of this research, which makes it quantitative research, and they will be examined thoroughly in Chapter 4. This is largely based on an opinion and salary survey targeting the senior and young graduates of RU,

STOU, and CU, to be mentioned later.

3. Scope of the study

It is not difficult to explain why Thailand and the two open universities were chosen as research targets. They were chosen for three reasons. First, Thailand was chosen as a model case because one can see that, as Umakoshi (1996) points out, Thailand is the only country in Asia that promoted higher education successfully by establishing open universities. Also, Thailand is one of the very rare countries in the world that have more than two open universities. Second, RU and STOU were chosen because they are the very universities that accepted a number of increasing students during the rapid economic growth in 1970s, 1980s, and 1990s. In addition, as mentioned in the "Rationale" section previously, the two universities are still influential in Thai society in terms of the student population. RU was chosen because, as the Ministry of University Affairs, Thailand (2000), says, RU was established "following of a crisis in the quest for higher education" which is the hot issue now in its neighboring countries such as Vietnam, Laos, Cambodia and Myanmar.

It is not difficult, either, to explain why Chulalongkorn University should be taken. This university should be chosen because it is the first university in Thailand both from historical viewpoint and from the viewpoint of social status in Thailand. It is one of the top local universities to which Thai people pay the greatest respect, as many points out. Its graduates are naturally considered as people in the middle or upper class in Thai society. Therefore, comparing the graduates from the two open universities with those from the top university will make the social position or status of the former graduates clearer than comparing with those from middle-level universities that are difficult to define. In other words, if this research successfully shows that there is no significant difference in current salaries between RU and CU graduates, for example, the former will also be naturally considered as

members of the middle class. The conclusion will be more persuasive than any other cases where the comparison is made with traditional universities other than CU.

When implementing the survey, the largest obstacle or limitation is the lack of various data in Thailand, "especially in the field of education," as Sethasathien (1977) points out. Therefore, this survey largely depends on the personal views and answers to the questionnaire to be mentioned later, instead of national statistics. It is also necessary to take it into account that there will be limitation or difficulty that comes from the difference between the two open universities. The difference has two aspects. One is their history and the other is the nature or the concept of their business. From the historical point of view, RU was established in 1971 and STOU was established in 1978. Therefore, STOU had no graduates in the 1970s because it received its first academic class in 1980. This fact makes a comparison with CU, established in 1917, difficult especially when dealing with Thai economic development in the 1970s. In addition, even within the same university, every faculty was not established in the same year.

From the conceptual point of view, RU has its own campus and classrooms for students because they sometimes have to come to the class even though RU is an open university. Because of that characteristic or requirement, students are relatively young. In fact, majorities come to RU immediately after they graduate from high school. On the other hand, STOU offers most of its lectures as TV and radio programs. It does not have any campus because most students do not have to come to school. Due to this concept, students include many business people, housewives, and even the retired. This also makes comparison a little difficult especially when comparing salaries and social status of the graduates of the three universities. In this case, age will be an important factor.

Moreover, there is another limitation in the research. STOU, for example, now has as many as eleven faculties, including humanities, social science, and natural science.

However, it does not have its own "campus" in a traditional sense, and, thus, does not have any laboratories for natural science faculties. Therefore, it is a bit controversial or unfair to compare the quality of education between STOU and CU that, of course, has state-of-the-art laboratories. Hence, such natural science faculties as the School of Agricultural Extension and Cooperatives and the School of Health Sciences should not be the target of this research, and time and financial constraints also support this idea.

In addition, it is necessary to take the faculties that commonly exist among the three target universities because, if some universities have faculties of business administration, and some do not, it is not possible to compare them with one another. Fortunately, the four faculties taken here commonly exist among the three target universities.

4. Conceptual framework of the study

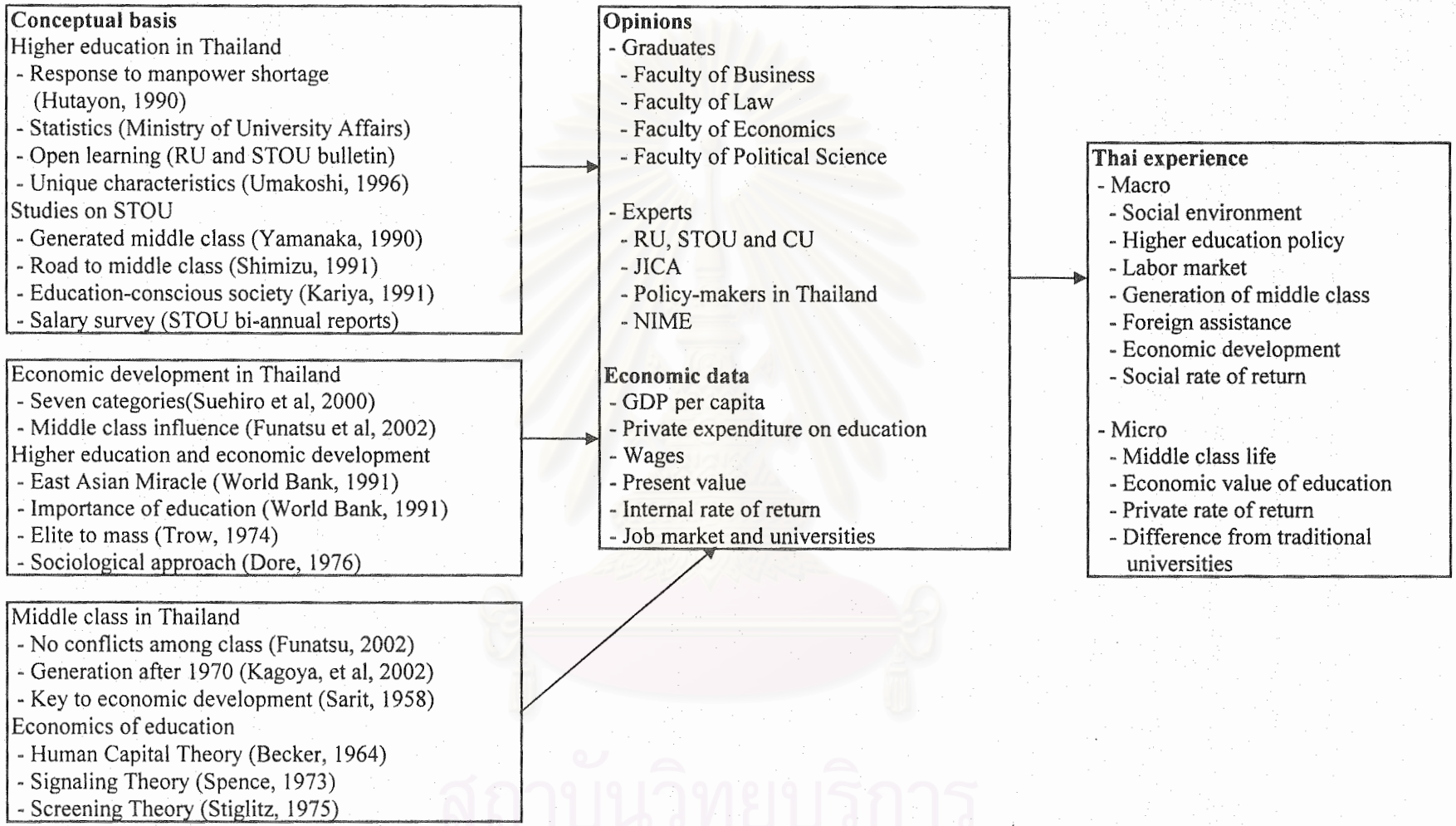
The following flow chart shows the conceptual framework of this study. The first box in the left is for the theories or existing and related studies of the literature. It starts with the development of Asian universities in comparison with Western universities, and goes to Thai economic development, followed by the generation of the Thai middle class in 1970s, 1980s, and 1990s. The objectives of the literature studies here, therefore, are to overview the past and current situation in Thailand in terms of higher education, economic development, and the generation of the middle class. This part is a foundation or backbone of the study, and gives a framework and tools for analysis with regard to the relationship among the three elements, namely, higher education, economic development, and the generation of the middle class. The literature survey then turns to economic analysis, focusing on human capital theory and rate of return.

The next box, Opinions, is to gather opinions by questionnaire and interviews. The target of the questionnaire is the graduates of the three target universities, while that of the

interviews is experts and policy-makers. The questions of the former include questions about beginning salary, current salary, university-choice behavior, and studying behavior at university. The questions of the latter include the background and the concept of establishing the two open universities, which will also be the background of this research when analyzing the data. It was expected that the respondents will give lively and unwritten information, which will give body and substance to the study. Also, various economic data will be collected on different levels and from different perspectives.

Through the two necessary processes above, a clearer experience or lessons of open higher education in Thailand will be drawn from the both macro and micro points of view.

Conceptual Framework of the Study



5. Definition of terms

Open university means universities that offer unlimited admission, no entrance examinations, and either no or voluntary class attendance with minimal fees. They often use TV, radio, and even the Internet as a means of education instead of face-to-face lectures in a classroom. Both RU and STOU fall into this category. On the other hand, **traditional** university means universities that offer limited admission, compulsory entrance examinations, and also compulsory class attendance with reasonable fees. They basically use classrooms for face-to-face lectures. CU falls into this category.

"Impact" in the thesis title means how the graduates of RU and STOU affected Thailand's economic growth both as workforce and as consumers. In this paper, it will be judged purely from their wage, because, in market economy, earning more represents working harder and spending more, which promotes economic growth. In addition, to be sure if the "Impact" was big or small, wage data of CU graduates will be also collected and comparison will be made.

Middle class often has various meanings, and even researchers use this term in different ways. Generally speaking, for example, it has two layers. One is called "Upper middle class" which is very close to the upper class elites, and the other is "Lower middle class" or "Middle strata" which is bigger than the upper middle in numbers and close to the working class, according to Hattori and Funatsu (2002). Here, however, middle class should be defined as follows. Lipset and Benix (1959), Treiman (1977), and Goldthorp (1987) define middle class by professions. It includes 1) Management, 2) Specialist personnel and engineers, and 3) White collar, partially including sales and service. This definition is very useful when analyzing statistical data and comparing those data among different countries, cultures, and societies. Thus, when referring to the statistics, this paper uses this definition.

Here is another useful definition of middle class, when referring to **middle class in**

Thailand, in particular. Suehiro (1993) defines middle class in Thailand in two different ways. First, he uses professions, making a definition which is similar to the above definition proposed by Lipset and Benix (1959), Treiman (1977), and Goldthorp (1987). Suehiro's definition of the middle class in Thailand is 1) University professors, doctors, nurses, lawyers, and specialist personnel such as computer engineers, 2) Middle managers of government and public institutions, 3) White collar workers, and 4) Company owners with a bachelor's degree or higher, and managers of large/middle-scale companies. Suehiro argues that, although company owners and managers of large/middle-scale companies may belong to the upper class according to their income range, they still share much in common with middle class people in terms of their perspectives and way of living, particularly in Thailand.

Second, Suehiro uses household income range in defining the **middle class in Thailand**. He says that the monthly household income of the middle class ranged between Baht 20,000 and 30,000 in the early 1990s. He also gives some specific examples of goods that most middle class people must possess. They include 1) single family home, 2) electric appliances such as TV, VCR, and audio set, and 3) telephones, particularly a mobile phone.

Graduates mean students who finished all the undergraduate coursework for a Bachelor of Arts (BA) degree as well as BA graduation examinations, if any, and fulfilled the graduation requirement set by the universities.

Economic development in 1970s, 1980s and 1990s in Thailand means the growth of GDP and GDP per capita from 1970 to 1997 when economic growth in Thailand stopped due to the Asian financial crisis.

Policy has two meanings. One is the policy set by the government, particularly by the Ministry of University Affairs or its former entity, the Department of Higher Education, Ministry of Education. The other is the one set by individual universities. It is sometimes

called "school policy" or "school discipline."

Homoscedasticity is known as equality or homogeneity of variance. In t tests, one condition, called homoscedasticity, should be met to justify the method of pool variances. It only means that the variances of the samples to be compared do not differ by an amount that is statistically significant. Differences that would be attributed to sampling error do not impair the validity of the process.

6. Significance of the study

This research has three significant points. First, it will give Vietnam, Laos, Myanmar and Cambodia much information to learn as a case study. Because these countries are now going through rapid economic growth as well as economic transition from centrally planned to market based, they are eager to have leaders of the society that are well educated, as soon and many as possible. If this is the case, the precedent of Thailand will be, through the research, shown to the policy-makers of Vietnam, Laos, Myanmar, and Cambodia. They can share Thai experience in the 1970s, 1980s and 1990s with one another.

Second, this research is also beneficial for Thailand itself because neither the two open universities, namely RU and STOU, nor the Ministry of University Affairs of Thailand did such a follow-up research for the last thirty years. As mentioned in the "Rationale" section earlier, the two universities are still dominant in terms of the student population. In addition, as the total number of university students in the society grows, the two open universities must also grow. They are actually growing now in terms of quality such as curriculum and student care as well as in terms of quantity such as the number of students, professors, class rooms and media studios. Under such circumstances, the research can contribute to the two universities by giving them some feedback from both senior and young graduates. The feedback will be useful when the two universities reform their curriculum for instance.

Above all, quantitative research such as this has not been done so far with regard to the two open universities in Thailand. Although extensive research was done for STOU by the Japanese government, the big donor and supporter of STOU, in 1990, it does not have much information about the income of the graduates. In addition, unfortunately, no research comparable to the research for STOU has ever been done for RU. Therefore, many international researchers find it difficult to acquire information on the two open universities and their role in Thailand. Due to the limitations or mal-distribution of information, international researchers, particularly Japanese researchers, have tended to overestimate the role played by STOU in terms of economic development in Thailand and put more emphasis on STOU than RU. However, the fact is that there are so few academic studies about RU that no one can deny the possibility that RU actually played a larger role than STOU in promoting economic development in Thailand by creating more members of the middle class. It is thus expected that this research will help those international researchers to some extent, by introducing what STOU and RU were in the past and what they are now.

Third, this research can also show something to learn for the discussions of the newly emerging "virtual university" often seen in the United States. A virtual university is a university without any campus in this real world. It does, however, have a campus in cyber space like the Internet and is a new type of distance education institution. Boggs and Sau (1999) say that the number of university students studying in distance learning programs was about 710,000 in 1998, while in 2002, the number will increase up to 2,200,000 in the US. This could not be possible without the rise of the Internet.

Furthermore, the Virtual University Research Forum (2001) gives the following statistics. According to a survey of the National Center for Education Statistics, US Department of Education, the number of universities using the Internet as a means of distance education increased dramatically from only 14% in 1995 to 77% in 1997. For

example, the University of Phoenix offers on-line education since 1989. In 2000, 16,000 students out of its 60,000 students enrolled this web-based education courses and the number is still increasing. From their homes, the students can see the professor on their computer screens and listen to his/her lecture from their speakers, which makes students feel as if they were in a classroom. The students can also ask questions via e-mail, and the professor will answer them on line even simultaneously, which makes the on-line education more interactive than traditional distance education based on simple correspondence.

CHAPTER 2
RELATED LITERATURE REVIEW

In this chapter, relevant concepts, theoretical bases, existing research results and conceptual models in relation to the objectives of this paper are reviewed and presented in the following topics.

1. Middle class and economic development in Thailand
2. Research on RU and STOU
3. Cost benefit analysis of higher education
4. Human Capital Theory
   - Present Value Method
   - Internal Rate of Return
5. Major experimental studies based on Human Capital Theory
6. Signaling Theory
7. The Theory of Screening
8. The contribution rate of education to economic development in Thailand

1. Emerging middle class and economic development in Thailand

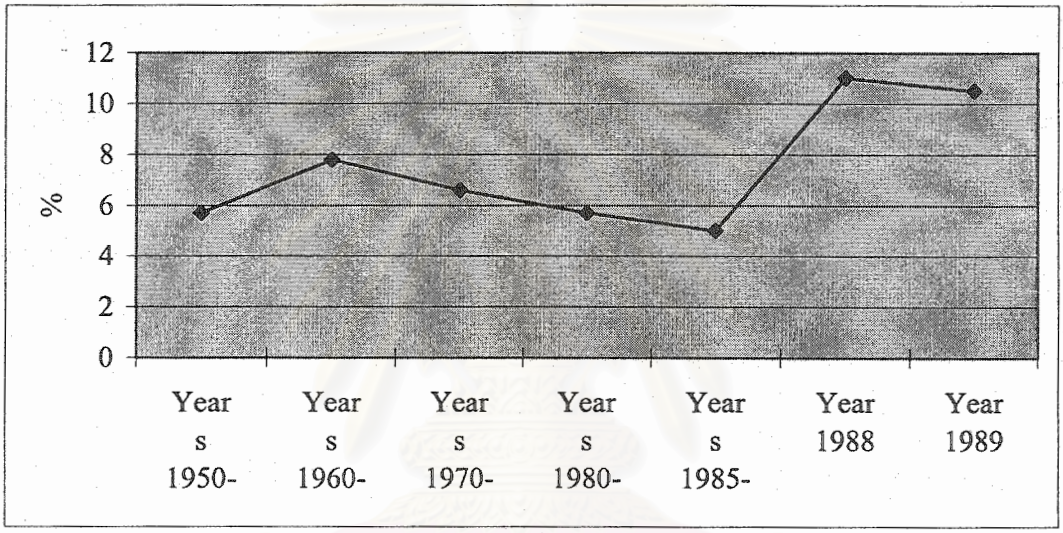
1.1 Economic development as an environment of the birth of middle class in Thailand

According to some important macro-economic indicators, say Suehiro and Higashi (2000), economic development in Thailand, during 1972 – 1999, can be divided into seven different stages as follows.

1972 – 1978 Relative growth period

During this period, argue Suehiro and Higashi, Thailand faced the first oil crisis in 1973 and high inflation in 1973-1974. At the same time, however, it sold more agricultural products in the international market than ever before in its history, and, as a result, the Thai macro-economic indicators were comparatively stable in this period. RU and STOU were established in this period.

Figure 2-1 GDP growth rate in Thailand before 1990



Source: World Bank, World Tables 1976 and 1988-1989 (Washington DC), various pages.

Asian Development Bank, Asian Development Outlook 1990 (Manila) for 1988 and 1989 figures, various pages.

1979 – 1981 Low growth period

In 1979, another oil crisis hit Thailand and it was more serious than the former one. In addition, the prices of agricultural products went down and accordingly, The Thai economy was in the worst situation for the twenty years since 1960.

1982 – 1984 Worldwide depression and structural adjustment period

The Thai economy would not get better and recover in the first half of the 1980s, and Thailand had to receive a Structural Adjustment Loan (SAL) from the World Bank in 1982-1983.

1985 – 1987 Gradual recovery period

The SAL worked and it helped Thailand change its economic policies and reform its economic and social systems as a whole. Moreover, the Plaza Agreement in 1985 encouraged foreign investment in Thailand and these enabled the Thai economy to gradually to get better.

1988 – 1992 Boom period

Thailand enjoyed two-digit growth rate in three consecutive years since 1988, due to the booming foreign investment mentioned above. Let us look at the economic boom period from the workers' perspectives. The table below shows the productivity indicator by industry during the period of 1985 and 1990, where the productivity indicator in 1980 is 1.00. For the secondary industry, the productivity indicator decreased by 0.09 during 1985 and 1987, while it increased by 0.47 during 1987 and 1990.

Table 2-1 Productivity indicators by industry

	1985	1986	1987	1988	1989	1990
Primary industry	1.15	1.26	1.30	1.31	1.42	1.43
Secondary industry	1.05	1.01	0.96	1.17	1.33	1.43
Tertiary industry	1.07	1.02	1.00	1.13	1.22	1.35

Source: Itoga (1992) p.41.

1993 – 1996 Bubble economy period

However, year by year since 1993, huge amounts of money began to flow into stock and land speculation instead of regular economic investment. As a result, the Thai economy looked bigger than it really was. This tendency was quite similar to that of Japan in the late 1980s and the early 1990s, during what is called “Bubble Economy” in the sense that the bubble makes things seem bigger than they really are and it easily bursts.

Table 2-2 Structural change in Thai economy (% in nominal value)

	1975	1985	1990	1995
Primary industry	26.7	15.8	12.5	11.1
Secondary industry	24.2	31.8	37.2	39.0
- Manufacturing	18.8	21.9	27.2	28.2
- Construction	3.2	5.1	6.2	7.3
Tertiary industry	49.1	52.4	50.3	49.9
- Transport. and communication	5.0	7.4	7.2	7.3
- Sales	20.1	18.3	17.7	16.2
- Banking and insurance	2.7	3.3	5.5	7.5
- Service	12.6	14.5	13.4	12.8
Total	100.0	100.0	100.0	100.0

Source: Suehiro and Higashi (2000) p.6.

1997 – 1999 Economic crisis period

In this period, say Suehiro and Higashi, because foreign investment went away from Thailand very rapidly, financial unrest and a currency crisis hit Bangkok and other major cities in Thailand. The country was forced to change its currency management style to a managed floating system and had to receive urgent loans from International Monetary Fund (IMF).

Suehiro and Higashi also argue that the Thai economy, during the period of 1972-1999, accomplished a drastic change not only in the quantity of its GDP and international market share but also in its quality and structure. The next table shows that the sector-by-sector value added structure changed dramatically. The primary industry dropped from 27% to only 11% in 1995, and the secondary sector, which requires more educated workers than the primary sector, increased from 19% to 28% in the same period.

1.2 Historical overview of Thai middle class

According to Chalolemkiat (1990), Sarit, Former Prime Minister of Thailand, said in his speech in 1958, that the best way for nation building and a stable civil society is to increase the number of middle class people to more than any other class. It is crucial that, at the very beginning of the development era in Thailand, the top leader already realized the value of the middle class, and referred to its importance in his official speech. This fact should be remembered first of all, when considering the history of the middle class in Thailand.

Second of all, however, as Funatsu and Kagoya (2002) argue, it was not until in the 1970s that sociologists and political scientists began to use “middle class” as a tool for analyzing Thai society and its politics. It was because the middle class was rarely seen, and very few people belonged to this class in Thailand before1970. Wilson (1962), for example, describes Thai society in the 1950s as society with just two categories: They include urban elite, who were the minority but governing the society, and rural farmers, who are the majority but did not have much power. As a sociologist, Wilson, thus, describes Thai society as a society without a substantial number of middle class people.

From a political scientist's point of view, Riggs (1966) sees Thai politics as bureaucratic polity governed only by the small number of military elite. He also points out that only the promotion or empowerment of the private sector would modernize Thai politics.

Suehiro (1993) refers to the structural change of the middle class leaders of democratic movements in the late 1980s and the early 1990s. This change, he argues, came mainly from development of education proposed by Prime Minister Sarit. He shows the following table and says the dramatic increase of the number of university students between 1962 and 1988 brought about such changes.

Table 2-3 Changes in the number of university students

Year	Number of Enrolled University Students			Number of University Graduates	
	National	Open	Private	National	Private
1962	45,415	n.a.	n.a.	2,991	n.a.
1970	55,315	n.a.	n.a.	10,741	n.a.
1973	65,496	38,364	6,447	16,141	902
1975	70,830	52,736	13,254	22,063	1,842
1977	72,614	117,415	18,341	24,870	3,103
1980	86,027	476,845	27,844	32,765	4,087
1985	92,006	569,869	46,250	51,790	8,400
1988	97,610	523,467	61,742	57,324	11,193

Source: Suehiro (1993) p. 185.

Funatsu and Kagoya (2002) support their observation, by presenting the following data. In 1960, only 2.6% of total workers were middle class in Thailand. Even in Bangkok, there were only 15% middle class people at that time, they argue.

Table 2-4 Proportion of workers by profession (%)

Year	Middle Class			Lower Class					
	Engin-eering	Manage-ment	White Collar	Sales	Service	Primary	T/C	Production	Other
1960	1.3	0.2	1.1	5.3	2	82.5	1.1	5.9	0.7
1970	1.7	1.5	1.5	5	5.9	79.6	1.4	5.9	0.2
1975	2.8	1	1.8	12.1	3.6	58.4	3.1	17.2	0
1980	4.4	3.1	2.7	12.6	4.6	48	2.9	21.5	0.2
1985	3.9	1.5	2.7	11	4	59	3.1	14.8	0
1990	6.4	2.8	3.8	12.3	4.2	47.8	3	19.6	0.2
1995	5.1	2.9	4.1	13.2	5.2	40.9	4.6	24	0

Source: Hattori, Funatsu, and Torii (2002) Table 3-T, p.289. T/C stands for Transportation and Communication.

Tominaga, Komai, Okamoto, and Ise (1970) point out that, among those few middle class members in Bangkok, only 20% came from rural areas and the majority, approximately 70%, just kept or succeeded to the status of their parents. The research of Tominaga and others was done in 1967 in Bangkok, and after a careful review of the research data, they testify that a population concentration was about to begin in Bangkok and anticipate that liquidity in the labor force and class structure would follow. They also argue that the role of education did not play a decisive role in that new movement or phenomena before 1970.

Researchers started to observe and realize the existence of middle class, not only because of rapid economic growth and booming foreign investment in the 1970s, but also because of political movement in Thailand such as the student demonstration in which approximately 400,000 people participated in October 1973.

Anderson (1977), for example, points out that there are two middle classes. They are a new middle class (new moyen bourgeoisie) that consists of hotel managers and the owners of construction companies, and an old middle class (new petty bourgeoisie) that

consists of service engineers and small shop owners. Anderson sees these people negatively by saying that they are just afraid of losing what they have and are too conservative to change the society.

Juree (1979), on the other hand, sees the middle class in Thailand as a positive signal leading to democracy. He argues that the middle class in Thailand are free from traditional "bureaucratic polity" and see it as obsolete for modern democracy. Girling (1981) is in between. To some extent, he puts a favorable evaluation on the middle class in Thailand, just like Juree, but argues that it is still premature. He sees it as premature because the middle class in Thailand is not free from various traditional or conservative perspectives yet and is still politically ambiguous. He also argues that such a fragile group should be called "middle strata" instead of middle class.

With the gradual but sure accomplishment of political stability in Thailand, education began to play an important role in creating a new middle class in the 1980s. Hara (1998) points out that, in the 1980s, both Thai and international private companies raised salaries every year according to business skills and knowledge that came from education. As a result, he sees two changes in this period. First, more and more Thai people wanted to go to high schools and universities to get higher salaries. Second, the job preference of the new graduates shifted from government and other public institutions to private companies that offer higher salaries than the public sector.

Based on research in Bangkok 1994, Funatsu and Kagoya (2002) put more emphasis on education in analyzing the middle class in Thailand. They asked 1,043 local residents in Bangkok about the major and crucial factors for success in Thailand. As the table below shows, approximately 60% of people in every level think that education and ability are the key to success, and do not see a household's financial strength/size and human networks as important factors. As far as this tendency is concerned, there is no

difference in statistical significance among each level, sex and age. It is obvious that people in Thailand nowadays equate ability and skills with education. The more educated, the higher skills and abilities they get.

Table 2-5 Opinions on the key to success in Thailand (%)

	Education	Ability	Efforts	Family	Connection	Religion
Bangkok						
Upper white collar	65.0	65.0	44.2	13.3	10.0	2.5
White collar	62.5	63.8	43.8	12.5	11.3	7.5
Middle manual	57.6	69.7	42.4	18.0	9.1	3.0
Lower white collar	67.8	57.1	40.5	18.2	11.2	5.4
Lower manual	59.4	64.1	40.1	19.8	7.8	7.3
Farmers	90.9	54.5	27.3	9.1	9.1	9.1
North and northeast						
Farmers	55.9	52.7	42.9	29.7	8.1	10.7

Source: Funatsu and Kagoya (2002) p.222.

Yamanaka (1990) describes the everyday lives and perspectives of the urban middle class in an anthropological way. He shows three cases, although he conducted more interviews, including a 34-year-old female lecturer of Thammasat University who married a Japanese researcher, a 40-year-old single female flight attendant who graduated from both Chulalongkorn University and STOU, and a 51-year-old male helicopter pilot who is also a student at STOU. Yamanaka gives typical lives of middle class people in Bangkok by describing what they do every day and what they want to do in the future in quite a lot of detail. In addition, through the interviews with these people, he finds three key issues on middle class in Thailand. First, he finds the value and importance of mass media as a tool to disseminating the various information on middle class lifestyles such as urban condominiums, fashion, and sophisticated hobbies. Second, Chinese families in Thailand, regardless of their own education level, tend to give their children higher education than local Thai families do. Third, in order to join the new middle class, going to university is not necessarily a prerequisite, but graduating from high school is a must.

2. Research on RU and STOU

There is a big survey on the profiles of STOU graduates done by a Japanese research team led by Dr. Takehiko Kariya, Professor, Tokyo University, in late 1980s. The survey was supported by the National Institute of Multimedia Education (NIME), Japan, that has also supported STOU for many years since its establishment. One of the most important facts about NIME's survey is its overall assumption or tone where graduates of STOU are considered as middle class people as can be seen in the titles of the research papers written by Shimizu (1991) and Yamanaka (1991) in the final report. Whether this assumption is true or not will be discussed in Chapter 4, but, in any case, it has some important suggestions and new findings that are very useful for this paper. One of them is the implication made by Shimizu (1991) with regard to the salary survey for STOU students and graduates. The research data is as follows.

Table 2-6 Comparison of salaries between students and graduates of STOU (in Baht)

	New entrants	New graduates
Public	3,675	5,008
Private	4,153	5,421
Entrepreneur	4,732	5,681

Source: Shimizu (1991) p.64.

Based on the data above, Shimizu points out that the graduates' average salary is higher than the students' one in every job category, although the difference may include automatic or natural increase during their school years. People usually think that it is because of STOU's quality of education. Yamanaka (1991), in fact, introduces the data where as many as 94% of STOU graduates say that what they learned at STOU has been useful for their current job assignment. However, Shimizu presents another perspective by implying that the cause could be the reason, and the reason could be the cause. He says that there are students who receive big salaries and the big salaries made them graduate. He did not mention anything about the quality of education as the reason of

higher salaries. Below is additional important data with regard to salary.

Table 2-7 Monthly salaries of STOU 1987 graduates (in Baht)

Amount	Number of graduates	%
Less than 2,765	460	5.07
2,765-3,114	438	4.83
3,115-3,534	735	8.09
3,535-3,954	1,494	16.45
3,955-5,000	2,394	26.36
5,001-6,000	1,247	13.73
6,001-7,000	665	7.32
More than 7,000	1,198	13.19
Do not know	450	4.96
Total	9,081	100.00

Source: Yamanaka (1990) p.11.

Out of 9081 respondents above, 6566 (72.3%) are public servants. The mean is 4965 baht and the median is 4450 baht. The data above could be compared with the newly collected data of this research in Chapter 4. However, the limitation of this data is that it is only about the 1987 graduates, and is just limited to STOU. Therefore, this can only give us the tendency of a very limited group in a very limited year. No one can tell whether the average monthly salary, 4965 Baht, is high or low. Shimizu gives us the salary data by faculty as follows.

Table 2-8 Monthly salary of STOU 1987 graduates by faculty (in Baht)

Faculty	Mean	Median
Education	4,703	4,450
Business	5,038	4,325
Law	5,668	5,221
Health	4,916	4,200
Economics	6,028	5,425
Home Economics	4,339	4,100
Political Science	4,866	4,200
Agriculture	5,227	4,786
Communication	5,712	5,000
Total	4,965	4,450

Source: Shimizu (1990) p.25.

The data above can also be compared with the newly collected salary data of this research in Chapter 4. When comparing the data, it is important to note that the age composition of STOU students and CU students are basically different. This is because most STOU students had some years of working experience before entering the university, and thus they were older than most CU students, who usually came up directly from high school.

Table 2-9 Average age of STOU students by faculty

Faculty	Mean	Mode	Median
Education	32.14	30.94	30.00
Business	30.11	28.38	25.00
Law	36.54	35.49	30.00
Health	31.64	28.70	26.00
Economics	32.33	31.08	26.00
Home Economics	30.05	28.94	27.00
Political Science	32.11	30.00	27.00
Agriculture	31.87	29.89	28.00
Communication	30.91	29.15	31.00
Total	31.93	30.25	28.00

Source: Shimizu (1990) p.17.

Other important data is about unemployment as follows.

Table 2-10 Comparison of unemployment rate by university

	Traditional universities	RU	STOU
Number of graduates	18,101	21,043	8,196
Unemployment rate	18.3%	42.3%	1.9%

Source: Kariya (1991) p.33.

The unemployment rate is important when comparing salary data between traditional universities and STOU. If there are many unemployed graduates for one university and their salary is almost nothing, the average salary of the graduates of that university tends to be lower than that of the other university that does not have the unemployed. The next table shows the reason they are unemployed.

Table 2-11 Reasons of unemployment

Reason of unemployment	Number (%)
Cannot find jobs	157 (62.30%)
Still hunting for jobs	33 (13.10%)
Do not feel like working yet	21 (8.33%)
Still studying	12 (4.76%)
Want to study more	7 (2.78%)
Other	22 (8.73%)
Total	252 (100%)

Source: Yamanaka (1990) p.9.

Table 2-12 Student share of the two open universities in Thailand

	Number of students	Ratio
Traditional universities (national)	92,181	13.0%
Traditional universities (private)	53,397	7.5%
STOU	165,617	23.4%
RU	397,516	56.1%

Source: Kariya (1991) p.32.

3. Economic theories and empirical analysis with special reference to higher education

3.1 Human Capital Theory

Although many classicists and neoclassicists tried to touch upon some relationships between economics and education before 1960, it was Becker (1964, 1975, and 1993) who first introduced full-fledged use of knowledge and tools of positive economics in analyzing education. He sees accumulated knowledge/experience, special skills, and professional techniques as assets. He thus puts economic values on education and training by broaching the idea of "human capital," which is commonly used in many academic fields nowadays. He says "Neither Malthus's nor the neoclassicists' approach to growth pays much attention to human capital. Yet the evidence is now quite strong of a close link between investments in human capital and growth. Since human capital is

embodied knowledge and skills, and economic development presumably depends on the accumulation of human capital."

With the concept of rate of return, to be mentioned later, Becker gives an empirical economic analysis on the effect of higher education, before and after the Second World War, between different race and sex, in the United States. Arai (1998 and 2002) argues that Becker's accomplishment has two important aspects. One is to present the economic value of higher education in numerical data, by comparing the income of higher school graduates with that of university graduates, to put it simple.

The other is to clarify why, when, and on what conditions people go to university, by calculating the rate of return.

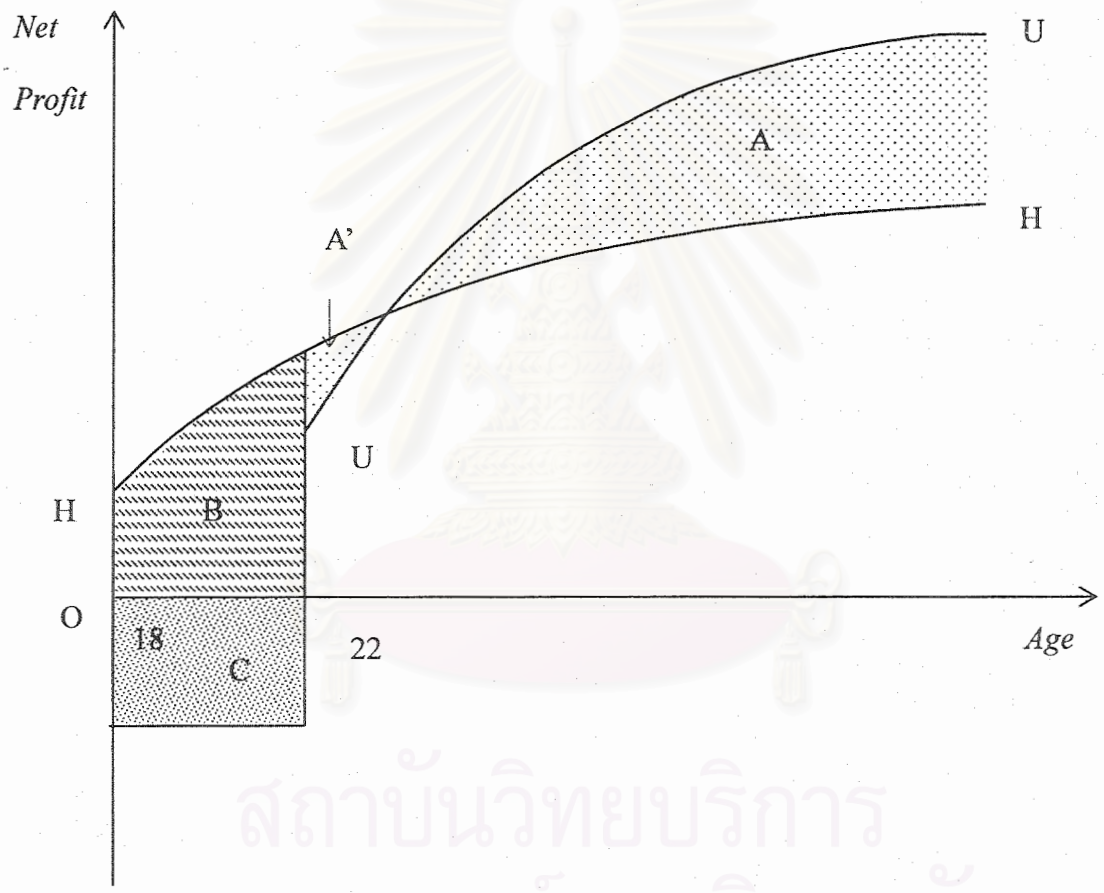
3.1.1 Cost benefit analysis

Before going to the explanation of the analytic tools of economics to calculate the value of education, private costs and benefits of the investment on higher education, shown below, should be presented graphically as a starting point of Human Capital Theory. HH below represents the average net income of high school graduates, while UU stands for that of university graduates, according to their age. Area A – Area A' represents the difference in net income between high school graduates and university graduates, and thus, is private benefits or profits arisen from higher education.

Area C includes university tuitions, fees for extra-curricular activities and other university-life-related spending, and thus is obviously the private cost for higher education. It is crucial to understand the concept of Area B, the missing income, which is also a cost of higher education. It is the total earnings that university graduates *could* receive while they were university students for four years. The fact is, however, that they go to university and cannot get any income. Therefore, Area B is the missing amount of

income for university graduates. The conclusion of above figure is that, if (Area A – Area A') > (Area B +Area C), in other words, if the amount of private benefit exceeds that of private cost, there is good reason for believing that people want to go to university.

Figure 2-2 Private costs and benefits of the investment on higher education



Source: Arai (2002) p.20.

According to Arai, there are two analytic tools of economics to calculate the value of education, particularly higher education. They are as follows.

3.1.2 Present Value Method

The concept of the Present Value Method is that Baht 100 at present is not equal to the same amount after ten years. It is because there is an interest rate. If the annual interest rate is 5%, one can get Baht 105 after saving Baht 100 in a bank for a year. Let's think about the simple and typical case as follows.

- A high school student goes to university and enjoys four years until graduation. C_j represents the cost he has to pay in the year *j*. It includes tuition fees, the missing income mentioned already and some other necessary costs.
- After graduation, he receives salaries until he retires after *T* years from high school graduation. R_k represents the difference between his salary and that of high school graduates of the same age in the year *k* from high school graduation.

Therefore, the cost he pays and the return he receives in order will be as follows.

$C_1, C_2, C_3, C_4, R_5, R_6, R_7, \ldots\ldots, R_T$

With *i* for interest rate, the present economic value of university education will be *V(i)* below.

$$V(i) = -C_1 - \frac{C_2}{1+i} - \frac{C_3}{(1+i)^2} - \frac{C_4}{(1+i)^3} + \frac{R_5}{(1+i)^4} + \frac{R_6}{(1+i)^5} + \bullet\bullet\bullet + \frac{R_T}{(1+i)^{T-1}}$$

This equation suggests that, if the *V(i)* above is positive, people have enough reason to go to university.

The Present Value Method is very common in the field of accounting, but, according to Arai (1998 and 2002), it is hardly used in economic research. This is because Internal Rate of Return Method is much more useful and practical when trying to compare data between different countries and times.

3.1.3 Internal Rate of Return Method

The rate of return is a concept of investment. If, for example, one gets Baht 106, by investing Baht 100 a year ago, the rate of return is 6%. Suppose that the interest rate in the financial market is only 5%, the rate of return = 6% is a successful investment because, in this case, the rate of return is bigger than the interest rate. According to Arai (1998 and 2002), the rate of return, *r*, can be defined in the following equation where *C* stands for the amount of initial investment, and *R* for the return after a year.

$$r = \frac{R}{C} - 1, \quad \text{which means} \quad C = \frac{R}{1+r}$$

Arai rearranges and rephrases the above equation to the following model for higher education. C_1 is the cost of higher education in the first year, and a typical university student spends C_1, C_2, C_3, and C_4 until he or she graduates from university. R_5 is the income he receives in the fifth year when he starts working after graduation. He gets R_T in the year *T* when he retires. Therefore, based on the original equation above, one can get the equation below.

$$C_1 + \frac{C_2}{1+r} + \frac{C_3}{(1+r)^2} + \frac{C_4}{(1+r)^3} = \frac{R_5}{(1+r)^4} + \frac{R_6}{(1+r)^5} + \bullet\bullet\bullet + \frac{R_T}{(1+r)^{T-1}} \qquad \text{(Equation No.1)}$$

The r above can be calculated with a computer, and one can get r^* as a solution of the equation above. If it is bigger than i, the actual interest rate, people have enough reason to go to university. Please note that this equation is very important and will be necessary in Chapter 5 again.

Arrow and Levhari (1969) prove, based on their research, that both the Present Value Method and Internal Rate of Return Method lead to the same conclusion in terms of the effect of higher education. However, as mentioned in (1) above, the Internal Rate of Return Method is used more than the Present Value Method.

4. Some major experimental studies based on Human Capital Theory

Oshio (2002) argues that the Becker's Human Capital Theory is important because many experimental studies follow in many different countries, education levels, and times from different perspectives. Among those studies, one of the most famous accomplishments is the international research done by Psacharopoulos (1973 and 1985) who calculated the internal rate of return in different areas, countries, and education levels. As well as private rate of return, he calculated social rate of return in many areas and countries. Social rate of return is the concept for the society as a whole whereas the private rate of return is for an individual person. The social rate of return is about the relationship between social cost such as government spending on education and social benefit such as the increase of productivity in the society as a whole, according to Arai (2002).

Table 2-13 Average returns to education by region, country, and level (%)

	Social			Private		
	Primary	Secondary	Higher	Primary	Secondary	Higher
Africa	26	17	13	45	26	32
Ethiopia	20	19	10	35	23	27
Ghana	18	13	17	25	17	37
-------	-	-	-	-	-	-
Asia	27	15	13	31	15	18
India	29	14	11	33	20	13
Thailand	31	13	11	56	15	14
-------	-	-	-	-	-	-
Latin America	26	18	16	32	23	23
Mexico	25	17	23	32	23	29
Intermediate	13	10	8	17	13	13
Greece	17	6	5	20	6	6
Spain	17	9	13	32	10	16
-------	-	-	-	-	-	-
Advanced	n.a.	11	9	n.a.	12	12
US	n.a.	11	11	n.a.	19	15
Japan	10	9	7	13	10	9
UK	n.a.	9	7	n.a.	11	23

Source: Psacharopoulos (1985) pp.583-604.

His findings after research in over 60 countries were “Returns are highest primary education, the general curricula, the education for women, and countries with the lowest per capita income.” It has important implications for planning future investment in education by the domestic and international donors. In fact, the World Bank started to focus on primary education in developing countries after his findings.

However, in his 1985 paper, he does not mention how he gets those numbers in detail. For example, as far as data of Thailand is concerned, it is based on the figures calculated by Sethasathien (1977), which are slightly different from those by Psacharopoulos. According to the calculation by Sethasathien, the rate of return to Thai primary education is 63% and that to higher education is only 18% in 1972, although she does not mention if it is social or private. From the research results of both Psacharopoulos and

Sethasathien, it is obvious that, in Thailand, the rate of return to primary education is much higher than that of higher education. It implies that primary education has more impact and influence in Thai society. Hence, one of Sethasathien's conclusion or recommendation about higher education in Thailand is to shift financial resources from higher education to primary education.

In the same context, Blaug (1976) supports Sethasathien's conclusion based on his own analysis. He calculated both the social and private rate of return by eduation level, sex, and age. For example, the private rate of return for age 7 is 26%, while that for age 24, master's level, is 11% in Thailand in 1970. According to his calculation, therefore, his "basic conclusion is that too much is being spent on higher education and too little on elementary education." For the comparison between men and women, (See the table below), there is no visible statistical significance, says Blaug. He also says, "While women show somewhat lower rates, the difference are well within our range of measurement error (±2%)."

Table 2-14 Selected social rates of return, men versus women, 1970 (%)

Level of Schooling	Men	Women
From 1 to 4 years	23	n.a.
From 4 to 7years	14	13
From 7 to 10 years	11	9
From 10 to 12 years	10	11
From 12 to 16 years	7	6
From 16 to 20 years	8	7

Source: Blaug (1976) p.282.

Japan's Economic Planning Agency (1998) shows the difference between national and private universities in terms of both private and social rate of return in Japan. For Japanese national universities, private rate of return exceeds social one, while private universities have contradictory result. This sounds natural because national universities receive more subsidies from the government than private ones.

Iwamura (1996) calculated private rate of return of ten individual universities and 33 faculties in Tokyo metropolitan area, Japan, in the fields of both natural and social science. Her findings were:

(a) Social science faculties, on one hand, show a higher rate of return than natural science faculties.

(b) Social science faculties, on the other hand, have a bigger range of statistical distribution of the rate of return than natural science faculties.

(c) The more competitive and prestigious the universities are, the higher the rate of return of those universities.

According to Oshio (2002), (a) above implies that the graduates from natural science faculties are either underestimated or underpaid in Japan. Oshio adds that (b) implies that the gap between hard workers and non-hard workers from social science faculties is bigger than the gap between workers from natural science faculties.

Although the researchers mentioned before Iwamura use only a single data set for average income to calculate the rate of return, Iwamura uses multiple data sets for average income of each individual industry by investigating how many go to which industry from which university. Hence, Iwamura's research results and final data are much more precise than those of the others. Although Iwamura's research samples are all Japanese universities, the research method she took has very important implications for this research on open universities in Thailand as well.

5. Signaling Theory

The idea of Signaling Theory was first broached by Spence (1973 and 1974), and its concept is completely different from that of Human Capital Theory. The largest difference is the role that universities play. In Human Capital Theory, the Faculty of Business, for example, gives knowledge, theory, training, and so on to the students so that their business productivity can increase after graduation. That is higher education and is why many students want to go to universities and study there, according to the Human Capital Theory. However, in Signaling Theory, Spence presumes that universities do not give any knowledge, and the productivity of the students never changes. In this theory, higher education only gives some signals in imperfect labor markets because of asymmetry of information. The following model shows the difference between Human Capital Theory and Signaling Theory.

Becker's Human Capital Theory:

Higher education → Increase of productivity → Higher income

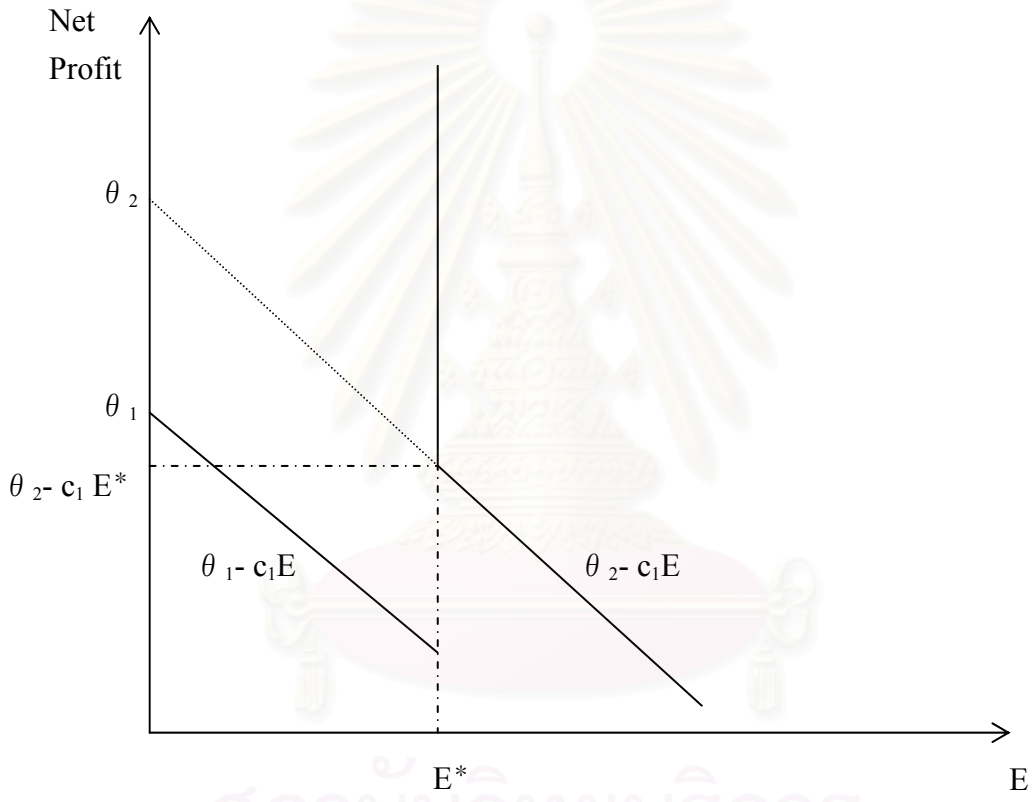
Spence's Signaling Theory

Higher education → Higher income

Oshio (2002) shows a simplified Signaling Model by hypothesizing a society where there are only two groups. These groups are the inferior with less capability, and the superior with more capability. The proportion each group in the society is p for the former, and 1 - p for the latter. The ability of the inferior is θ_1, and that of the superior is θ_2. After graduating from high school, both groups study for E year(s), and E^* is for university level, which is usually four in Thailand, for example. Every year the pay c_1

and c_2 respectively for education, and thus the total education cost for E year(s) is c_1E and c_2E where $c_1 > c_2$. The education cost varies according to his or her ability, says Spence, and, thus, in his theory, it is reasonable to hypothesize that the inferior have to spend more than the superior.

Figure 2-3 Net profit from education: The case of the inferior

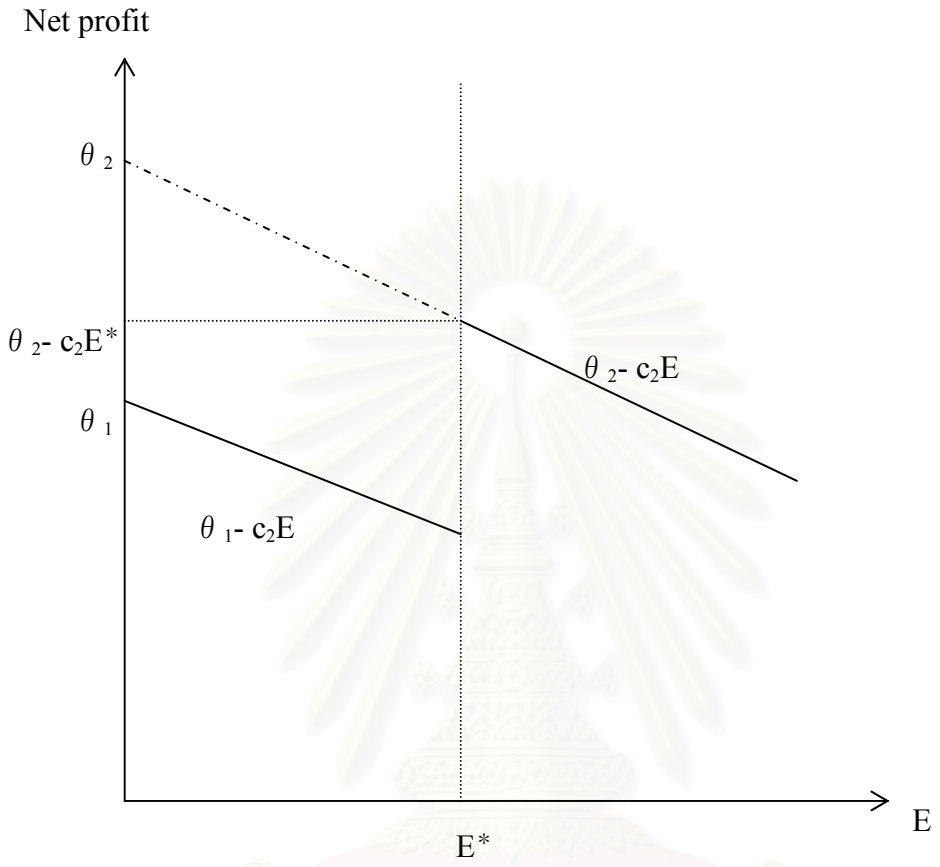


Source: Oshio (2002) p.57.

When $E < E^*$, the net profit for the inferior is $\theta_1 - c_1E$, while, if $E \geqq E^*$, the net profit is $\theta_2 - c_2E$. Therefore, on one hand, the best choice for the inferior is $E = 0$, that is, not going to university, as long as the following inequality is true.

$(\theta_2 - \theta_1)/c_1 < E^*$.(inequality No. 1)

Figure 2-4 Net profit from education: The case of the superior



Source: Oshio (2002) p.58.

On the other hand, for the superior, when $E < E^*$, the net profit is $\theta_1 - c_2E$.

When $E \geqq E^*$, the net profit is $\theta_2 - c_2E$. Therefore, the best choice for the superior is

$E = E^*$, that is, going to university, as long as the following inequality is true.

$(\theta_2 - \theta_1)/c_2 > E^*$. (inequality No. 2)

By combining the inequalities No. 1 and No. 2, the following new inequality comes up. $(\theta_2 - \theta_1)/c_1 < E^* < (\theta_2 - \theta_1)/c_2$ (inequality No. 3)

Inequality No. 3 is called “Signaling equilibrium,” and it means that the inferior do not go to university and the superior do. If this is the case, someone’s action of going to or graduating from university is the signal saying that he is among the superior. This signal gives very important information so that companies can judge certain a individual’s ability for sure.

The largest problem of Signaling Theory, argues Arai (2003), is that Spence hypothesizes a perfect capital market that encourages any students, if they wish, to go to university by lending or investing financial resources to them. In reality, however, the capital market has never been perfect in any country in history, and many talented people have to give up the idea of going to university due to the lack of financial resources. The richer the students or their families are, the easier it is for them to prepare for university life. Therefore, it is wrong to hypothesize that people with same ability have the same signaling cost.

Nevertheless, continues Arai, Signaling Theory still has important implications when considering the relationship between economic development and higher education. For example, it is observed that most university students in many developing countries are from rich families who live in big cities. This was also true in Japan until 1950s, but not now. Therefore, according to Arai, the validation of Spence’s Signaling Theory depends on the degree of economic development of each society.

6. The theory of screening

According to Human Capital Theory, higher education raises the productivity of students by giving them knowledge and training. On the contrary, the hypothesis of Signaling Theory is that higher education has no influence/effect on students’ productivity, but that it just gives signals to the society. Riley (1976) argues that

education can both raise the productivity and give signals. Therefore, his theory is in between. He first uses the concept of screening, instead of signaling. Universities for example, allow students to enter and also to graduate. Students, thus, are selected at least twice and the society or companies recognize students' ability based on education they received. According to Stiglitz (1975), Nobel Prize Winner, Signaling Theory says that superior students enter university to give the society signals that they are superior, but without education, he says, nobody knows if they are superior or not. Therefore, Stiglitz argues that students realize their ability in the learning process, which he calls screening or labeling.

7. Contribution rate of education to economic development in Thailand

Kitti (1992) calculated the contribution rate of education to economic growth in Thailand during 1974-1984, by education level, using econometric analysis. According to his analysis, the contribution rate of the least educated people to economic growth during this period was between 1.45% and 1.93%. By industry, these people contributed more to primary industry than to any other industry. He points out that there are tendencies where the contribution rate of the most educated people to the growth of the manufacturing sector has increased. He, however, has not shown any figures for university graduates in particular.

He concludes that the increase of value added for industries in Thailand during this period can be attributed to the following two changes. One is the structural change of workers' education level, and the other is the salary gap among industries. The former implies that the increase of university graduates brought about the economic growth in Thailand during the observed period.

CHAPTER 3
RESEARCH METHODOLOGY

This chapter presents the research methodology. It consists of sampling design, data collection, and statistical and economic analysis. The research methodology is based on the following three objectives mentioned in Chapter 1.

Objective 1: From a sociological point of view, to grasp why students go to open/traditional universities and how they see the universities' quality of education.

Objective 2: From a financial point of view, to describe the social status of the graduates of RU and STOU as middle class.

Objective 3: From a pure economic point of view, to find out if higher education at RU and STOU is a good investment.

1. Sampling design

For Objectives 1 and 2 above, a questionnaire will be sent to the graduates of three universities including CU, asking why they went to university. It will also ask about their academic record and the quality of education. Because of time and financial constraints, however, it would be more realistic to limit the number of recipients by choosing a certain year, a certain faculty, and a certain number of graduates. It is necessary to focus on four faculties, excluding natural science faculties, as mentioned in "Scope" in Chapter 1. They are all social science faculties and they include:

1.1 Faculty of Economics

1.2 Faculty of Business or Management

1.3 Faculty of Law

1.4 Faculty of Political Science

The next issue is the sample size. Let us look at the total student population of the target universities. For example, the following table is the number of entrants of STOU during 1980 to 1985.

Table 3-1 Number of Entrants of STOU

Faculty and Year	1981	1982	1983	1984	1985
Humanities	-	-	-	-	955
Education	75,334	10,328	12,063	20,421	17,332
Business	6,805	16,225	11,163	23,839	25,422
Law	-	29,827	14,913	18,792	16,482
Health	-	3,985	2,061	4,401	4,750
Economics	-	1,553	1,932	2,786	1,952
Political Science	-	-	3,731	4,688	4,180
Home Economics	-	2,287	2,353	3,006	3,998
Agriculture	-	5,356	1,896	3,006	3,378
Mass Comm.	-	-	-	4,102	5,608
Total	82,139	69,561	50,112	85,041	84,057

Source: STOU. 7 Years of STOU. Bangkok: STOU, 1985. various pages.

Regarding the numbers of the graduates, 200 graduates will be selected from each faculty of each university by a statistical random sampling method. Although, according to the Ministry of University Affairs, Thailand (2000), the number of graduates has increased year by year, the number of respondents should be kept the same to compare with one another. In 1998 at STOU, for example, Faculty of Economics had only 217 graduates, while Faculty of Business had as many as 3,918. Therefore, the sample number of 200 represents as many as 92% for the former on one hand, and only 5% for the latter on the other. Expected number of answers returned will be 30 out of 200. The total sample number expected should be 960 and 6,400 will be drawn from the yearbook of each university. See the matrix table below.

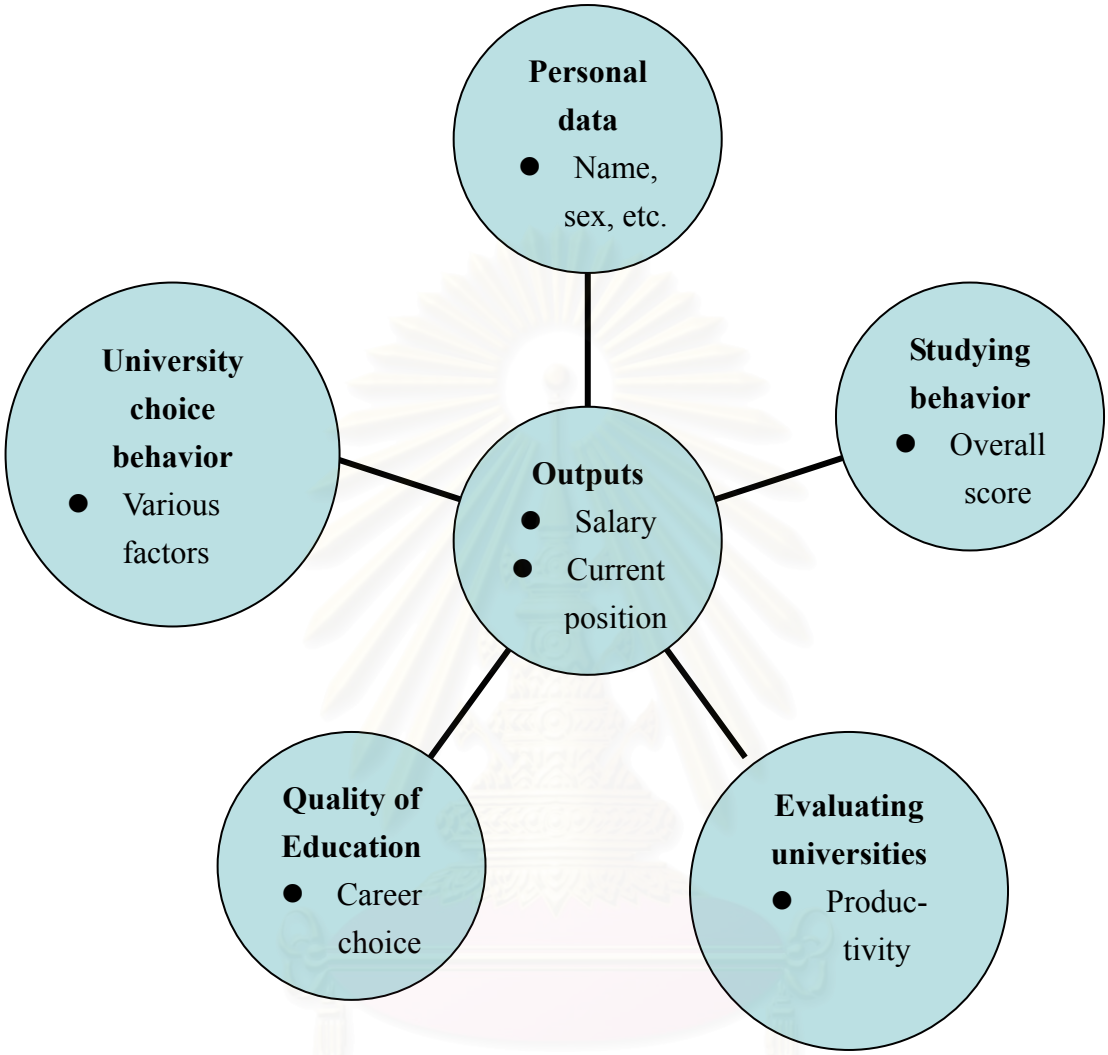
Table 3-2 Sample size

	1976-85		1986-95			1996-97		
Faculty/univ.	RU	CU	RU	STOU	CU	RU	STOU	CU
Business	30	30	30	30	30	30	30	30
Law	30	30	30	30	30	30	30	30
Economics	30	30	30	30	30	30	30	30
Political Sci.	30	30	30	30	30	30	30	30

2. Type of data

Data in this research are divided into two parts. One is statistical data by questionnaires, and the other is a series of economic indicators. For the former, a systemic sampling method is adopted. This allows us to make estimates about the larger population based on what one learns from the subset. It also eliminates selection bias, can generalize the population, and is cost-effective. For this purpose, however, it was necessary to obtain a complete listing of the entire population. The questionnaire in Thai and its English translation are provided in Appendices. In total, it has 23 questions and they can be divided into seven components as shown in Figure 3-1.

Figure 3-1 Structure of the questionnaire



Although respondents are requested to put exact numbers for such questions as beginning and current salaries, the questions are provided mostly in multiple choice style and some questions, such as the one with regard to the financial situation at the time of university entrance, have 5 scales, namely “Very rich,” “Rich,” “Middle,” “Poor,” and “Very poor,” for example.

3. Statistical analysis

The question for statistical analysis here, for example, is “People usually believe that there is a clear and explainable difference in social status between the graduates of traditional universities such as CU and open admission ones such as RU and STOU, but is it true?” Before answering this question, it is necessary to define “social status” in easy-to-understand language or to decide how to measure the social status of people in Thailand. However, imagine, for example, that there are two persons, one a director of a small company, and the other a manager of a world famous transnational enterprise. It will be difficult to judge which is higher status in Thai society, and it will depend largely on people’s personal belief and way of life.

In this research, to put it simple, social status will be judged purely from the financial situation of the graduates, and monthly income or salary represents their financial situation. Because Thailand is a market economy country, it is reasonable, to a large extent, to believe that people with higher income are people with higher social status. In this sense, income survey will be the key and the above questionnaire, thus, needs to include some inquiries about financial situation of the graduates such as their families’ financial situation at the time of their university entrance, their beginning salary and their current salary. After successful data collection, significant difference in average (mean) and variance of these income data among three universities will be examined by using regular statistical methods such as normal approximation of binomial distribution, F test, and T tests. These techniques are as follows.

3.1 Normal approximation of binomial distribution

To examine if the difference in percentage between two groups is statistically significant, the normal approximation of binomial distribution is used. For example, imagine that Group A has 400 members, and Group B has 300. When 20 members of Group A say that they are poor, and 22 of Group B say the same, is there any significant difference among these two groups? To answer this kind of questions, the normal approximation of binomial distribution is usually useful, and was actually used in Tables 4-16, 4-17, and 4-18 in Chapter 4, for example. Below is the set-up of the statistical test for the comparison between two groups where H_0 stands for null hypothesis, which is, there is no difference in percentage between two groups with the significant level of 5%., and H_1 for alternative hypothesis. Also, P_A stands for the appearance ratio of Group A and P_B for that of Group B.

$$H_0 : P_A = P_B$$

$$H_1 : P_A \neq P_B$$

To examine which of the above hypotheses to take, it is necessary to calculate the test statistic called u value by using the following equation where n_A and n_B stand for the sample size of each group.

$$u = \frac{P_A - P_B}{\sqrt{\overline{p}(1-\overline{p})(\frac{1}{n_A} + \frac{1}{n_B})}}$$

This can be changed to another equation where r_A and r_B stand for the frequency of appearance of each group as follows.

$$\overline{p} = \frac{r_A + r_B}{n_A + n_B}$$

It is also necessary to calculate the two-tailed probability called p value, which is the probability where $p \geq |u|$ in the normal distribution where the average is 0 and standard deviation is 1. One-tailed probability is the half of the two-tailed.

Then, the next question naturally arises. To what extent or how different are Group A and B in this regard? Let us estimate the difference between P_A and P_B to answer that question. Confidence intervals can be calculated as follows.

$$(P_A - P_B) - u(\alpha)\sqrt{\frac{P_A(1-P_A)}{n_A} + \frac{P_B(1-P_B)}{n_B}} \leq P_A - P_B \leq (P_A - P_B) + u(\alpha)\sqrt{\frac{P_A(1-P_A)}{n_A} + \frac{P_B(1-P_B)}{n_B}}$$

If α above is 5%, the 95% confidence interval can be calculated by using the above equation.

3.2 F test

In order to be sure if the variance for two groups is homogeneous or not, F distribution is usually used. This method was actually used to make sure if the variance for salary data of RU and CU is homogeneous, as shown in Table 4-23 in Chapter 4, for example. When F value is defined as $\frac{V_A}{V_B}$ where V_X represents variance of Group X where normal distribution with population variance ${\sigma_X}^2$ applies, F value follows F distribution with the first degree of freedom ϕ_A and second degree of freedom ϕ_B. In this case, the hypotheses to test and the result of calculation are as follows.

$$H_0 : \sigma_A^2 = \sigma_B^2$$

$$H_1 : \sigma_A^2 \neq \sigma_B^2$$

Using F distribution, the ratio $\frac{\sigma_A^2}{\sigma_B^2}$ and the 95% confidence interval of the ratio of the population variance of two groups can be calculated by the following equation where $F = \frac{V_A}{V_B}$.

$$\frac{F}{F(\phi_A, \phi_B; \frac{\alpha}{2})} \leq \frac{\sigma_A^2}{\sigma_B^2} \leq F \times F(\phi_B, \phi_A; \frac{\alpha}{2})$$

3.3 t-tests

3.3.1 Hypothesizing non-homoscedasticity

For the two groups that do not share homoscedasticity, a Welch t test is usually used when it comes to the comparison of averages. This method, as well as a Student t test to be mentioned later, was actually used to compare average salaries between the graduates of two universities, as shown in Table 4-24 in Chapter 4, for example. Let us then start a Welch t test with the following hypotheses where μ_A stands for the population mean of Group A, and μ_B for that of Group B.

$$H_0 : \mu_A = \mu_B$$

$$H_1 : \mu_A \neq \mu_B$$

The test statistics, the value of t_0 in this case, can be calculated by the following equation where $\bar{x}_A$ and $\bar{x}_B$ represent the mean of each sample group.

$$t_0 = \frac{\bar{x}_A - \bar{x}_B}{\sqrt{\frac{V_A}{n_A} + \frac{V_B}{n_B}}}$$

The equivalent degree of freedom ϕ^* can be calculated by the following equation.

$$\phi^* = \frac{(\frac{V_A}{n_A} + \frac{V_B}{n_B})^2}{(\frac{V_A}{n_A})^2 \frac{1}{n_A - 1} + (\frac{V_B}{n_B})^2 \frac{1}{n_B - 1}}$$

After that, p value, the probability where the number exceeds $|t|$ in t distribution with the equivalent degree of freedom ϕ^* should be calculated. When hypothesizing non-homoscedasticity, below is the equation to get the confidence interval of the mean difference represented by $\mu_A - \mu_B$.

$$(\bar{x}_A - \bar{x}_B) - t(\phi^*, \alpha)\sqrt{\frac{V_A}{n_A} + \frac{V_B}{n_B}} < \mu_A - \mu_B < (\bar{x}_A - \bar{x}_B) + t(\phi^*, \alpha)\sqrt{\frac{V_A}{n_A} + \frac{V_B}{n_B}}$$

$$\phi^* = \frac{(\frac{V_A}{n_A} + \frac{V_B}{n_B})^2}{(\frac{V_A}{n_A})^2 \frac{1}{n_A - 1} + (\frac{V_B}{n_B})^2 \frac{1}{n_B - 1}}$$

3.3.2 Hypothesizing homoscedasticity

When hypothesizing homoscedasticity, a Student t test is usually used. Let us then start a Student t test with the following hypotheses where μ_A stands for the population mean of Group A, and μ_B for that of Group B.

$$H_0 : \mu_A = \mu_B$$

$$H_1 : \mu_A \neq \mu_B$$

When σ_A^2 represents the population variance of Group A, and σ_B^2 that of Group B, the following equation can be applied because, in this case, homoscedasticity is hypothecated.

$$\sigma_A^2 = \sigma_B^2 = \sigma^2$$

The value of σ^2 is not known, but can be substituted as an estimate by the following V where S_A stands for the sum of the squared deviations of Group A, S_B for that of Group B, ϕ_A for the degree of freedom of Group A, and ϕ_B for that of Group B.

$$V = \frac{S_A + S_B}{\phi_A + \phi_B}$$

The value of t can be calculated by the following equation where $\bar{x}_A$ and $\bar{x}_B$ represent the mean of each sample group.

$$t = \frac{\bar{x}_A - \bar{x}_B}{\sqrt{V(\frac{1}{n_A} + \frac{1}{n_B})}}$$

The value of t above will give the p value, the probability where numbers are more than $|t|$ in t distribution with the degree of freedom $\phi_A + \phi_B$. When hypothesizing homoscedasticity, below is the equation to get the confidence interval of the mean difference.

$$(\bar{x}_A - \bar{x}_B) - t(\phi, \alpha)\sqrt{V(\frac{1}{n_A} + \frac{1}{n_B})} < \mu_A - \mu_B < (\bar{x}_A - \bar{x}_B) + t(\phi, \alpha)\sqrt{V(\frac{1}{n_A} + \frac{1}{n_B})}$$

$$V = \frac{S_A + S_B}{\phi_A + \phi_B}$$

4. Economic analysis

From the viewpoint of Signaling Theory and the Theory of Screening where there are so few experimental studies so far because of the difficulty in collecting relevant data, graduates will talk about the increase/decrease of their productivity by the university education.

From the viewpoint of Human Capital Theory, private internal rate of return will be calculated to find out if higher education at RU and STOU is a good investment, in comparison with the case of CU. The internal rate of return not only by university but also by faculty, will be calculated, by using the following simple equation mentioned in Chapter 2.

$$C_1 + \frac{C_2}{1+r} + \frac{C_3}{(1+r)^2} + \frac{C_4}{(1+r)^3} = \frac{R_5}{(1+r)^4} + \frac{R_6}{(1+r)^5} + \bullet\bullet\bullet + \frac{R_T}{(1+r)^{T-1}} \qquad \text{(Equation No. 1)}$$

To calculate the rate of return to education at RU, STOU, and CU, the next four different data will be necessary.

4.1 Estimates of private expenditure on tuition fees, books, stationary for the students/graduates of each individual university

4.2 Data on labor market conditions such as the initial and lifetime wages for high school graduates

4.3 Unemployment rate

4.4 Beginning and current wages of the graduates of the three target universities

Finally, the issue of economic growth rate should be raised here. One may think that it is still debatable whether and how economic development rate affects the internal rate of return. According to Arai (1995), one can change the equation for the rate of return, shown as *r* below, as follows, taking the economic growth rate, shown as *g* below, into consideration.

$$C_1 + \frac{C_2(1+g)}{1+r} + \frac{C_3(1+g)^2}{(1+r)^2} + \frac{C_4(1+g)^3}{(1+r)^3} = \frac{R_5(1+g)^4}{(1+r)^4} + \frac{R_6(1+g)^5}{(1+r)^5} + \bullet\bullet\bullet + \frac{R_T(1+g)^{T-1}}{(1+r)^{T-1}}$$

Furthermore, the following equation is the same as above.

$$C_1 + \frac{C_2}{\left(\frac{1+r}{1+g}\right)} + \frac{C_3}{\left(\frac{1+r}{1+g}\right)^2} + \frac{C_4}{\left(\frac{1+r}{1+g}\right)^3} = \frac{R_5}{\left(\frac{1+r}{1+g}\right)^4} + \frac{R_6}{\left(\frac{1+r}{1+g}\right)^5} + \bullet\bullet\bullet + \frac{R_T}{\left(\frac{1+r}{1+g}\right)^{T-1}}$$

There is already r^* as the solution of Equation No. 1, the equation without any consideration of economic development. By combining the equations and figures, the above equation can be simply changed as follows.

$$r = r^* + g + ig$$

Because *ig* in the above equation is usually very small and can be neglected, the above equation can be changed to the following.

$$r \fallingdotseq r^* + g$$

That is to say, the private internal rate of return in light of economic growth, *r*, is nearly equal to the sum of the economic growth rate, *g*, and the private internal rate of return without any consideration of economic growth, r^*. According to the Human Development Report (2000), the average growth rate of per capita GNP during 1975-1990 was 5.7%. Accordingly, if one takes the economic growth rate into consideration, the rate of return will be higher by approximately 5.7%.

CHAPTER 4
RESULTS OF THE STUDY

This chapter is guided by the three objectives below that were also shown in Chapters 1 and 3.

Objective 1: From a sociological point of view, to grasp why students go to open/traditional universities and how they see the universities' quality of education.

Objective 2: From a financial point of view, to describe the social status of the graduates of RU and STOU as middle class.

Objective 3: From a pure economic point of view, to find out if higher education at RU and STOU is a good investment.

For these purposes, this chapter first deals with comparisons between open universities and a traditional type of universities such as CU, largely based on an opinion and salary survey targeting the graduates of RU, STOU, and CU. Through these processes, one can relativize the utility of the open universities in Thailand.

Because this chapter deals only with the results of the study, some data will be further analyzed in the following chapter.

1. Socio-demographic data of samples

This study is a quantitative study, basically to compare RU, STOU, and CU. Table 4-1 below shows the number of respondents classified by university and by the year of graduation. Based on the systemic sampling method, the questionnaire was sent to over

1,000 graduates of RU, STOU, and CU, followed by a telephone call for late respondents. As a result, there were 972 respondents who answered and sent back the questionnaire (B-Faculty of Business, L-Law, P-Political Science, E-Economics). The demographic data of the respondents are shown in table 4-2.

Table 4-1 Actual sample size or the number of respondents

Year of graduation	RU (n=364)				STOU (n=244)				CU (n=364)			
	B	L	P	E	B	L	P	E	B	L	P	E
1976-1985	32	32	30	30	0	0	1	0	31	32	30	30
1986-1995	31	29	30	30	30	30	29	34	29	31	30	51
1996-1999	30	30	30	30	31	32	30	27	30	31	30	9
Total	93	91	90	90	61	62	60	61	90	94	90	90

Table 4-2 Demographic data of the respondents

Demographic data	%
Gender	
- Male	60.4
- Female	39.6
Year of birth (age as of 1 January 2004)	
- Before 1950 (Over 54)	9.5
- 1951-1955 (49-53)	19.3
- 1956-1960 (44-48)	11.6
- 1961-1965 (39-43)	22.5
- 1966-1970 (34-38)	11.1
- 1971-1975 (29-33)	13.0
- After 1976 (Under 28)	9.8
- Not specified	3.2
Marital status	
- Married	62.8
- Single	36.3
- Not specified	0.9

The next three tables show the current job of the graduates of RU, STOU, and CU respectively. Table 4-3 for RU graduates, for example, shows that the younger the generation, the wider the background.

Table 4-3 Current job: RU graduates

Job	1976-1985	1986-1995	1996-1997
	No. of persons (%)	No. of persons (%)	No. of persons (%)
Agriculture	1 (0.8)	2 (1.7)	3 (2.5)
Food	3 (2.4)	5 (4.1)	5 (4.2)
Trading	11 (8.9)	11 (9.1)	20 (16.7)
School/ University		2 (1.7)	2 (1.7)
Mass Media		1 (0.8)	2 (1.7)
Construction		5 (4.1)	1 (0.8)
Entertainment			1 (0.8)
Consultant	4 (3.3)		1 (0.8)
Accounting	1 (0.8)		1 (0.8)
Lawyer	5 (4.1)	5 (4.1)	5 (4.2)
Medical Doctor		1 (0.8)	1 (0.8)
Bank	10 (8.1)	16 (13.2)	2 (1.7)
Security/ Finance	1 (0.8)	1 (0.8)	5 (4.2)
Hotel	1 (0.8)	2 (1.7)	2 (1.7)
Travel		1 (0.8)	2 (1.7)
Heavy industry	11 (8.9)	2 (1.7)	2 (1.7)
Iron/ Metal			1 (0.8)
Fabric		2 (1.7)	1 (0.8)
Sales	9 (7.3)	14 (11.6)	8 (6.7)
Public	42 (34.1)	28 (23.1)	34 (28.3)
Others	24 (19.5)	23 (19.0)	19 (15.8)
No specific jobs			2 (1.7)
Total	123 (100.0)	121 (100.0)	120 (100.0)

Table 4-4 Current job: STOU graduates

Job	1986-1995	1996-1997
	No. of persons (%)	No. of persons (%)
Agriculture	2 (1.7)	
Food	2 (1.7)	2 (1.6)
Trading	4 (3.3)	8 (6.5)
School/ University	3 (2.5)	2 (1.6)
Mass Media	5 (4.1)	1 (0.8)
Construction	2 (1.7)	1 (0.8)
Entertainment	1 (0.8)	
Consultant		
Accounting		3 (2.4)
Lawyer	2 (1.7)	2 (1.6)
Medical Doctor	3 (2.5)	2 (1.6)
Bank	5 (4.1)	5 (4.1)
Security/ Finance		
Hotel		2 (1.6)
Travel	1 (0.8)	1 (0.8)

Table 4-4 Current job: STOU graduates (cont.)

Job	1986-1995	1996-1997
	No. of persons (%)	No. of persons (%)
	1 (0.8)	7 (5.7)
Iron/ Metal	2 (1.7)	2 (1.6)
Fabric		
Sales	4 (3.3)	4 (3.3)
Public	53 (43.8)	71 (57.7)
Others	24 (19.8)	10 (8.1)
No specific jobs	7 (5.8)	
Total	121 (100.0)	123 (100.0)

Table 4-5 Current job: CU graduates

Job	1976-1985	1986-1995	1996-1997
	No. of persons (%)	No. of persons (%)	No. of persons (%)
Agriculture	1 (0.8)		
Food	2 (1.6)	4 (3.3)	1 (0.8)
Trading	9 (7.4)	22 (18.3)	7 (5.7)
School/ University	4 (3.3)	2 (1.7)	4 (3.3)
Mass Media	1 (0.8)	9 (7.5)	8 (6.6)
Construction		5 (4.2)	
Entertainment			2 (1.6)
Consultant	5 (4.1)	5 (4.2)	5 (4.1)
Accounting	5 (4.1)		2 (1.6)
Lawyer	7 (5.7)	3 (2.5)	5 (4.1)
Medical Doctor		1 (0.8)	
Bank	2 (1.6)	14 (11.7)	8 (6.6)
Security/ Finance	6 (4.9)	2 (1.7)	3 (2.5)
Hotel	1 (0.8)	1 (0.8)	2 (1.6)
Travel		3 (2.5)	1 (0.8)
Heavy industry	8 (6.6)	7 (5.8)	3 (2.5)
Iron/ Metal		1 (0.8)	
Fabric			1 (0.8)
Sales	6 (4.9)	13 (10.8)	12 (9.8)
Public	31 (25.4)	14 (11.7)	26 (21.3)
Others	24 (19.7)	13 (10.8)	30 (24.6)
No specific jobs	10 (8.2)	1 (0.8)	2 (1.6)
Total	122 (100.0)	120 (100.0)	122 (100.0)

2. Analysis of university-choice behavior

Let us look at the reasons they went to university and chose the three particular universities. Looking at the "recommendation and enforcement from parents, friends, and relatives" categories in the table below, one will see a clear difference between open admission universities such as RU and STOU, and traditional universities such as CU. For these categories, CU has as many as 16.5% (=14%+2.5%), while RU has 10.1% and STOU 6.1%.

Table 4-6 Reasons for continuing study at university and getting a BA after high school

Reasons for continuing study at university	RU	STOU	CU
To find out what I am good at and what I want to do	20.9 (76)	27.9 (68)	29.7 (108)
To get a better job and higher salary after graduation	59.1 (215)	57.0 (139)	58.8 (214)
To prove that I am more than high school graduates	16.8 (61)	23.4 (57)	19.2 (70)
To enjoy student life	11.3 (41)	18.0 (44)	20.9 (76)
To study more	83.0 (302)	74.2 (181)	80.5 (293)
Social acceptance	41.8 (152)	36.1 (88)	50.3 (183)
Parents' enforcement	1.6 (6)	0.8 (2)	2.5 (9)
Recommendation from parents / friends / relatives	8.5 (31)	5.3 (13)	14.0 (51)
Others such as to help the society, to Get better future, to get a dream job	12.6 (46)	6.6 (16)	8.5 (31)

Note: In percentage and (actual number of respondents)

Table 4-7 The effect of parents, friends, and relatives on university-choice behavior for RU and CU

		A(RU)	B(CU)
Number of samples	n	364	364
Frequency of appearance	r	37	60
Frequency of non-appearance	n-r	327	304
Appearance ratio	P	0.101648	0.164835
Average appearance ratio		0.133242	
Difference in ratio	$P_A - P_B$	-0.06319	
Significant level	α	0.05	
Test statistic	u value	-2.50838	
Rate of rejection (Two-tailed)	u(α)	1.959963	
Rate of rejection (Upper)	u(2α)	1.644853	
Rate of rejection (Lower)	-u(2α)	-1.64485	
Two-tailed probability	p value	0.012129	
One-tailed probability (Upper)	p value	0.006064	
One-tailed probability (Lower)	p value	0.993936	

Because the p value above is 0.012129<0.05, the null hypothesis can be rejected, which means that there is statistical difference with the significant level of 5%. The 95% confidence interval is -0.112 $\leq P_A - P_B \leq$ -0.014.

Let us now go on to the comparison between the other open admission university, STOU, and CU. Next table shows the comparative data of STOU and CU. As a result of calculation, because the p value above is 0.000145<0.05, the null hypothesis can be rejected again, which means that there is statistical difference with the significant level of 5%. Further calculation gives the 95% confidence interval, which is -0.152 $\leq P_A - P_B \leq$ -0.055.

Table 4-8 The effect of parents, friends, and relatives on university-choice behavior for STOU and CU

		A(STOU)	B(CU)
Number of samples	n	244	364
Frequency of appearance	R	15	60
Frequency of non-appearance	n-r	229	304
Appearance ratio	P	0.061475	0.164835
Average appearance ratio		0.123355	
Difference in ratio	$P_A - P_B$	-0.10336	
Significant level	α	0.05	
Test statistic	U value	-3.79887	
Rate of rejection (Two-tailed)	U(α)	1.959963	
Rate of rejection (Upper)	U(2 α)	1.644853	
Rate of rejection (Lower)	-u(2 α)	-1.64485	
Two-tailed probability	p value	0.000145	
One-tailed probability (Upper)	p value	7.27E-05	
One-tailed probability (Lower)	p value	0.999927	

Table 4-9 Reasons for choosing the university

Reasons for choosing the university	RU	STOU	CU
Recommendation from parents/friends/relatives	6.9 (25)	18.9 (46)	20.9 (76)
Geographical closeness	6.9 (25)	45.1 (110)	17.3 (63)
Social status of the university	4.7 (17)	16.0 (39)	25.0 (91)
Quality of education	31.3 (114)	36.5 (89)	69.8 (254)
Reputation/Social acceptance of the University	30.8 (112)	33.2 (81)	84.1 (306)
Did not like open universities	1.4 (5)	8.6 (21)	20.3 (74)
Able to study while working	41.5 (151)	73.4 (179)	3.3 (12)
Open admission system	60.7 (221)	34.4 (84)	0.3 (1)
Failure of the entrance examination of other universities	49.2 (179)	9.0 (22)	0.0 (0)
Reasonable or inexpensive tuition	16.8 (61)	22.5 (55)	4.1 (15)
Newness of the university	7.1 (26)	6.1 (15)	0.0 (0)
No specific reasons	1.1 (4)	1.2 (3)	0.5 (2)
Others	11.3 (41)	25.0 (61)	28.3 (103)

Note: In percentage and (actual number of respondents)

The result of the comparison between RU and CU, and between STOU and CU will be interpreted in Chapter 5.

3. Analysis of studying behavior at university

The next question, "Then, did the respondents study hard after entering the university?" will come up. Let us find out to what extent they studied hard, according to the overall academic score at university. Although it is based on self-assessment, it will give us some tendencies so that one can understand studying behavior of the students of each university.

Table 4-10 Overall scores of the respondents at university

The overall score at university	RU	STOU	CU
Very good	39.6 (144)	37.6 (89)	53.9 (194)
Good	48.1 (175)	56.1 (133)	38.3 (138)
Fair	11.8 (43)	6.3 (15)	7.5 (27)
Poor	0.5 (2)	0.0 (0)	0.0 (0)
Very poor	0.0 (0)	0.0 (0)	0.3 (1)
Total	100.0 (364)	100.0 (237)	100.0 (360)

As far as the category "Very good" is concerned, it seems that the three universities have different tendency, because CU has as many as 53.9% while RU and STOU have less than 40%. Let us take CU and RU, for example, to examine if the difference is statistically significant.

Table 4-11 Comparison of the respondents' overall score "Very good" between RU and CU

		A (RU)	B (CU)
Number of samples	n	364	360
Frequency of appearance	r	144	194
Frequency of non-appearance	n-r	220	166
Appearance ratio	P	0.395604	0.538889
Average appearance ratio		0.466851	
Difference in ratio	$P_A - P_B$	-0.14328	
Significant level	α	0.05	
Test statistic	u value	-3.86383	
Rate of rejection (Two-tailed)	u(α)	1.959963	
Rate of rejection (Upper)	u(2α)	1.644853	
Rate of rejection (Lower)	-u(2α)	-1.64485	
Two-tailed probability	p value	0.000112	
One-tailed probability (Upper)	p value	5.58E-05	
One-tailed probability (Lower)	p value	0.999944	

Because p value of 0.000112 < 0.05, the null hypothesis that there is no significant difference, can be rejected with 5% significant level. Now it is clear that there is a statistical difference between RU and CU in terms of overall score at university. Let us then examine how different these universities, including STOU, are in tendency in this aspect. For m (column) x n (row) contingency tables like the one above, next characteristics can be used effectively. That is, for $\sum_i \sum_j \frac{(f_{ij} - t_{ij})^2}{t_{ij}}$, χ^2 distribution where f_{ij} stands for the frequency of appearance for column *i* and row *j*, t_{ij} for the expected value for column *i* and row *j*, and the degree of freedom is (m-1) x (n-1), can be applied. Let us first calculate the expected value by using the following equation where $N_{i=}$ stands for the total of column *i*, N_{-j} for that of row *j*, and N for the grand total.

$$t_{ij} = \frac{N_{i-} \times N_{-j}}{N}$$

The following table shows the result of calculation for expected value. In addition, based on the calculation , let us now calculate $\frac{(f_{ij} - t_{ij})^2}{t_{ij}}$ for test statistic.

Table 4-12 Calculation of expected value and test statistic of overall score

Score	Expected value			Test statistic		
	RU	STOU	CU	RU	STOU	CU
Very good	161.7357	105.3059	159.9584	1.944869	2.524866	7.244585
Good	168.9324	109.9917	167.076	0.217935	4.812937	5.060043
Fair	32.19563	20.96254	31.84183	3.625785	1.695972	0.736243
Poor	0.757544	0.493236	0.74922	2.037764	0.493236	0.74922
Very poor	0.378772	0.246618	0.37461	0.378772	0.246618	1.044054

Because $\chi^2 = \sum_i \sum_j \frac{(f_{ij} - t_{ij})^2}{t_{ij}}$, one now has χ^2 value as follows. As can be seen

below, χ^2 = 32.8129 > χ^2 (8, 0.05) = 15.50731, and thus the null hypothesis can be rejected. This means that there is a clear difference in the overall tendency among these three universities with regard to the academic score students received.

Given that the tendency in the above aspect is statistically different among the three universities, the question "How different?" comes up. In order to answer this question, it is useful to examine residuals that are the difference between the observed frequency of appearance and the expected value. First, standardized residuals, e_{ij}, the variance of e_{ij}, V_{ij}, and adjusted residuals, d_{ij}, can be calculated as follows.

$$e_{ij} = \frac{f_{ij} - t_{ij}}{\sqrt{t_{ij}}} \qquad V_{ij} = (1 - \frac{n_{i-}}{N}) \times (1 - \frac{n_{-j}}{N}) \qquad d_{ij} = \frac{e_{ij}}{\sqrt{V_{ij}}}$$

Table 4-13 Calculation of test statistic with χ^2 value and the degree of freedom

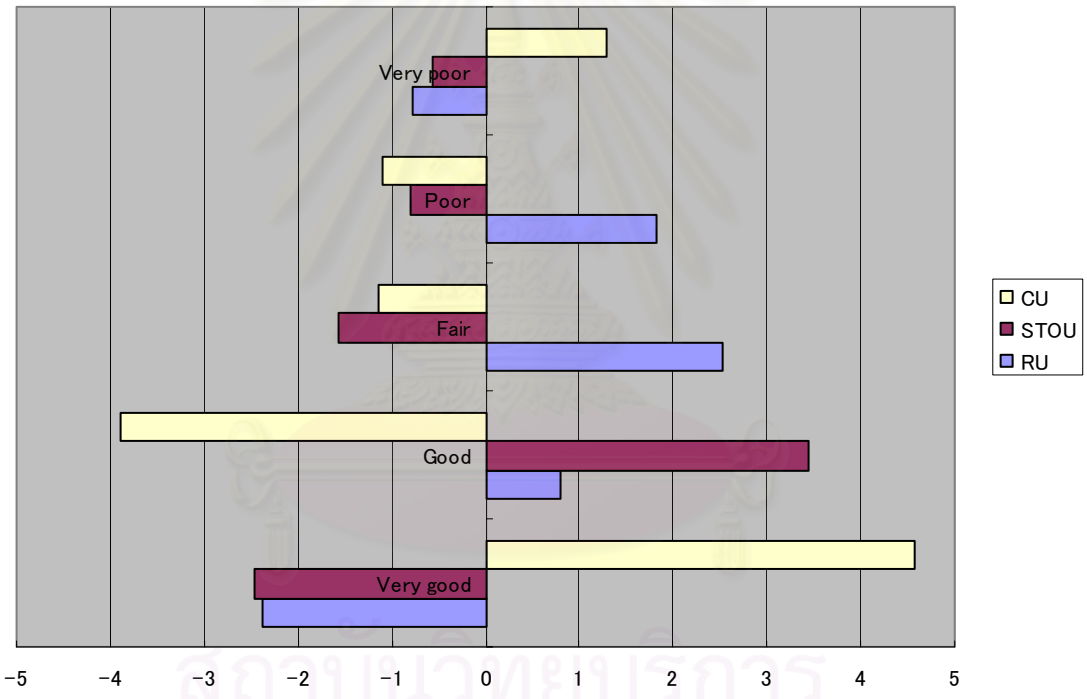
Test statistic	χ^2 value	32.8129
Degree of freedom	ϕ	8
Significant level	α	0.05
Rate of rejection	χ^2 (ϕ, α)	15.50731

Table 4-14 Calculation of standardized residuals and adjusted residuals

	Standardized residuals			Adjusted residuals		
Score	RU	STOU	CU	RU	STOU	CU
Very good	-1.39459	-1.58898	2.691577	-2.37362	-2.45585	4.565857
Good	0.466835	2.193841	-2.24945	0.809088	3.452674	-3.88561
Fair	1.904149	-1.30229	-0.85805	2.530377	-1.57149	-1.13644
Poor	1.427503	-0.70231	-0.86557	1.813025	-0.80998	-1.09567
Very poor	-0.61544	-0.49661	1.02179	-0.78125	-0.57244	1.292743

The figure below is the visualization of the above table. For d_{ij}, normal distribution where the mean is 0 and the standard deviation is 1 can be applied. Usually, if $|d_{ij}|$ is more than 2, it is considered as a characterizing portion. Based on this concept, the following can be said. Compared to other universities, CU has many "Very good", STOU has many "Good" and RU has many "Fair."

Figure 4-1 Calculation of adjusted residuals



4. Quality of higher education

First of all, as many as 94.7% of the respondents deny the Signaling Theory by saying that the university education helped increase their working productivity based on greater knowledge and new perspectives. From the viewpoint of university graduates, it is natural to think that university education has something significant because they spent

time and money for it. Therefore, even though many respondents deny the Signaling Theory, this does not necessarily permit an assertion that the Signaling Theory is wrong. Layard and Psacharopoulos (1974) deny the Signaling Theory by saying that even university dropouts earn higher wages than high school graduates. Therefore, they say, university education is significant to some extent and the society does not look at people only in view of the fact that they have a university graduation certificate. Taking into account that both RU and STOU have many students who attend for a number of years but do not eventually graduate, further research targeting those dropouts may help to test the appropriateness of the Signaling Theory.

The following tables give us some information with regard to the quality of education of each university. The graduates of each university evaluate their own university only.

Table 4-15 RU respondents' opinions about RU's quality of education

Development in various parts	Level of Development (n=363)		
	Much	Neutral	Less
Increase opportunity to succeed in working	75.2 (273)	21.2 (77)	3.6 (13)
Increase channels to find jobs/ occupation	73.2 (265)	23.8 (86)	3.0 (11)
Increase intellectual capacity	75.8 (275)	22.0 (80)	2.2 (8)
Learning about life and working philosophy	63.4 (230)	30.0 (109)	6.6 (24)
Learning about team work	45.5 (165)	38.3 (139)	16.3 (59)

Note: In percentage and (exact number of respondents)

Table 4-16 STOU respondents' opinions about STOU's quality of education

Development in various parts	Level of Development (n=244)		
	Much	Neutral	Less
Increase opportunity to succeed in working	72.5 (177)	24.2 (59)	3.3 (8)
Increase channels to find jobs/ occupation	62.3 (152)	26.2 (64)	11.5 (28)
Increase intellectual capacity	77.5 (189)	21.3 (52)	1.2 (3)
Learning about life and working philosophy	61.5 (150)	34.8 (85)	3.7 (9)
Learning about team work	46.3 (113)	45.9 (112)	7.8 (19)

Note: In percentage and (exact number of respondents)

Table 4-17 CU respondents' opinions about CU's quality of education

Development in various parts	Level of Development (n=363)		
	Much	Neutral	Less
Increase opportunity to succeed in working	75.5 (274)	22.9 (83)	1.7 (6)
Increase channels to find jobs/ occupation	78.5 (285)	18.7 (68)	2.8 (10)
Increase intellectual capacity	71.1 (258)	23.7 (86)	5.2 (19)
Learning about life and working philosophy	45.9 (166)	43.9 (159)	10.2 (37)
Learning about team work	34.0 (123)	47.0 (170)	19.1 (69)

Note: In percentage and (exact number of respondents)

Let us now compare the three universities on quality of education by picking, from the three tables above, the numbers and percentage of positive respondents who chose "Much" in each question. If one looks at the total percentage below, he will find that RU's is the highest among the three. This means that the graduates of RU see its quality of education as very high and gave the most positive evaluation to the education they received, compared to STOU and CU. Since an objective of this paper is to examine the difference between open universities and traditional ones, let us compare RU and CU to take a closer look at their statistical difference. Because the total numbers of respondents are the same, it is easy to compare both the numbers and percentage of RU and CU.

Table 4-18 Comparison among three universities on quality of education

Quality of education	RU (n=362)	STOU (n=244)	CU (n=362)
Increase opportunity to succeed in working	75.2 (273)	73.2 (265)	75.5 (274)
Increase channels to find jobs/occupation	73.2 (265)	62.3 (152)	78.5 (285)
Increase intellectual capacity	75.8 (275)	77.5 (189)	71.1 (258)
Learning about life and working philosophy	63.4 (230)	61.5 (150)	45.9 (166)
Learning about team work	45.5 (165)	46.3 (113)	34.0 (123)
Total of positive respondents	39.03 (1,208)	25.23 (781)	35.74 (1,106)

Note: In percentage and (exact number of respondents)

First, let us look at the impact of higher education on intellectual capacity. As many as 75.8% of RU graduates said that the education at RU increased their intellectual capacity, while only 71.1% of CU graduates are positive about this question. Therefore, at a first glance, it looks as if the graduates of RU and CU see the quality of education differently. To examine if this difference is statistically significant, it is necessary to use a normal approximation of binomial distribution technique with a significant level of 5%. The table below shows the result of the statistical calculation.

Table 4-19 Comparison between RU and CU on the impact on intellectual capacity

		A(RU)	B(CU)
Number of samples	n	362	362
Frequency of appearance	r	275	258
Frequency of non-appearance	n-r	87	104
Appearance ratio	p	0.759669	0.712707
Average appearance ratio		0.736188	
Difference in ratio	$P_A - P_B$	0.046961	
Significant level	α	0.05	
Test statistic	u value	1.433633	
Rate of rejection (Two-tailed)	u(α)	1.959963	
Rate of rejection (Upper)	u(2 α)	1.644853	
Rate of rejection (Lower)	-u(2 α)	-1.64485	
Two-tailed probability	p value	0.151677	
One-tailed probability (Upper)	p value	0.075839	
One-tailed probability (Lower)	p value	0.924161	

Because p value of 0.151677 > 0.05, the null hypothesis that there is no difference cannot be rejected. Thus, on one hand, the difference above is not statistically significant, and one cannot say, with a significant level of 5%, that there is difference between RU and CU on the impact on intellectual capacity.

On the other hand, however, it seems obvious that there is difference between RU and CU in terms of the positive attitude toward the last two questions about life and work. While 64.0% of RU graduates see the education for life and working philosophy positive,

only 45.9% of CU think that the education they received was helpful in this field. In addition, with regard to the education for team work, 45.5% of RU graduates are positive, while only 34.0% of CU graduates are positive. Here again, by using the normal approximation of binomial distribution technique, p value was calculated as shown in the tables below.

Table 4-20 Comparison between RU and CU on the quality of life and work education

		A (RU)	B (CU)
Number of samples	n	362	362
Frequency of appearance	r	230	166
Frequency of non-appearance	n-r	132	196
Appearance ratio	p	0.635359116	0.458564
Average appearance ratio		0.546961326	
Difference in ratio	$P_A - P_B$	0.17679558	
Significant level	α	0.05	
Test statistic	u value	4.778204602	
Rate of rejection (Two-tailed)	u(α)	1.959962787	
Rate of rejection (Upper)	u(2α)	1.644853476	
Rate of rejection (Lower)	-u(2α)	-1.644853476	
Two-tailed probability	p value	0.000001770906	
One-tailed probability (Upper)	p value	0.000000885453	
One-tailed probability (Lower)	p value	0.999999115	

For the above table, p value of 0.00000177 < 0.05, the null hypothesis that there is no difference can be rejected. In the same context, in the table below, p value of 0.001427 < 0.05, the null hypothesis can be rejected. Therefore, for the last two questions, there is clear difference between the attitude of RU and CU graduates with a significant level of 5%. Based on the analysis below, RU and STOU graduates gave a higher score to the quality of education at their universities than CU graduates. This result contradicts the result mentioned previously, the fact that for RU and STOU graduates, quality of education was not more important than for CU graduates before they entered the

universities. Table 4-6 shows that, before entering the universities, 69.8% of CU graduates said that the quality of education is the major reason for entering CU, while only 31.3% of RU and 36.5% of STOU graduates saw it as major reason for entering their universities. In conclusion, the more they had expected beforehand, the less they felt satisfied afterwards, may be one of the best explanation of this phenomena, although it sounds a bit cynical.

Table 4-21 Comparison between RU and CU on the quality of teamwork education

		A (RU)	B (CU)
Number of samples	n	362	362
Frequency of appearance	r	165	123
Frequency of non-appearance	n-r	197	239
Appearance ratio	p	0.455801	0.339779
Average appearance ratio		0.39779	
Difference in ratio	$P_A - P_B$	0.116022	
Significant level	α	0.05	
Test statistic	u value	3.18918	
Rate of rejection (Two-tailed)	u(α)	1.959963	
Rate of rejection (Upper)	u(2 α)	1.644853	
Rate of rejection (Lower)	-u(2 α)	-1.64485	
Two-tailed probability	p value	0.001427	
One-tailed probability (Upper)	p value	0.000713	
One-tailed probability (Lower)	p value	0.999287	

5. Financial aspects

In this section, financial data will be provided chronologically and a comparison will be made to verify whether STOU and RU contributed to create a middle class in Thai society. Before going into the detailed explanation, let us look at the conclusion in advance. The conclusion is that, on one hand, if social status should be judged simply from one's salary, there is no significant difference among RU, STOU, and CU except some cases, as a result of statistic comparison by faculty, which is truly counter to the common belief among Thai people. On the other hand, there is a significant difference in

salary between faculties of the same university, even when one chooses CU, considered the best university in Thailand.

5.1 At the time of university entrance

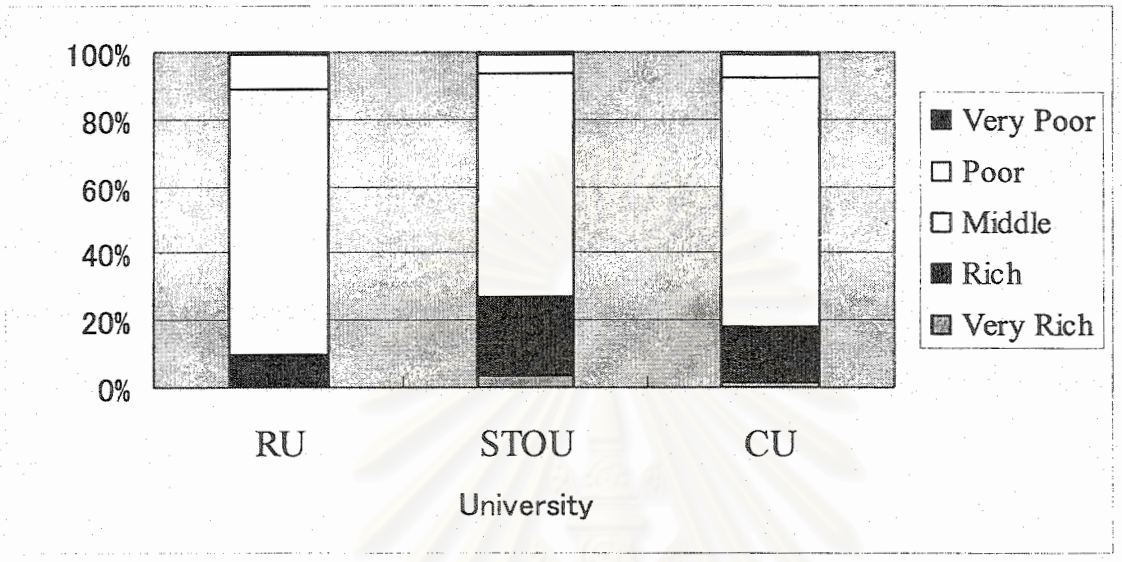
The table below is the answers to the question or opinions with regard to the financial situation of the respondents' households at the time of university entrance. Although five choices, namely, "Very rich," "Rich," "Middle," "Poor," and "Very poor" were provided, the definition of each category was not necessarily rigid. In addition, there is no clear border between one category and another. Therefore, this table enables nobody to a give clear-cut analysis, but it will give us a rough sketch or tendency of the students of each university.

Table 4-22 Households' financial situation at the time of university entrance

Financial Situation	RU	STOU	CU
Very rich	0	3.3 (8)	1.7 (6)
Rich	9.4 (34)	24.0 (58)	16.6 (60)
Middle	79.2 (286)	66.5 (161)	74.3 (269)
Poor	10.5 (38)	5.8 (14)	6.9 (25)
Very poor	0.8 (3)	0.4 (1)	0.6 (2)
Total	100 (361)	100 (242)	100 (362)

The figure below shows clearer difference among three universities visually.

Figure 4-2 Households' financial situation at the time of university entrance



Yamanaka (1990 and 1991) stresses the vital role of STOU in creating a middle class in Thai society. Kariya (1991) and others support this idea that, nowadays, is shared by many followers. However, as long as one relies on the data above, he cannot say for sure that STOU has created a middle class, because as many as 93.8% STOU students say that, at the time of university entrance, they were already at or above middle class. Moreover, the number of STOU students who say that they were from very rich families is approximately twice as big as that of CU. Thus, on one hand, this survey tells us that it is not very reasonable to believe that STOU has promoted the mobility among classes, from poor to middle, and middle to rich, in particular.

On the other hand, in this survey, RU has no students who say that they were from very rich families. In addition, it has 11.3% students from poor and very poor families. One can estimate that it has also quite a large portion of lower middle class, but at the same time it cannot be proved because lower middle class is inevitably included in the category "Middle class" in this study. Because, as mentioned above, the definition of

into smaller categories such as "Upper middle class", "Middle class," and "Lower middle class," which is a limitation of this study. At this point, let us just keep it in mind that, in contradiction to the common belief, RU may have played a larger role in creating a middle class in Thai society than STOU, which will be examined gradually later.

Before going to the analysis of data, it is important to understand that, when comparing salaries, it is natural that salaries of senior graduates will be higher than salaries of fresh graduates. Besides, the Thai economy grew very rapidly in the 1970s and 1980s, and as economy grew, prices also went up. Thus, it is meaningless to compare first salaries in, for example, 1978 and 1998 that have different economic backgrounds. Therefore, in order to make the data comparison and analysis productive, let us divide all the data samples into three groups by graduation year and rename them as follows.

- Generation 1: Graduation year 1976-1985 (For RU and CU only)
- Generation 2: Graduation year 1986-1995
- Generation 3: Graduation year 1996-1999

Before going to the next section that compares the salaries in detail, let us look at the wage increase of the poor and the very poor above. It is shown in the next table.

Table 4-23-1 Wage increase of the poor and the very poor

		Average monthly salaries in Baht			
University	Generation	Beginning	Current	Overall increase	Annual increase
RU	1	4,289.29	45,813.57	968%	10.3%
	2	5,995.45	50,180.00	737%	16.3%
	3	8,447.78	13,015.45	54%	11.4%
STOU	1	n.a.	n.a.	n.a.	n.a.
	2	7,617.00	34,790.00	357%	11.4%
	3	5,444.00	9,220.00	69%	14.0%
CU	1	3,142.86	52,335.00	1565%	12.4%
	2	4,364.29	40,000.00	817%	17.1%
	3	9,600.00	10,000.00	4%	1.0%

Obviously, these people are not poor any more. Let us compare these data with those of the rest of the people, excluding the data of Generation 3 that show comparatively smaller changes than those of other generations.

Table 4-23-2 Wage increase comparison

		Average monthly salaries in Baht			
University	Generation	Beginning	Current	Overall increase	Annual increase
RU	1 (Poor and very poor)	4,289.29	45,813.57	968%	10.3%
	1 (Overall)	3,632.42	50,422.08	1288%	11.5%
	2 (Poor and very poor)	5,995.45	50,180.00	737%	16.3%
	2 (Overall)	4,951.84	35,155.61	610%	15.0%
STOU	1	n.a.	n.a.	n.a.	n.a.
	2 (Poor and very poor)	7,617.00	34,790.00	357%	11.4%
	2 (Overall)	8,548.06	31,016.57	263%	9.6%
CU	1 (Poor and very poor)	3,142.86	52,335.00	1565%	12.4%
	1 (Overall)	2,894.52	56,398.07	1848%	13.1%
	2 (Poor and very poor)	4,364.29	40,000.00	817%	17.1%
	2 (Overall)	6,894.72	57,565.32	735%	16.3%

Table 4-23-2 shows clear distinction where, for Generation 1, former poor and very poor people have slightly lower annual salary increase than overall respondents in the same generation, while for Generation 2, former poor and very poor people have slightly higher annual salary increase.

5.2 Right after graduation

In this section and in the next section, let us look at the average salaries of the graduates of each university in more details. This section deals with those of right after graduation, and the next with those of now (January 2004).

Before moving to the analysis, it is important to notice that, in a market economy, the salary one receives is, to some extent, an evaluation by society of the particular university that one graduated from. If, for example, the average salary of the graduates of University A has been higher than that of University B for many consecutive years, the society sees University A as more important than University B. This tendency is observed more often right after graduation than 30 years after graduation, because, as time goes by, the society comes to see people not from the viewpoint of which university they graduated from in the past, but from the viewpoint of what they can do at present.

Usually, which university is considered more important by Thai people, RU or CU? Most people will say that CU is more important because it has a longer tradition and the entrance examination of CU is more competitive than that of RU. However, surprisingly enough, the research result below shows no significant difference in their average salaries right after graduation. Let us move on to the research data. For Generation 1, monthly salary soon after graduation, hereinafter called beginning salary, is as follows.

Table 4-24 Beginning monthly salary for Generation 1

	RU		CU	
Salary (in Baht)	Frequency	Percentage	Frequency	Percentage
Less than 2,500	65	59	52	49
2,501-5,000	34	31	47	44
5,001-7,500	5	5	4	4
7,501-10,000	1	1	4	4
More than 10,000	5	5	0	0
Total	110	100	107	100

RU has five graduates who received more than 10,000 Baht soon after graduation, while CU has none as such. With this as the only exception, the overall tendency between these two universities looks similar and the difference, if any, looks relatively small. However, if one compares the salaries by faculty, he will find a very interesting and clear difference between those at a glance.

Table 4-25 Number of samples, mean and standard deviation by faculty and university for Generation 1

Faculty	RU (n)	CU (n)	RU (Salary in Baht)		CU (Salary in Baht)	
			Mean	Standard deviation	Mean	Standard deviation
Business	29	25	4,057.93	7,914.42	3,049.38	1,308.61
Law	26	28	5,159.09	6,368.65	2,687.50	1,683.27
Economics	26	28	2,723.85	1,589.52	3,266.43	1,305.24
Political Science	29	26	2,652.76	2,018.75	2,568.08	1,406.68
Total Number	110	107				

One of the obvious differences between RU and CU is the standard deviation of beginning salary. For every faculty, CU has smaller standard deviations than RU as above. This implies that, soon after graduation, CU graduates had a narrow salary range, and RU graduates had a comparatively broad salary range.

What about the average beginning salary? Is there any significant difference among the average (mean) salaries of RU and CU graduates? To statistically compare the population means of two groups, Group A and Group B, it is necessary to compare in advance the population variance of the two groups. This is because there are two ways to compare the population means and it depends on the population variance. One is to hypothecate homoscedasticity for population variance and the other is not to. Let us examine which method to take by taking the Faculty of Business as a first case study, and compare their variances.

Table 4-26 Difference in variance for the Faculty of Business of RU and CU for Generation 1

		A (RU)	B (CU)
Number of samples	n	29	25
Variance	V	62638043.94	1712460.13
Degree of freedom	Φ	28	24
Larger variance	V1	62638043.94	
Smaller variance	V2	1712460.132	
First degree of freedom	φ1	28	
Second degree of freedom	φ2	24	
Significant level	α	0.05	
Test statistics	F value	36.57781151	
Rate of rejection (Two-tailed)	F (φ1, φ2; α/2)	2.226457241	
Rate of rejection (One-tailed)	F (φ1, φ2; α)	1.951967477	
Two-tailed probability	p value	0.0000	
One-tailed probability (Upper)	p value	0.0000	
One-tailed probability (Lower)	p value	1.0000	

As can be seen above, p value (upper one-tailed) is almost $0 < 0.05$. Accordingly, the null hypothesis should be rejected and the alternative hypothesis should be taken. Thus, the population variance of RU is bigger than that of CU and therefore, the population variance of each group is not homogeneous.

Let us then compare the average salaries of the Faculty of Business of RU and CU that clearly do not share homoscedasticity with a 5% significant rate. For such two groups that do not share homoscedasticity, a Welch t test is usually used as mentioned in Chapter 3. The table below, namely, Table 4-28-1 and 4-28-2, are the result of calculation. Both t values and F values are provided in Appendices.

For the cases of other three faculties and other generations, the same technique can be applied and the next tables show the result of calculation.

Table 4-27 Comparison of average beginning salary between RU and CU: The case of the Faculty of Business, Generation 1

		A (RU)	B (CU)
Number of samples	N	29	25
Average (Mean)		4057.93	3049.38
Squared deviations	S	1753865230	41099043.2
Variance	V	62638043.94	1712460.13
Degree of freedom	Φ	28	24
Mean difference		1008.55	
Equivalent degree of freedom		29.76917079	
Significant level	A	0.05	
Test statistics	t value	0.675612759	
Rate of rejection	t (φ*, α)	2.045230758	
Rate of rejection (Upper)	t (φ*, 2α)	1.699127097	
Rate of rejection (Lower)	-t (φ*, 2α)	-1.699127097	
Two-tailed probability	p value	0.504638736	
One-tailed probability (Upper)	p value	0.252319368	
One-tailed probability (Lower)	p value	0.747680632	

In conclusion, therefore, for Generation 3, STOU and CU have no significant difference in the current average salary except the case of the Faculty of Business where the average salary of CU graduates exceeds that of STOU graduates.

Summing up all the calculations with regard to current salary, there are seven cases where there is clear and significant difference, out of 20 cases in comparison by faculty and university. In all these seven cases, CU always exceeds others as follows. Taking it into account that, for the beginning salary, there were only three cases, one can conclude that the salary gap between the graduates of open universities and a traditional university widened as time went by, on one hand. On the other hand, however, there is no significant difference between RU and CU for 9 cases out of 12 (75%), and 4 cases out of 8 (50%) for STOU. In addition, for the Faculty of Law, there is no significant difference in current salaries between the graduates of RU and CU, and those of STOU and CU.

Table 4-28-1 P values when compared with CU (Generation 1)

Generation	Faculty	Difference in:		RU vs CU
1	Business	Variance	For beginning salary	0.0000
			For current salary	0.2528
		Beginning salary	By Welch t test	0.5046
			By Student t test	n.a.
		Current salary	By Welch t test	0.7986
			By Student t test	0.8247
	Law	Variance	For beginning salary	0.0000
			For current salary	0.5344
		Beginning salary	By Welch t test	0.0654
			By Student t test	n.a.
		Current salary	By Welch t test	0.3570
			By Student t test	0.3687
	Economics	Variance	For beginning salary	0.3179
			For current salary	0.1702
		Beginning salary	By Welch t test	0.1786
			By Student t test	0.1750
		Current salary	By Welch t test	0.5028
			By Student t test	0.4842
	Pol. Science	Variance	For beginning salary	0.0717
			For current salary	0.3392
		Beginning salary	By Welch t test	0.8563
			By Student t test	0.8590
		Current salary	By Welch t test	0.9249
			By Student t test	0.9183

Even within CU, the current average salary differs from faculty to faculty. For example, there is a significant difference when comparing the Faculties of Business and Economics with the Faculty Law, where the former faculties always exceed the Faculty of Law. As a result of statistical comparison by university and faculty, the overall conclusion about the average beginning and current salary is that, on one hand, if social status should be judged simply from one's salary, there is no significant difference in the graduates' social status among RU, STOU, and CU except some cases, which is truly counter to the common belief among Thai people. On the other hand, there are significant differences in salary or perhaps social status between faculties of the same university, even when one chooses CU, considered the best university in Thailand.

Table 4-28-2 P values when compared with CU (Generation 2 and 3)

Generation	Faculty	Difference in:		RU vs CU	STOU vs CU
2	Business	Variance	For beginning salary	0.0116	0.0000
			For current salary	0.0048	0.0486
		Beginning salary	By Welch t test	0.0830	0.0532
			By Student t test	n.a.	n.a.
		Current salary	By Welch t test	0.0000	0.0002
			By Student t test	n.a.	n.a.
	Law	Variance	For beginning salary	0.0000	0.0004
			For current salary	0.0018	0.4436
		Beginning salary	By Welch t test	0.3304	0.7029
			By Student t test	n.a.	n.a.
		Current salary	By Welch t test	0.7153	0.3268
			By Student t test	n.a.	0.3219
	Economics	Variance	For beginning salary	0.0000	0.0000
			For current salary	0.0000	0.0000
		Beginning salary	By Welch t test	0.8471	0.8040
			By Student t test	n.a.	n.a.
		Current salary	By Welch t test	0.0000	0.0007
			By Student t test	n.a.	n.a.
	Pol. Science	Variance	For beginning salary	0.0808	0.0001
			For current salary	0.2996	0.0081
		Beginning salary	By Welch t test	0.4198	0.9608
			By Student t test	0.4193	n.a.
		Current salary	By Welch t test	0.1480	0.0006
			By Student t test	0.1774	n.a.
3	Business	Variance	For beginning salary	0.0013	0.3007
			For current salary	0.1807	0.0722
		Beginning salary	By Welch t test	0.1471	0.0000
			By Student t test	n.a.	0.0000
		Current salary	By Welch t test	0.1841	0.0000
			By Student t test	0.1730	0.0000
	Law	Variance	For beginning salary	0.0000	0.0298
			For current salary	0.8353	0.0044
		Beginning salary	By Welch t test	0.2939	0.5039
			By Student t test	n.a.	n.a.
		Current salary	By Welch t test	0.5684	0.4796
			By Student t test	0.5715	n.a.
	Economics	Variance	For beginning salary	0.5775	0.2801
			For current salary	0.0127	0.0000
		Beginning salary	By Welch t test	0.0544	0.0028
			By Student t test	0.0295	0.0001
		Current salary	By Welch t test	0.9415	0.4824
			By Student t test	n.a.	n.a.
	Pol. Science	Variance	For beginning salary	0.0000	0.0000
			For current salary	0.0328	0.0000
		Beginning salary	By Welch t test	0.0290	0.0104
			By Student t test	n.a.	n.a.
		Current salary	By Welch t test	0.0325	0.9147
			By Student t test	n.a.	n.a.

Table 4-29 Difference in beginning salary at a glance

	Generation 1		Generation 2		Generation 3	
	Business	≒	Business	≒	Business	≒
RU	Law	≒	Law	≒	Law	≒
vs	Economics	≒	Economics	≒	Economics	CU>RU
CU	Pol. Science	≒	Pol. Science	≒	Pol. Science	CU>RU
			Business	≒	Business	CU>STOU
STOU			Law	≒	Law	≒
vs	Not applicable		Economics	≒	Economics	CU>STOU
CU			Pol. Science	≒	Pol. Science	CU>STOU

The symbol ≒ means that there is no significant difference.

Table 4-30 Difference in current salary at a glance

	Generation 1		Generation 2		Generation 3	
	Business	≒	Business	CU>RU	Business	≒
RU	Law	≒	Law	≒	Law	≒
vs	Economics	≒	Economics	CU>RU	Economics	≒
CU	Pol. Science	≒	Pol. Science	≒	Pol. Science	CU>RU
			Business	CU>STOU	Business	CU>STOU
STOU			Law	≒	Law	≒
vs	Not applicable		Economics	CU>STOU	Economics	≒
CU			Pol. Science	CU>STOU	Pol. Science	≒

The symbol ≒ means that there is no significant difference.

6. Economic viewpoint: Rate of return

Let us calculate the private internal rate of return of Generation 1 graduates of each faculty of RU and CU. For Generation 1 graduates, their graduation years vary from 1976 to 1985, but to make the comparison as simple as possible, let us take 1980 as the average graduation year for Generation 1. Next, it is necessary to recall the following equation for internal rate of return mentioned as Equation No. 1 in Chapter 2.

$$C_1 + \frac{C_2}{1+r} + \frac{C_3}{(1+r)^2} + \frac{C_4}{(1+r)^3} = \frac{R_5}{(1+r)^4} + \frac{R_6}{(1+r)^5} + \bullet\bullet\bullet + \frac{R_T}{(1+r)^{T-1}} \qquad \text{(Equation No. 1)}$$

By inputting the exact numbers into C_n and R_n above, one can get *i*, the internal rate of return. For that purpose, first, let us calculate the costs for higher education, namely from C_1 for the year 1976 to C_4 for the year 1979. In order to calculate the internal rate of return, it is necessary to get the amount of the salaries of high school graduates. According to Sethasathien (1977), in 1972, the beginning salary of Thai high school graduates was Baht 990 per month for public servants, and she deducted 2.3% as unemployment rate. Therefore, the adjusted beginning monthly salary for public servants who just graduated from high school was 967.23 Baht and their annual salary was 11,606.76 Baht in 1972. She, thus, uses the latter number as foregone earnings, or opportunity cost in economics terms, which, of course, is one of the components of the costs of higher education.

Second, she also uses incidental costs as another component of the costs of higher education. It consists of the fees for books, transportation, and etc. and the cost estimate was 690 Baht in 1972. She assumes that these costs, including the foregone earnings above, increase at the rate of 4% every year, and they are shared both by CU and RU. It is necessary to calculate the exact number for both in 1980. The last component is the school costs that consist of admission fee, tuitions, registration fee, ID card issuance fee, etc. In 1980, for traditional national universities, it was approximately 1,000 Baht, while for the open universities it was approximately 250 Baht, one fourth of the traditional national universities. For the school costs, this proportion between CU and RU still remains the same even in 2004.

The next table shows the result of calculation. Note that, for RU, Case 1 represents the traditional learning style for those who completed full-time studying and no full-time job. On the other hand, Case 2 is for those who worked full-time, studied part-time, and

graduated in four years, although it is very rare and is one of the extremes. For these people, there are no foregone earnings because they worked and studied at the same time.

Table 4-31 Comparison table for private costs of higher education

Year	Costs of higher education in Baht		
	RU: Case 1	RU: Case 2	CU
1976	20,573.71	1,057.20	21,323.71
1977	21,396.66	1,099.49	22,176.66
1978	22,252.52	1,143.47	23,063.72
1979	23,142.62	1,189.20	23,986.27

Next, it is necessary to calculate the revenues, R_n, by extracting the salary of high school graduates from that of university graduates in the same years. For the salaries of university graduates, the rate of wage increase can be calculated based on the average beginning salary in 1980 and the current average salary in 2004, if one assumes that the wage or salary increased at the constant rate during the period between 1980 and 2004. The next table is the result of calculation by faculty and university.

Table 4-32 Wage increase rate for Generation 1

Faculty	Wage increase rate (%)	
	RU	CU
Business	11.57	13.17
Law	9.39	13.53
Economics	13.28	13.18
Political Science	12.82	12.82

There should be two more assumptions to estimate the wage increase rate. First, to estimate the wage increase rate for high school graduates, let us take the lowest rate for university graduates. It is for the Law graduates of RU and is 9.39% every year. Second,

the future wage increase rate will be constantly 5% from 2005 until 2017 when the Generation 1 graduates retire at the age of 60. This estimate rate comes from the average figure for the last five years found in the research done by Bankoku Nihonjin Shoko-kaigisho (1999, 2000, 2001, 2002, and 2003).

The next table shows the result of calculation only for the Faculty of Business, based on the above assumptions. Please note that the private revenue below means annual salary and *R* is the difference in annual salaries between university graduates and high school graduates.

Table 4-33 Comparison table for private revenue: The case of the Faculty of Business

Year	H.S. graduates	RU graduates	CU graduates	*R for RU*	*R for CU*
1980	22,831.55	48,695.16	36,592.56	25,863.61	13,761.01
1981	24,976.77	54,329.67	41,411.89	29,352.90	16,435.12
1982	27,323.54	60,616.14	46,865.94	33,292.60	19,542.40
1983	29,890.82	67,630.03	53,038.31	37,739.21	23,147.49
1984	32,699.31	75,455.48	60,023.59	42,756.17	27,324.27
1985	35,771.69	84,186.43	67,928.85	48,414.74	32,157.16
1986	39,132.74	93,927.62	76,875.25	54,794.88	37,742.51
1987	42,809.59	104,796.00	86,999.91	61,986.38	44,190.32
1988	46,831.91	116,921.90	98,458.02	70,089.98	51,626.11
1989	51,232.16	130,450.90	111,425.20	79,218.74	60,193.03
1990	56,045.85	145,545.40	126,100.20	89,499.50	70,054.32
1991	61,311.82	162,386.40	142,707.90	101,074.60	81,396.06
1992	67,072.58	181,176.10	161,502.90	114,103.50	94,430.28
1993	73,374.62	202,139.90	182,773.20	128,765.30	109,398.59
1994	80,268.78	225,529.50	206,844.90	145,260.70	126,576.12
1995	87,810.70	251,625.50	234,086.90	163,814.80	146,276.20
1996	96,061.25	280,741.00	264,916.70	184,679.80	168,855.48
1997	105,087.00	313,225.50	299,806.90	208,138.50	194,719.93
1998	114,960.80	349,468.80	339,292.30	234,508.00	224,331.45
1999	125,762.40	389,905.70	383,977.90	264,143.40	258,215.57
2000	137,578.80	435,021.70	434,548.80	297,442.90	296,970.01
2001	150,505.50	485,357.90	491,780.00	334,852.50	341,274.50
2002	164,646.70	541,518.60	556,548.60	376,871.90	391,901.92
2003	180,116.60	604,177.60	629,847.50	424,061.00	449,730.84
2004	197,040.10	674,086.90	712,800.00	477,046.80	515,759.89
2005	206,892.10	707,791.30	748,440.00	500,899.10	541,547.88
2006	217,236.70	743,180.80	785,862.00	525,944.10	568,625.27
2007	228,098.60	780,339.90	825,155.10	552,241.30	597,056.54
2008	239,503.50	819,356.90	866,412.90	579,853.40	626,909.36
2009	251,478.70	860,324.70	909,733.50	608,846.00	658,254.83
2010	264,052.60	903,340.90	955,220.20	639,288.30	691,167.57
2011	277,255.20	948,508.00	1,002,981.00	671,252.80	725,725.95
2012	291,118.00	995,933.40	1,053,130.00	704,815.40	762,012.25
2013	305,673.90	1,045,730.00	1,105,787.00	740,056.20	800,112.86
2014	320,957.60	1,098,017.00	1,161,076.00	777,059.00	840,118.51
2015	337,005.50	1,152,917.00	1,219,130.00	815,911.90	882,124.43
2016	353,855.70	1,210,563.00	1,280,086.00	856,707.50	926,230.65
2017	371,549.00	1,271,091.00	1,344,091.00	899,543.00	972,542.18

Therefore, based on the assumptions and the figures above, the following equation previously mentioned as Equation No. 1,

$$C_1 + \frac{C_2}{1+r} + \frac{C_3}{(1+r)^2} + \frac{C_4}{(1+r)^3} = \frac{R_5}{(1+r)^4} + \frac{R_6}{(1+r)^5} + \bullet\bullet\bullet + \frac{R_T}{(1+r)^{T-1}}, \quad \text{(Equation No. 1)}$$

should be as follows, in the case of Generation 1 graduates, the Faculty of Business, CU.

$$21{,}323.71 + \frac{22{,}176{,}66}{1+r} + \frac{23{,}063.72}{(1+r)^2} + \frac{23{,}986.27}{(1+r)^3} = \frac{13{,}761.01}{(1+r)^4} + \frac{16{,}435.12}{(1+r)^5} + \bullet\bullet\bullet + \frac{972{,}542.18}{(1+r)^{41}}$$

As a result of calculation, the real value of r, r^*, is 0.266809. For other faculties and universities, one can apply this method and repeat calculation, although the numbers are different. As a result, the rates of return for other faculties and universities are as follows.

Table 4-34 Rates of return by faculty and university, Generation 1

Faculty	Rate of return		
	RU: Case 1	RU: Case 2	CU
Business	0.319212	1.292585	0.266809
Law	0.268740	1.507666	0.245727
Economics	0.201188	0.891965	0.282115
Political Science	0.190432	0.853855	0.225646

Here is the next and fundamental question. Then, is it a good investment to go to RU or CU? As mentioned in Chapter 2, one can say that it is a good investment if the rate of return is more than the interest rate during the same period. According to the IMF (1994), the interest rates (deposit) during the period of 1977 and 1994 in Thailand were as follows.

Table 4-35 Interest rates in Thailand

Year	1977	1978	1979	1980	1981	1982	1983
Interest rate	8.00%	8.00%	8.25%	12.00%	12.50%	13.00%	13.00%

Year	1984	1985	1986	1987	1988	1989	1990
Interest rate	13.00%	13.00%	9.75%	9.50%	9.50%	9.50%	12.25%

Source: International Monetary Fund, International Financial Statistics Yearbook 1994 (Washington DC), pp.700-701.

During this period, Thai economy was literally booming and the interest rates were higher than any other period. Nevertheless, the highest figure during this period is just 0.13 and is higher than none of the rates of return above. Therefore, the answer to the question just raised above is that, yes, it was a good investment to go to either RU or CU for Generation 1.

Let us then calculate the rate of return for Generation 2. Before examining the wage increase rates for the university graduates, it is important to calculate the beginning salary for high school graduates in 1990 when Generation 2 students graduated from their universities. As mentioned earlier, the beginning salary for Thai public servants who just graduated from high school in 1972 was 990 Baht, according to Sethasathien. According to Japanese Organization for Employment of the Elderly and Persons with Disabilities or JEED (2003), the beginning salary of Thai high school graduates in 2001 was 4,700 Baht for public servants and people used the same salary table even in 2003. Therefore, although Sethasathien estimated that the beginning salary for high school graduates would increase at a rate of 4% every year from 1972, the actual rate was 4.747475% on average between 1972 and 2003. Based on these figures and taking Sethasathien's unemployment rate of 2.3%, the estimate of the beginning monthly salary of fresh high school graduates in 1990, when Generation 2 students graduated from their universities, is 3,071.879 Baht, and, thus, their annual income is 36,862.55 Baht.

As a result of calculation, the wage increase rates for Generation 2 during the period of 1990 and 2004 are as follows. The Business graduates of STOU have the lowest rate, although it is because they had comparatively higher beginning salary on average than other graduates. This rate, 6.99%, can be applied to Thai public servants who just graduated from high school in 1990, and had a beginning monthly salary of 3,071,879 Baht on average.

Table 4-36 Wage increase rates for Generation 2

Faculty	Wage increase rate (%)		
	RU	STOU	CU
Business	14.25	6.99	19.86
Law	17.52	9.89	10.75
Economics	12.65	9.14	20.20
Political Science	14.00	17.31	14.94

Based on the all the figures above, the internal rates of return for various universities and faculties are as follows.

Table 4-37 Rates of return for Generation 2

Faculty	Rate of return		
	RU	STOU	CU
Business	0.259398	2.15200	0.364736
Law	0.342762	2.06788	0.476847
Economics	0.269937	1.98929	0.355492
Political Science	0.339042	0.647372	0.402617

With regard to the above table, please note that the figures of STOU are for those who entered at the age of 17 or 18, and at the same time, started working full-time. As most RU and CU students do, they graduated from STOU in four years and/but did not quit their jobs. The fact, however, is that, because the average age of STOU students is

around 30, according to Kariya (1991), and most STOU students attend there more than four years, the above case rarely occurred and, thus, is just a model case. Moreover, there are many who cannot graduate at any cost and, thus, cannot get a B.A. despite all their efforts. Therefore, the figures of STOU above are biased upwardly to some extent. Nevertheless, one thing is clear. STOU graduates enjoy much higher rate of return than RU and CU graduates. It is because STOU students need not quit their job to enter university, unlike RU and CU students, and they have privileges of being able to work and study simultaneously. Therefore, they do not have to pay opportunity costs or missing income shown as Area B in Figure 2-2 in Chapter 2. That is why STOU graduates have extremely higher rate of return than RU and CU graduates, although STOU's Political Science graduates, due to their lower average beginning salary, have a bit lower rate of return than the graduates of other faculties.

For Generation 3, there is much uncertainty because they have just started their career. For that reason, this paper does not examine the rate of return for this generation.

It is very important to note that the internal rates of return for all four faculties of all three target universities for the two generations are all higher than those presented by Psacharopoulos (1985) shown in Table 2-12 in Chapter 2. According to him, the private internal rate of return for higher education in Thailand is 14%, and the social rate is 11%. This implies that it was a better investment to go to open universities than to go to average traditional universities that have been supposed to generate many middle class people in Thai society.

CHAPTER 5
SUMMARY OF RESEARCH, IMPLICATIONS, AND RECOMMENDATIONS

For the purpose of utilizing Thailand's valuable experience of open higher education for its neighboring countries, the researcher has summarized the results according to the objectives, scope of the study, a conceptual framework of the study, research methodology, research findings, implications and recommendations as follows.

1. Objectives of the study

Numerous attempts have been made so far by scholars to demonstrate the positive role of the two open universities in Thailand, namely, Ramkhamhaeng University (RU) and Sukhothai Thammathirat Open University (STOU), in its miraculous economic growth for the last thirty years. However, most of these attempts tend to stress the weight of numbers of graduates that RU and STOU have sent to Thai society during the period of rapid economic growth. People in Thailand, therefore, praise the huge *number* of RU and STOU graduates, but not the productivity of these graduates, compared to that of traditional university graduates. In the same context, people attach a high value to the epoch-making introduction of the open admission system, but not to the quality of education originated by that system. What is lacking, therefore, is a comparative study between these open universities and traditional universities with high social valuation. The objectives of this study are as follows.

Objective 1: To grasp why students go to open/traditional universities and how they see the universities' quality of education.

Objective 2: To describe the social status of the graduates of RU and STOU as middle class in comparison with those of Chulalongkorn University (CU), a typical and top traditional university..

Objective 3: To find out if higher education at RU and STOU is a good investment, in comparison with higher education at CU.

2. Scope of the study

Because this paper examines the difference in various aspects between open universities and traditional universities in Thailand, so the research focuses on the three universities that consist of two open universities, Ramkhamhaeng University (RU) and Sukhothai Thammathirat Open University (STOU) and one traditional university (CU). Furthermore, the four faculties shared commonly among the three universities were chosen. They are the Faculty of Business, the Faculty of Law, the Faculty of Economics, and the Faculty of Political Science. The data of the study derived from the survey which largely depends on the personal views and answers to the questionnaire.

3. Conceptual framework of the study

First, the theories and existing/related studies were examined and reviewed, which started with higher education in Asia, economic development in Thailand, and the generation of a middle class in Thailand. The literature survey then turns to economic analysis, focusing on human capital theory and rate of return. Second, it is important to listen to the people concerned such as graduates of the three target universities, and members of JICA who assisted STOU from its preparation period.

4. Research methodology

By a systemic sampling method, questionnaires were sent to 1,000 graduates of the four faculties of the three target universities mentioned above for data collection, and 972 actually responded. For more data collection, reports and statistics compiled by various international organizations and government agencies were used effectively. In order to examine differences in university-choice behavior, the quality of education, and the social status of graduates from the three target universities, statistical analyses were made from many different perspectives.

In order to determine whether it is worth investing in attendance at the particular faculties of particular open universities, the private internal rate of return was calculated.

5. Research findings

5.1 University-choice behavior

(1) The reasons of study in higher education

Regardless of which universities they graduated from, approximately 80% of the respondents said that they went to university because they wanted to study more. At the same time, however, not a few CU graduates said that they did so because of recommendations or enforcement from the people nearby, while such graduates are fewer for RU and STOU. There is a significant difference in this attitude between open university graduates and traditional university ones.

(2) The reasons of study at RU, STOU, or CU in particular

Approximately 70% of CU graduates said that they went to CU because of its quality of education, while, for RU and STOU, those who said the same are less than 37%. In addition, more than 80% of the CU graduates said that they chose CU because of the

school, which sounds like a positive choice. On the contrary, many RU and STOU students said that they chose open admission system due to financial constraints or failure in the entrance examinations of other universities, which sounds like a negative choice. Therefore, 1.1 above and 1.2 suggest that there is significant difference in university-choice behavior, mentioned in **Objective 1**, between open university graduates and traditional university ones. Unfortunately, it seems that, in terms of studying motivation, this difference affected their studying behavior after they entered universities.

5.2 Studying behavior

While 53.9% of the CU graduates said that their overall scores at CU were very good, the percentage of open university graduates who said the same is below 40%, meaning that there is a significant difference in this aspect between these two groups. Judging from this result, CU graduates studied the hardest, and STOU graduates came next followed by RU graduates, although the difference between STOU and RU is relatively small.

5.3 Quality of education

Although RU and STOU students did not expect, just like ordinary Thai citizens, much about the quality of education of these open universities at the time of entrance, they were not disappointed with it after they actually entered, contrary to the common belief among Thai people. In fact, for all the three universities, more than 70% respondents agreed that they appreciated the education they received in the sense that it increased their intellectual capacity. Surprisingly enough, there is no significant difference in this aspect among the three universities after graduation. Moreover, with regard to the education of more philosophical aspects and how to work as a team, there is a slight difference in their satisfaction between the graduates of open universities and a traditional university. RU and

STOU graduates put more value on the education of that kind than CU graduates. Therefore, one can say that with regard to the *total* quality of education, mentioned in **Objective 1**, graduates gave higher score to open universities than to a traditional university, which is surprising enough because it is totally contrary to the common belief among Thai people.

5.4 Finance and salary

In this research, the respondents or the graduates were divided into three groups by graduation years as follows. The graduates who left university during 1976-1985 are called Generation 1, and the graduates who left there during 1986-1995 are called Generation 2. The youngest graduates who left university after 1996 are called Generation 3. Their social status should be judged purely from economic perspectives, by generation, faculty, and university, at the three different points of time as follows.

(1) At the time of university entrance

For all the target universities, approximately 90% of the respondents said that they were from middle class or above families. Therefore, contrary to common belief and numerous studies so far, higher education itself did not mean anything to the generation of a middle class in Thailand. RU and STOU graduates were already fairly rich at the time of university entrance.

Very few respondents said that they were either financially poor or very poor at the time of university entrance. Among those very few, RU has 11.3% respondents who were either poor or very poor, while STOU has only 6.2%. The difference is statistically significant at a 5% level on a two tail test. In addition, these people are not poor any more, judging from their current salary. Table 4-20-1 in Chapter 4, for example, shows that Generation 2 RU graduates that said either poor or very poor previously earn as much as 50,180 Baht on

average now while STOU and CU graduates earn 34,790 and 40,000 Baht respectively. Therefore, one of the new findings is that, contrary to the belief commonly shared among Thai people, RU had more impact on and played a greater role in generating a new middle class than STOU. In addition, the social status of the students of the three target universities, mentioned in **Objective 2**, is slightly different at the time of university entrance, from the pure economic perspectives.

(2) Right after university graduation

Another new finding is that, for all the four faculties, there is no significant difference in the amount of average beginning salary between open university graduates and traditional university graduates in the case of Generations 1 and 2. For example, the average beginning salary of 29 RU Business graduates, Generation 1, is 4,057 Baht and that of 25 CU Business graduates, Generation 1, is 3,049 Baht. Although these two figures look different, the difference is not statistically significant at 5% level on a two tail test, because the variance is different.

For Generation 3, there are three cases where there is clear and significant difference, out of eight cases in comparison by faculty and university. They include the Faculty of Political Science in the case of RU and CU, and the Faculty of Business and the Faculty of Political Science in the case of STOU and CU. Moreover, excluding extreme data, there are two more cases where there is significant difference. They include the Faculty of Economics in the case of RU and CU, and the Faculty of Economics for STOU and CU. In all of these three cases, CU always exceeds others as can be seen in Table 4-69 in Chapter 4. However, in total including Generation 1 and 2, graduation from CU does not necessarily promise immediate higher earnings compared to graduation from open universities often considered second-class universities, contrary to the common belief in Thai society. In particular, the

social status of the senior graduates of the three target universities, mentioned in **Objective 2**, is not statistically different at the time of university graduation, from the purely economic perspective.

(3) At present

There are seven cases where there is clear and significant difference, out of 20 cases in comparison by faculty and university. In all these seven cases, CU always exceeds the others. For example, the current average salary of 24 STOU Economics graduates, Generation 2, is 31,668 Baht, while that of 41 CU Economics graduates, Generation 2, is 64,782 Baht. The difference is clear and is statistically significant at 5% level on a two tail test.

Taking it into account that, for the beginning salary, there were only three cases, one can conclude on one hand that the salary gap or the gap of social status, mentioned in **Objective 2**, between the graduates of open universities and a traditional university widened as time went by. On the other hand, however, there is no significant difference between RU and CU for nine cases out of twelve (75%), and four cases out of eight (50%) for STOU. In addition, for the Faculty of Law, there is no significant difference in current salaries between the graduates of RU and CU, and those of STOU and CU.

Even within CU, the current average salary differs from faculty to faculty. For example, there is significant difference when comparing the Faculty of Business with that of Law, and the Faculty of Economics with that of Law, where the former faculty always exceeds the latter, the Faculty of Law. Therefore, the overall conclusion about the average beginning and current salary is that, on one hand, if social status should be judged simply from one's salary, there is no significant difference in the graduates' social status, mentioned in **Objective 2**, among RU, STOU, and CU except some cases, as a result of statistical comparison by university and faculty, which is truly counter to the common belief among Thai people. On

the other hand, there is significant difference in salary or perhaps social status between the faculties of the same university, even when one chooses CU, considered the best university in Thailand.

(4) Internal rate of return

The rate of return is a concept of investment. If, for example, one gets Baht 106, by investing Baht 100 a year ago, the rate of return is 6%. Suppose that the interest rate in the financial market is only 5%, the rate of return = 6% is a successful investment because, in this case, the rate of return is higher than the interest rate. The internal rate of return can be calculated by solving the following equation where C_1 is the cost of higher education in the first year, and a typical university student spends C_1, C_2, C_3, and C_4 until he or she graduates from university. R_5 is the income he receives in the fifth year when he starts working after graduation. He gets R_T in the year T when he retires. One can get r^o as a solution of the equation above. If it is bigger than i, the actual interest rate, people have enough reason to go to university.

$$C_1+\frac{C_2}{1+r}+\frac{C_3}{(1+r)^2}+\frac{C_4}{(1+r)^3}=\frac{R_5}{(1+r)^4}+\frac{R_6}{(1+r)^5}+\bullet\bullet\bullet+\frac{R_T}{(1+r)^{T-1}} \quad \text{.....(Equation No.1)}$$

As a result of calculation, based on the data acquired in this research, RU > CU in the case of the Faculty of Business and the Faculty of Law, and CU > RU in the case of the Faculty of Economics and the Faculty of Political Science, for Generation 1, although they have no significant difference in the current average salary as mentioned earlier. RU Business shows the highest rate of return, 31.9%, which means the best investment in the viewpoint of economics, and CU Economics comes next, while RU Political Science shows

the lowest rate of return.

For Generation 2, CU has higher rates of return than RU in every faculty, while STOU has higher rates than CU in every faculty. STOU Business shows the highest rate of return, 215%, due to the privileges of being able to work and study simultaneously, although the figures for STOU are biased upward.

Judging from the fact that, in every faculty of every university for each generation, the internal rates of return are always higher than the interest rate, one can safely state that it was a good investment to go to open universities in the 1970s, 1980s and 1990s, purely from the viewpoint of economics, which is the answer to the question mentioned in **Objective 3**.

6. Discussion

With regard to the university-choice behavior, the result of the comparison between RU and CU, and between STOU and CU, shown in Table 4-5 in Chapter 4, could be interpreted as follows.

Explanation A: Thai people are less interested and less enthusiastic when their friends or children go to open universities than when going to traditional universities.

Explanation B: Students who wish to go to open universities are more independent and self-reliant than those who go to traditional universities.

To discuss which is more explainable, let us look at the answers to the next question. The question is "Why did you choose your university?" and the next statistics shows the answers to that question. According to Table 4-6 in Chapter 4, the first three reasons for choosing the universities of the respondents in ascending order are as follows. For CU:

No. 1: Reputation/Social acceptance of the university	84.1%
No. 2: Quality of education	69.8%
No. 3: Social status of the university	25.0%

Obviously, CU is a big name for the people in Thailand because it has the longest tradition, and people choose CU because of its name value and believe in its quality of education, which, generally speaking, sounds quite natural for traditional universities.

On the other hand, however, people tend to choose RU and STOU by putting more emphasis on their system uniqueness and accessibility rather than their tradition or social status. Let us pick the first three reasons for choosing RU or STOU. For RU, the first three reasons are as follows.

No. 1: Open admission system	60.7%
No. 2: Failure of the entrance examination of other universities	49.2%
No. 3: Able to study while working	41.5%

It is important to notice that, just like CU's, RU's undergraduate course is usually for young people who have just graduated from high school, while STOU's is for mid-career student or above. That is why reason No.2 above appears in the case of RU. For STOU, the percentage of the same reason is just 9 % and three major reasons are as follows.

No. 1: Able to study while working	73.4%
No. 2: Geographical closeness	45.1%
No. 3: Quality of education	36.5%

It should not be overlooked that the fourth largest reason for STOU is "Open admission system." These data, thus, show that many graduates of RU and STOU take the open admission system and easy accessibility quite positively. In addition, another big difference between traditional universities such as CU and open universities such as RU and STOU is the cost for education. RU has 16.8% respondents and STOU has 22.5% who liked the reasonable tuition, while CU has only 4.1%. Considering all these data, one can conclude that the basic framework of open university system, which consists of open admission system, accessibility, and reasonable tuition, were all positive factors when choosing the university, and are all appreciated by the graduates. This implies that it will not be an exaggeration to say that promoting the two open universities in Thailand was successful to a large extent in the sense that RU and STOU have been accepted many those who could not have been university students without these two special universities.

At the same time, however, it will provide a different perspective to look at the reason No. 2 for RU, which is "Failure of the entrance examination of other universities." It is a negative choice and implies that about half of the total graduates of RU did not actually want to go there. They went there because it was unavoidable for them to do so, which sounds passive and backward-looking. In this sense, Explanation B above can be rejected and Explanation A can be more appropriate interpretation of the earlier data. Furthermore, it should be remembered that, for RU and STOU graduates, quality of education, the second largest reason for CU graduates, was not more important than for CU graduates before they entered the universities.

With regard to the social status of the graduates of RU and STOU as middle class, the statistical analysis implies that Generation 1 graduates of RU and STOU, who survived

through all the seven stages of economic development in Thailand theorized by Suehiro and Higashi (2000), by both enjoying economic prosperity and suffering from business depression, have no significant difference in beginning salary as well as in current salary. This strongly supports the hypothesis of this research that RU sent many graduates to Thai society at the beginning of rapid economic growth. In addition, as mentioned in the "Definition of terms" section, Chapter 1, they, as workforce, have been engines of the economic development in Thailand so far, and, at the same time, have promoted the economic growth in Thailand as consumers just like the graduates of CU who are the top elites of this country.

Generation 2 and Generation 3 graduates of RU, STOU, and CU, on one hand, have no significant difference in beginning and current salaries in most cases, which also supports the above hypothesis. On the other hand, however, in several cases, there are significant difference and in all cases, CU graduates enjoy higher salary than other two. In addition, that tendency depends on faculties. For example, as mentioned above, Law graduates have no significant difference in beginning and current salaries between open universities and a traditional university. These facts partially deny the popular argument, presented by Yamanaka (1990) and believed commonly among many Thai people, that STOU generated many middle class people in Thailand.

With regard to the economic analysis based on the Human Capital Theory by Becker (1964, 1975, 1993), the result shows that internal rates of return are different between faculties and universities, and CU's is not always higher than RU's and STOU's. That implies that some faculties of the two open universities have played a more important role in generating middle class or above in Thai society than traditional universities such as CU.

In addition, for Generation 1 and Genaration 2 graduates, internal rate of return are always higher than interest rates. This supports Becker's argument that people go to university if the rate of return is higher than the interest rate.

It is very important to note that the internal rates of return for all four faculties of all three target universities for the two generations are all higher than those presented by Psacharopoulos (1985) and Blaug (1976) shown in Tables 2-12 and 2-14 respectively in Chapter 2. According to the former, and also based on the framework of Sethasathien (1977), the private internal rate of return for higher education in Thailand is 14%, and the social rate is 11%. This implies that it was a better investment to go to open universities than to go to average traditional universities that have been supposed to generate many middle class people in Thai society.

Recommendations for future research

1 To carry out follow-up research for Generation 3 graduates. This is because, regarding the average salaries, both beginning and the current salaries, the gap between the graduates of open universities and traditional universities became more serious for Generation 3 than for Generation 1 and 2. It is necessary to find out why and how.

2 To carry out more detailed and micro level research by listening to people in small groups in the same companies. In addition, it would be interesting to interview managers in personnel sections and ask them about personnel policies and the realities of their companies. If these were done on a large scale, they would help clarify differences between universities, companies, and industries with regard to the treatment or the status of the graduates of each university.

3 To focus on dropouts of open universities and have surveys on their wages, to examine if the Signaling Theory is true. If the salaries of those dropouts are higher than those of high school graduates, education at open universities has something to do with the increase of productivity.

References

Altbach, P. G., and Selvaratnam, V., eds. (1989). The Development of Asian Universities: From Dependence to Autonomy. Singapore: Kluwer Academic Publishers.

Altbach, P. G. (1998). Comparative Higher Education: Knowledge, The University, and Development. Westport, CT., and London: Ablex Publishing.

Arai, K. (2002). Kyoiku no Keizai-gaku Nyumon: Kokyo-shin no Kyoiku wa Naze Hitsuyo ka (Introduction to the Economics of Education: Why is education for civism necessary?). Tokyo: Keiso Shobo.

Arai, K. (1998). The Economics of Education. New York: Springer-Verlag.

Arrow, K. J., and Levhari, D., eds. (1969). Uniqueness of the Internal Rate of Return with Variable Life of Investment. Economic Journal 79: 560-566.

Asian Development Bank. (1995-2002). The Key Indicators of Developing Asian and Pacific Countries. Manila: Asian Development Bank.

Asian Development Bank. (1995-2004). Asian Development Outlook. Manila: Asian Development Bank.

Becker, G. S. (1964, 1975, 1993). Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education. 3rd ed. Chicago: University of Chicago Press.

Best, J. W., and Kahn, J. V., eds. (1998). Research in Education. 8th ed. Boston: Allyn and Bacon.

Blaug, M. (1976). The Rate of Return on Investment in Education in Thailand. Journal of Development Studies January: 270-284.

Boggs, R., and Lau, S., eds. (1999). The State of Technology Usage in Higher Education Institutions. New York: International Data Corporation.

Chira, H., and Itoga, S., eds. (1992). Tai no Jinteki Shigen Kaihatsu (Human Resource Development in Thailand). Tokyo: Institute of Developing Economies.

Dore, R. P. (1976). The Diploma Disease: Education, Qualification, and Development. CA: University of California Press.

Funatsu, T., and Kagoya, K. (2002) Tai no Chukan So (Middle Class in Thailand). In Hattori, T., Funatsu, T., and Torii, T., eds. Ajia Chukan So no Seisei to Tokushitsu (Generation and Attributes of Middle Class in Asia). 201-234. Tokyo: Institute of Developing Economies.

Girling, J. L. S. (1981). Thailand: Society and Politics. Ithaca and London: Cornell University Press.

Goldthorp, J. (1987). Social Mobility and Class Structure in Modern Britain. 2nd ed. Oxford: Clarendon Press.

Hac, P. M. (1998). Vietnam's Education: The Current Position and Future Prospects. Hanoi: The Gioi Publishers.

Hattori, T., and Funatsu, T. (2002). Ajia ni okeru Chukanso no Seisei to sono Tokushitsu (Generation and Attributes of Middle Class in Asia). In Hattori, T., Funatsu, T., and Torii, T., eds. Ajia Chukanso no Seisei to Tokushitsu (Generation and Attributes of Middle Class in Asia). 3-36. Tokyo: Institute of Developing Economies.

Ikemoto, Y. (1991). Income Distribution in Thailand: Its Changes, Causes, and Structure. Tokyo: Institute of Developing Economies.

International Monetary Fund. (1990-2002). International Financial Statistics Yearbook. Washington D.C.: International Monetary Fund.

Iwamura M. (1996). Koto Kyoiku no Shiteki Shueki-ritsu: Kyoiku Keizai-gaku no Tenkai (Higher Education's Private Rate of Return: Evolution of the Economics of Education). Journal of Educational Sociology 58: 5-28.

Japan. (1998). Economic Planning Agency. Ekonomisuto ni yoru Kyoiku –kaikaku eno Teigen (A Proposal for Educational Reform by Economists). Tokyo: Ministry of Finance.

Japan. (2003). Japan Organization for Employment of the Elderly and Persons with Disabilities or JEED. Dai Roku-sho: Tai-hen (Chapter 6: Thailand). In JEED., eds. Sho-gaikoku ni okeru Korei-sha no Shugyo-keitai no Jitsujo ni kansuru Chosa Kenkyu Hokoku-sho II (Research Report II on the Real Condition of Job Patterns of the Elderly abroad). 89-96. Tokyo: JEED.

Japan. (2001). Ministry of Education, Culture, Sports, Science, and Technology. National Education Statistics 2000. Tokyo: Ministry of Education, Culture, Sports, Science, and Technology, Japan.

Juree, N. V. (1979). Not Too High and Not Too Low: A Comparative Study of Thai and Chinese Middle-Class Life in Bangkok, Thailand. Ph.D. Dissertation. University of California.

Kariya, T. (1990). Tokei kara Mita Intabyu Taisho-sha no Purofiru (The Profiles of Interviewees Based on Statistics). Report on Multimedia Education 22 (June 1990): 29-43.

Kariya, T. (1991-1). Tai ni okeru Kindai Kyoiku-Seido no Hatten to Kokai Daigaku (The Development of Educational System in Modern Thailand and Open Universities). Report on Multimedia Education 36 (May 1991): 27-35.

Kariya, T. (1991-2). STOU wo toshite Miru Gakureki Shakai no Sho-Mondai (Issues in Education-Conscious Society from the Viewpoint of STOU). Report on Multimedia Education 36 (May): 201-208.

Kariya, T. (1991-3). STOU no Shisutemu to Gakusei Sotugyosei (System, Students, and Graduates of STOU). Report on Multimedia Education 36 (May): 37-49.

Kitti, L. (1992). Kyoiku oyobi Rodo no Shitsu ni Kiin suru Keizai Seicho Yoin (The Factors of Economic Growth Originated in Education and Labor Quality). In Chira. H., and Itoga, S., eds. Tai no Jinteki Shigen Kaihatsu (Human Resource Development in Thailand). 15-38. Tokyo: Institute of Developing Economies.

Layard, R., and Psacharopoulos, G.., eds. (1974) The Screening Hypothesis and the Return to Education. Journal of Political Economy 82: 985-998.

Leslie, L. L., and Brinkman, P. T. (1988). The Economic Value of Higher Education. New York and London: American Council on Education and Macmillan Publishing Company.

Lipset, S. M., and Bendix, R. (1959). Social Mobility in Industrial Society. Berkeley: University of California Press.

Nikom, D. (1991). STOU no Enkaku Kyoiku Shisutemu (Distance Learning System of STOU). Report on Multimedia Education 36 (May): 209-217.

Okitsu, Y. (1991). Enkaku Koto-Kyoiku Donyu no Haikei toshiteno Tai no Shakai-Kozo: Juso teki 'Nijyu Kozo' no Sonzoku to Yuragi wo Chushin to shite (Social Structure in Thailand as The Background of the Introduction of Distance Higher Education: Focusing on the Endurance of Multi-Tiered 'Dual Structure' and Fluctuation). Report on Multimedia Education 36 (May): 7-26.

Onishi, Y. (1998). The Possibility of Educational Broadcasting in Myanmar: A Survey in Yangon. Educational Media Study 5-1: 64-71.

Onishi, Y. (2000). Media Survey in Vientiane: Education and Media in Laos, in Comparison with Those in Thailand. Educational Media Study 7-2: 39-53.

Psacharopoulos, G.. (1973). Returns to Education: An International Comparison. Amsterdam: Elsevier Scientific Publishing Company.

Psacharopoulos, G. (1985). Returns to Education: A Further International Update and Implication. Journal of Human Resources 20: 583-604.

Que, N. X., and Kagoshima, H., eds. (1998). A Challenge for the Curriculum Reform of Vietnamese Higher Education. Ho Chi Minh City: Statistics Publishing House

Ramkhamhaeng University. (2001). Ramkhamhaeng University Catalog 2000. Bangkok: Ramkhamhaeng University.

Riggs, F. (1966). Thailand: The Modernization of Bureaucratic Polity. Honolulu: East-West Center Press.

Riley, J. (1976). Information, Screening, and Human Capital. American Economic Review 66: 254-260.

Sethasathien, K. (1977). Thailand: Using Cost-Benefit Analysis to Derive the Rates of Return in Different Levels of Education. Ph.D. Dissertation, College of Education, Florida State University.

Shimizu, H. (1990) Intabyu Jirei kara Mita Gakusei Sotsugyosei no Purofiru (The Profiles of Students and Graduates Based on Interviews). Report on Multimedia Education 22 (June): 44-50.

Shimizu, H. (1991). Kaiso Hendo no naka no STOU: Midoru Kurasu he no Michi (STOU in the Class Movement: A Road to Middle Class). Report on Multimedia Education 36 (May): 51-72.

Shimizu, H. (1991). Esunikku Gurupu to Enkaku Koto-Kyoiku (Ethnic Groups and Distance Higher Education). Report on Multimedia Education 36 (May): 103-120.

Sloper, D., and Can, L. T. (1995). Higher Education in Vietnam. Singapore: Institute of Southeast Asian Studies.

Spence, M. (1973). Job Market Signaling. Quarterly Journal of Economics 87-3: 355-374.

Spence, M. (1974). Market Signaling. Cambridge, MA: Harvard University Press.

Sasakawa Peace Foundation or SPF (1996-1998). Annual Report of SPF. Tokyo: SPF.

Stiglitz, J. E. (1975). The Theory of "Screening" Educaion, and the Distribution of Income. American Economic Review 65-3: 283-300.

Sudo, M. (1991). Tohoku Tai Noson-bu ni okeru Gakushu Kikai (Study Opportunities in Villages of Northeast Thailand). Report on Multimedia Education 36 (May): 145-200.

Suehiro, A. (1993). Tai: Kaihatsu to Minshushugi (Thailand: Development and Democracy). Tokyo: Iwanami Shoten.

Suehiro, A., and Higashi, S., eds. (2000). Tai no Keizai Seisaku: Seido,/Soshiki/Akutaa (Economic Policy in Thailand: Its System, Organization, and Actors). Tokyo: Institute of Developing Economies.

Sukhothai Thmmatirat Open University. (2000). 22nd Anniversary Sukhothai Thammathirat Open University. Bangkok: Sukhothai Thmmatirat Open University.

Thailand. (2000). Ministry of University Affairs. Thai Higher Education in Brief. Bangkok: Ministry of University Affairs, Thailand.

Treiman, D. J. (1977). Occupational Prestige in Comparative Perspective. New York: Academic Press.

Trow, M. (1974). Problems in the Transition from Elite to Mass Higher Education. Paris: UNESCO.

Umakoshi, T. (1996). Education in Contemporary Asia. Tokyo: Toshindo.

Umakoshi, T. (2001) Kankoku-no Shigaku Koto-kyoiku (Jou): Yunibaasaru-ka eno Kenninsha (Private Higher Education in Korea I: A Driving Force for Universal Education). Tokyo: Research Institute for Independent Higher Education.

United Nations Development Programme. (1990-2004). Human Development Report. Washington D.C.: United Nations Development Programme.

Ushiogi, M. (2004) Iko Taisei ka deno Koto Kyoiku Seisaku: Kanbojia Betonamu no Kesu (Higher Education Policy in Transitional Economies: The Cases of Cambodia and Vietnam). Proceedings of the 7th Annual Convention of the Japanese Association of Higher Education Research. 7: 1-14.

UNESCO. (1990-2002). World Education Report. Paris: UNESCO.

Virtual University Research Forum. (2001). Virtual University. Tokyo: ALC.

Watson, K. (1980). Educational Development in Thailand. Hong Kong: HEB.

Wilson, D. A. (1962). Politics in Thailand. Ithaca and New York: Cornell University.

World Bank. (1990-2003). World Development Report. Washington D.C.: World Bank.

Yamanaka, H. (1990). Tai no Shinko Midoru-Kurasu no Raifu-Sutairu to Kachi Shiko: Tai Kokai Daigaku (STOU) no Gakusei ni taisuru Homon Chosa yori (The Lifestyles and Value Orientation of New Middle Class in Thailand: From the Interviews with the Students and Graduates of Sukhothai Thammathirat Open University -STOU-). Bulletin of the National Institute of Multimedia Education 4: 187-216.

Yamanaka, H., and Shimizu H. (1990). STOU no Gakusei Dotai to Shushoku Jyokyo (The Student Life and Employment of STOU). Report on Multimedia Education 22: 4-28.

Yamanaka, H. (1991) Tai Shinko Midoru Kurasu to sono Yobigun to shite no STOU Shusshin-sha: Sono Raifu Sutairu to Kachi Shiko wo Megutte (New Middle Class in Thailand and STOU Graduates as Reserved Middle Class). Report on Multimedia Education 36 (May): 73-102.

Yoshida, A. (1991). Gakureki Shugi no Kakucho-ki ni okeru Hitobito no Ishiki (People's Attitude in the Diastole of Diplomaism). Report on Multimedia Education 36 (May): 121-144.

APPENDICES

Appendix A: Questionnaire in English

QUESTIONNAIRE

To the selected respondents:

This survey is perfectly for academic purposes and, therefore, is confidential. The survey aims to review the history of higher education and economic development in Thailand during the period of 1970s - 1990s. You are selected among thousands of graduates by random sampling and that is why information from you is extremely valuable. Although you are expected to answer all the questions below, which will take just 10 to 15 minutes, you can skip some if you are not sure of them or simply do not want to answer. Once again, your privacy will surely be protected because this survey is purely academic. Thank you for your cooperation in advance.

I. Attribute of graduates

1. Name: Miss/Mrs./Ms./Mr. ( )
2. Address: ( )
3. Year of birth: (19)
4. Sex: (1) Male (2) Female
5. Marital status: (1) Married (2) Not married
6. University: (1) RU (2) STOU (3) CU
7. Faculty

   (1) Business or Management (2) Law (3) Economics (4) Political Science

8. Years of entrance and graduation

(1) Entrance (19) (2) Graduation (19)

9. When you entered the university above, your family was

(1) Very rich (2) Rich (3) Middle (4) Poor (5) Very poor

II. Reason for university entrance and degree of satisfaction

10. Why did you decide to go to university and get a B.A. after high school? (You can choose more than one.)

(1) To find out what I am good at and what you want to do

(2) To get a better job and higher salary after graduation

(3) To prove that I am more than high school graduates

(4) To enjoy student life

(5) To study more

(6) To get social acceptance

(7) Because of the enforcement of parents

(8) Because of the recommendation of parents/friends/relatives

(9) Other (Please specify:)

11. Why did you choose your university? (Same as above)

(1) Because of the recommendation of parents/friends/relatives

(2) Because of the geographical closeness

(3) Because of the social status of the university

(4) Because of the belief in academic stuff

(5) Because of the reputation/social acceptance

(6) Because of the difficulty in studying at open university

(7) Because of the compatibility of studying and working

(8) Because of the open admission system

(9) Because of the failure of the entrance examination of other universities

(10) Because of financial aspects

(11) Because of the newness of the university

(12) No specific reason

(13) Other (Please specify:)

12. How much did your university help you develop the following area?

(1) Succeeding in working career a. Very much b. Fair c. Not very much

(2) Finding jobs a. Very much b. Fair c. Not very much

(3) Getting new perspectives a. Very much b. Fair c. Not very much

(4) Learning about life planning/ working career

a. Very much b. Fair c. Not very much

(5) Learning about team work a. Very much b. Fair c. Not very much

13. How do you rate your overall score at university?

(1) Very good (2) Good (3) Fair (4) Poor (5) Very poor

14. Current affiliation: ( )

15. Current position: ()

16. Current monthly salary: ( ) Baht

17. Type of business

(1) Agriculture(2) Food(3) Trading (4) School/University (5) Mass media

(6) Construction (7) Entertainment(8) Consultant

(9) Accountant(10) Lawyer (11) Medical Doctor (12) Bank

(13) Security/Finance (14) Hotel (15) Travel (16) Heavy industry

(17) Iron/Metal (18) Fabric (19) Sales (20) Public

(21) Other (Please specify:)

18. Monthly salary in the university graduation year:

( ) Baht

19. Do you get mostly higher salary than your friends and relatives who are at your age and did NOT go to university?

(1) Yes, I do.

(2) No, I don't. About the same amount.

(3) No, theirs is higher than mine.

(4) All my relatives and friends went to university.

20. Do you think that studying at university helped you with your working productivity?

(1) Yes, I got much knowledge and new perspectives at university and they helped me increase my working productivity after graduation.

(2) No, even if I had not been to university, I could have gotten the productivity to the same degree as I have now.

(3) No, my productivity is even lower than that of high school graduates of my age.

III. Optional

21. Are you a hill tribe?

(1) Yes (2) No (3) Don't want to answer

22. Are you willing to help the researcher by taking an interview with him?

(1) Yes (2) No

23. If yes, please state how you would like to be contacted.

(1) Tel……. (2) Fax…… (3) E-mail……

Thank you very much for your time and cooperation.

Appendix B: Questionnaire in Thai

แบบสอบถาม

ถึงท่านผู้ตอบแบบสอบถาม

ผู้จัดการสำรวจขอเรียนให้ท่านทราบว่า การสำรวจครั้งนี้จัดทำขึ้นเพื่อประโยชน์ทางด้านการศึกษาเท่านั้น ดังนั้นข้อมูลต่างๆ ในแบบสอบถามจะถูกเก็บเป็นความลับ สำหรับวัตถุประสงค์ในการสำรวจคือเพื่อศึกษารูปแบบการศึกษาระดับสูงกับการพัฒนาทางเศรษฐกิจในประเทศไทยช่วงยุค พ.ศ. 2513 ถึง 2533 โดยรายชื่อของท่านได้ถูกสุ่มคัดเลือกจากกลุ่มผู้สำเร็จการศึกษาระดับปริญญาตรหลายพันคน ข้อมูลของท่านจึงถือว่ามีค่ายิ่ง และแม้แบบสอบถามนี้จะถูกออกแบบมาให้ง่ายต่อผู้ตอบมากที่สุด ซึ่งท่านสามารถกรอกได้เสร็จภายในเวลา 10-15 นาที แต่ท่านอาจไม่ตอบคำถามในข้อใดก็ได้ ไม่ว่าจะเป็นเพราะความไม่แน่ใจหรือไม่ประสงค์จะให้ข้อมูล ขอย้ำอีกครั้งว่าข้อมูลของท่านจะถูกเก็บไว้เป็นความลับเนื่องจากการสำรวจทำเพื่อการศึกษาเท่านั้น ขอบคุณทุกท่านที่กรุณาให้ความร่วมมือ

ข้อมูลส่วนตัวของผู้จบการศึกษา

1. ชื่อ: นางสาว/นาง/นาย (.....)
2. ที่อยู่ (.....)
3. ปี พ.ศ. (.....)
4. เพศ: (1) ชาย (2) หญิง
5. สถานะ (1) แต่งงาน (2) โสด
6. จบการศึกษาระดับปริญญาตรีจาก
   (1) มหาวิทยาลัยรามคำแหง
   (2) มหาวิทยาลัยสุโขทัยธรรมาธิราช
   (3) จุฬาลงกรณ์มหาวิทยาลัย
7. คณะที่จบ (1) บริหารธุรกิจหรือการจัดการ (2) กฎหมาย (3) เศรษฐศาสตร์ (4) รัฐศาสตร์
8. ปีที่เริ่มและจบการศึกษา (1) ปี พ.ศ. ที่เริ่มศึกษา (.....) (2) ปี พ.ศ. ที่จบการศึกษา (.....)
9. ขณะกำลังศึกษาในมหาวิทยาลัยดังกล่าวข้างต้น ครอบครัวของท่านจัดได้ว่ามีฐานะ
   (1) ดีมาก (2) ดี (3) ปานกลาง (4) ลำบาก (5) ลำบากมาก

เหตุผลในการเลือกศึกษาต่อและระดับความพอใจ

10. เหตุใดท่านจึงตัดสินใจศึกษาต่อในระดับมหาวิทยาลัย หลังจบการศึกษาระดับมัธยมปลาย **(ตอบได้มากกว่า 1 ข้อ)**
    (1) เพื่อค้นหาว่าตัวเองเหมาะกับวิชาใดและต้องการทำอะไร
    (2) เพื่อได้งานและเงินเดือนในระดับสูงขึ้น
    (3) เพื่อพิสูจน์ว่าท่านเป็นได้มากกว่านักศึกษาชั้นมัธยม
    (4) เพื่อใช้ชีวิตนักศึกษา
    (5) เพื่อหาความรู้เพิ่มเติม
    (6) การยอมรับทางสังคม
    (7) ถูกพ่อ แม่ / ผู้ปกครองบังคับ
    (8) เนื่องจากคำแนะนำของผู้ปกครอง/มิตร/ญาติ
    (9) อื่นๆ (ปรดระบุ) .....

11. เหตุใดท่านจึงเลือกศึกษาต่อในสถาบันข้างต้น **(ตอบได้มากกว่า 1 ข้อ)**
    (1) เนื่องจากคำแนะนำของผู้ปกครอง/เพื่อน/ญาติ
    (2) เนื่องจากเหตุผลด้านการเดินทาง
    (3) เนื่องจากสังคมในมหาวิทยาลัย
    (4) ความเชื่อมั่นในประสิทธิภาพด้านการเรียน การสอน
    (5) สถาบันเป็นที่ยอมรับของสังคม
    (6) ไม่ต้องการเรียนในมหาวิทยาลัยเปิด
    (7) ต้องการเรียนและทำงานไปพร้อมกัน
    (8) เนื่องจากเป็นระบบมหาวิทยาลัยเปิด
    (9) เนื่องจากไม่สามารถสอบเข้าในมหาวิทยาลัยอื่นได้
    (10) เนื่องจากเหตุผลทางการเงิน
    (11) เนื่องจากเป็นมหาวิทยาลัยแห่งใหม่
    (12) ไม่มีเหตุผลใดเป็นพิเศษ
    (13) อื่นๆ (โปรดระบุ) .....

12. "การเรียนในระดับอุดมศึกษา (มหาวิทยาลัย) ช่วยให้ท่านพัฒนา ด้านต่างๆ ต่อไปนี้มากน้อยเพียงใด

    12.1 เพิ่มโอกาสประสบความสำเร็จในการทำงาน ( ) มาก ( ) ปานกลาง ( ) น้อย

    12.2 เพิ่มช่องทางในการหางานทำให้กว้างขวางขึ้น ( ) มาก ( ) ปานกลาง ( ) น้อย

12.3 การพัฒนาด้านระบบความคิด ( ) มาก ( ) ปานกลาง ( ) น้อย

12.4 การเรียนรู้ด้านการวางแผน / การทำงาน ( ) มาก ( ) ปานกลาง ( ) น้อย

12.5 การเรียนรู้ด้านการทำงานเป็นทีม ( ) มาก ( ) ปานกลาง ( ) น้อย

13. ท่านมีความคิดเห็นโดยรวมอย่างไรกับมหาวิทยาลัยของท่าน

(1) ดีมากอย่างมาก (2) ดี (3) ปานกลาง (4) ไม่ดี (5) ไม่ดีอย่างมาก

14. สถานที่ทำงานปัจจุบันของท่าน (.....)

15. ตำแหน่งงานในปัจจุบัน (.....)

16. เงินเดือนปัจจุบัน (.....บาท)

17. ประเภทกิจการ

(1) การเกษตร (2) อาหาร (3) กิจการค้า (4) สถานศึกษา (5) สื่อสารมวลชน

(6) ก่อสร้าง (7) บันเทิง (8) ที่ปรึกษา (9) บัญชี (10) ทนายความ

(11) แพทย์ (12) ธนาคาร (13) การเงิน (14) โรงแรม (15) การท่องเที่ยว

(16) อุตสาหกรรมหนัก (17) เหล็ก / โลหะ (18) เสื้อผ้า (19) การขาย

(20) ราชการ(21) อื่นๆ (โปรดระบุ)

.....

18. เงินเดือนที่ได้รับครั้งแรกหลังจบการศึกษาจากมหาวิทยาลัย (.....บาท)

19. หากเปรียบเทียบกับเพื่อน /ญาติซึ่งอายุใกล้เคียงกับท่าน **ที่ไม่ได้จบการศึกษาระดับมหาวิทยาลัย** ท่านพบว่ารายได้ของท่านเป็นอย่างไร

(1) รายได้ของท่าน **มากกว่า** เพื่อน / ญาติโดยส่วนใหญ่
(2) เพื่อน / ญาติที่มีรายได้มากกว่า และน้อยกว่าท่านมีจำนวนพอๆ กัน
(3) รายได้ของท่าน **น้อยกว่า** เพื่อน / ญาติโดยส่วนใหญ่

20. ท่านคิดว่าการศึกษาในระดับปริญญาตรีทำให้ท่านมีประสิทธิภาพในการทำงานเพิ่มขึ้นหรือไม่
(1) เพิ่มมากขึ้น ข้าพเจ้าได้รับความรู้และมุมมองใหม่ๆ จากมหาวิทยาลัย
(2) ไม่ ถึงแม้ข้าพเจ้าไม่เลือกศึกษาต่อ ข้าพเจ้าก็สามารถทำงานได้อย่างมีประสิทธิภาพเท่ากัน
(3) ไม่ ประสิทธิภาพที่ได้ มีน้อยกว่าผู้สำเร็จการศึกษาระดับมัธยมปลายที่มีอายุเท่ากัน

ท่านสามารถเลือกตอบคำถามต่อไปนี้หรือไม่ก็ได้

21. ท่านเป็นชาวนาเขาหรือไม่
(1) ใช่ (2) ไม่ใช่ (3) ไม่ประสงค์จะตอบ

22. ท่านยินดีให้ข้อมูลเพิ่มเติมแก่ผู้สำรวจโดยการให้สัมภาษณ์หรือไม่
(1) ยินดี (2) ไม่ยินดี

23. หากท่านยินดีให้ข้อมูลเพิ่มเติม ท่านประสงค์จะได้รับการติดต่อกลับไปทางใด
(1) โทรศัพท์ ระบุ……..
(2) โทรสาร ระบุ……...
(3) อีเมล์ ระบุ…….....

ขอขอบคุณในความร่วมมือของท่าน และขอบคุณที่กรุณาสละเวลาอันมีค่าเพื่อตอบแบบสอบถาม

Appendix C: Statistical tables

Table C-1 Family Status at University Entrance

Family Status	%
Very rich	1.7
Rich	16.5
Middle	74.2
Poor	7.0
Very poor	0.6
Total	100.0

Table C-2 Faculty

Faculty	%
Business or Management	25.1
Law	25.4
Economics	24.8
Political Science	24.7
Total	100.0

Table C-3 Years of Entrance

Years of Entrance	%
Not more than Year 1975	24.6
Year 1976-1980	4.4
Year 1981-1985	32.8
Year 1986-1990	5.1
Year 1991-1995	31.4
Year 1996 and above	0.6
Cannot remember	1.1
Total	100.0

Table C-4-1 Years of Graduation

Years of Graduation	%
Year 1976	10.1
Year 1977	11.5
Year 1978	2.8
Year 1979	0.1
Year 1980	0.7
Year 1985	0.3

Year 1986	10.4
Year 1987	21.1
Year 1988	4.6
Year 1989	0.7
Year 1994	0.1
Year 1995	2.6
Year 1996	8.1
Year 1997	20.7
Year 1998	5.7
Year 1999	0.5
Total	100.0

Table C-4-2 Years of Graduation (Cluster)

Years of Graduation	%
Year 1976-1985	25.5
Year 1986-1995	39.5
Year 1996-	35.0
Total	100

Table C-5 Reasons for continuing study and opinions on studying at university

Reasons for continuing study at university	%
To study more	79.8
To get a better job and higher salary after graduation	58.4
Social acceptance	43.5
To find out what you are good at and what you want to do	25.9
To prove that you are more than high school graduates	19.3
To enjoy student life	16.6
The recommendation of parents / friends / relatives	9.8
Parents forcing	1.7
Others such as to help society / good future / applying for job that they dream, etc.	9.6

Table C-6 Reasons for choosing the university (can choose more than one)

Reasons for choosing university	%
Reputation / Acceptance about image of university	51.3
Trusting of effectiveness of academic part	47.0
Working and studying together	35.2
Open admission system	31.5
The failure of the entrance examination of other universities	20.7
The geographical closeness	20.4
The recommendation of parents / friends / relatives	15.1
Social status of the university	15.1

The reasonable or inexpensive tuition	13.5
Do not want to study Open University	10.3
New university	4.2
No specific reason	0.9
Others such as the recommendation of lecturers / do not attend the class that can read the book by yourself / friends also study in this university, etc.	21.1

Table C-7 Opinion on studying at university to develop in various parts

Development in various parts	Level of Development		
	Much	Neutral	Less
1. Increase opportunity to succeed in working	74.6	22.6	2.8
2. Increase channel to find job / occupation	72.4	22.5	5.1
3. Thinking improvement	74.4	22.5	3.1
4. Learning about life planning/ working	56.3	36.4	7.3
5. Learning about team work	41.4	43.4	15.2

Table C-8 The study at above university helped with working productivity

Working Productivity	%
Yes, I got much knowledge and new perspectives at university and they helped me increase my working productivity after graduation.	94.7
No, even if I had not been to university, I could have get the productivity to the same degree as I have now.	4.9
No, my productivity is even lower than that of high school graduates of my age.	0.4
Total	100.0

Table C-9 The overall score at university

The overall score at university	%
Very good	44.4
Good	46.5
Fair	8.8
Poor	0.2
Very poor	0.1

Table C-10 Monthly salary after graduation

Monthly salary after graduation	%
Not more than 2,500 Baht	21.1
2,501-5,000 Baht	31.7
5,001-7,500 Baht	18.2
7,501-10,000 Baht	15.5
More than 10,000 Baht	13.5
Total	100.0

Table C-11 Current monthly salary

Current monthly salary	%
Not more than 10,000 Baht	18.1
10,001-15,000 Baht	11.7
15,001-20,000 Baht	14.8
20,001-25,000 Baht	6.9
25,001-30,000 Baht	15.0
30,001-35,000 Baht	3.0
35,001-40,000 Baht	6.1
40,001-45,000 Baht	1.0
45,001-50,000 Baht	9.4
More than 50,000 Baht	14.0
Total	100.0

Table C-12 Current position

Current position	%
Business Owner	18.4
President/ Vice president/ Managing Director	8.9
Manager/ Director	14.2
Department Head/ Head of Division	7.9
Assistant Manager/ Deputy Director	4.6
Assistant Department Head/ Assistant Head of Division	1.8
Staff	35.9
Unemployment	4.6
Freelance such as researcher/ analyst	1.1
Head of household/ Housewife/ Retired	2.6
Total	100.0

Table C-13 Salary/ Income of respondents when comparing with friends/ relatives

Salary/ Income of respondents when comparing with friends/ relatives	%
You have much higher salary/ income than friends/ relatives	58.2
Friends/ relatives have higher or less salary/ income than you in the same proportion	20.6
You have less salary/ income than friends/ relatives	9.8
No relatives/ friends graduated below Bachelor Degree	11.4
Total	100.0

Table C-14 Type of business

Type of business	%
Public	28.9
Trading	8.3
Sales	7.4

Banking	6.5
Lawyer	3.6
Heavy industry	3.6
Mass media	2.8
Food	2.5
Consultant	2.1
School/ University	2.0
Security/ Finance	1.9
Construction	1.5
Accounting	1.3
Hotel	1.2
Agriculture	0.9
Travel	0.9
Medical doctor	0.8
Iron/ Metal	0.6
Entertainment	0.5
Fabric	0.5
Others such as state enterprise/ real estate/ gem or jewelry/ telecommunication / services/ paper/ chemical, and etc.	22.2
Total	100.0

Table C-15 Financial situation change

Financial situation at university entrance	Average salary	
	After graduation	Current salary
Poor	5,824.72	33,041.51
Very poor	3,070.00	59,513.33

Table C-16 Average monthly salary after graduation and variance

University	Mean (Monthly salary after graduation)	Variance
RU	8510.07	2,677,005,617
STOU	13466.16	4,588,797,267
CU	7777.51	158,551,649

Table C-17 Average current monthly salary and variance

University	Mean (Current monthly salary)	Variance
RU	35,632.69	1,327,547,651
STOU	28,037.49	2,729,838,766
CU	43,025.87	1,193,227,632

Table C-18 Difference in variance of average beginning salary between Generation 1 graduates of RU and CU

		Business		Law		Economics		Political Science	
		RU	CU	RU	CU	RU	CU	RU	CU
Number of samples	n	29	25	26	28	26	28	29	26
Variance	V	62638043.94	1712460.13	40559702.82	2833397.89	2526573.83	1703651.46	4075351.563	1978748.622
Degree of freedom	φ	28	24	25	27	25	27	28	25
Larger variance	V1	62638043.94		40559702.82		2526573.83		4075351.563	
Smaller variance	V2	1712460.13		2833397.89		1703651.46		1978748.622	
First degree of freedom	φ1	28		25		25		28	
Second degree of freedom	φ2	24		27		27		25	
Significant level	α	0.05		0.05		0.05		0.05	
Test statistics	F value	36.57781156		14.31486307		1.483034464		2.059560025	
Rate of rejection (two-tailed)	F (φ1, φ2; α/2)	2.226457241		2.182574121		2.182574121		2.199200821	
Rate of rejection（one-tailed)	F (φ1, φ2; α)	1.951967477		1.920973602		1.920973602		1.932292548	
Two-tailed probability	p value	0.0000		0.0000		0.3179		0.0717	
One-tailed probability（Upper）	p value	0.0000		0.0000		0.1590		0.0359	
One-tailed probability（Lower）	p value	1.0000		1.0000		0.8410		0.9641	

Table C-19 Difference in variance of average beginning salary between Generation 2 graduates of RU and CU

		Business		Law		Economics		Political Science	
		RU	CU	RU	CU	RU	CU	RU	CU
Number of samples	n	29	23	26	29	24	45	27	27
Variance	V	2331759.54	6473869.58	12388358.48	941264854.4	21719608	4257042	32740025	65819471
Degree of freedom	φ	28	22	25	28	23	44	26	26
Larger variance	V1	6473869.58		941264854.4		21719608		65819471	
Smaller variance	V2	2331759.54		12388358.48		4257042		32740025	
First degree of freedom	φ1	22		28		23		26	
Second degree of freedom	φ2	28		25		44		26	
Significant level	α	0.05		0.05		0.05		0.05	
Test statistics	F value	2.776388161		75.97978828		5.102042216		2.010367158	
Rate of rejection (two-tailed)	F (φ1, φ2; α/2)	2.200579274		2.199200821		1.985966946		2.194305182	
Rate of rejection（one-tailed)	F (φ1, φ2; α)	1.934871818		1.932292548		1.77778503		1.929212345	
Two-tailed probability	p value	0.0116		0.0000		0.0000		0.0808	
One-tailed probability（Upper）	p value	0.0058		0.0000		0.0000		0.0404	
One-tailed probability（Lower）	p value	0.9942		1.0000		1.0000		0.9596	

Table C-20 Difference in variance of average beginning salary between Generation 2 graduates of STOU and CU

		Business		Law		Economics		Political Science	
		STOU	CU	STOU	CU	STOU	CU	STOU	CU
Number of samples	n	24	23	15	29	22	45	17	27
Variance	V	183751038.0	6473869.584	133925996.6	941264854.4	100478972.2	4257041.83	8551588.98	65819470.93
Degree of freedom	φ	23	22	14	28	21	44	16	26
Larger variance	V1	183751038		941264854.4		100478972.2		65819470.93	
Smaller variance	V2	6473869.584		133925996.6		4257041.83		8551588.98	
First degree of freedom	φ1	23		28		21		26	
Second degree of freedom	φ2	22		14		44		16	
Significant level	α	0.05		0.05		0.05		0.05	
Test statistics	F value	28.38349393		7.028246035		23.60300325		7.696753327	
Rate of rejection (two-tailed)	F (φ1, φ2; α/2)	2.344172856		2.748663519		2.016477652		2.603314897	
Rate of rejection（one-tailed)	F (φ1, φ2; α)	2.037666036		2.319907821		1.800884775		2.219593398	
Two-tailed probability	p value	0.0000		0.0004		0.0000		0.0001	
One-tailed probability（Upper）	p value	0.0000		0.0002		0.0000		0.0001	
One-tailed probability（Lower）	p value	1.0000		0.9998		1.0000		0.9999	

Table C-21 Difference in variance of average beginning salary between Generation 3 graduates of RU and CU

		Business		Law		Economics		Political Science	
		RU	CU	RU	CU	RU	CU	RU	CU
Number of samples	n	25	30	19	25	26	9	19	28
Variance	V	46062554.56	12824778.57	18033611.56	211258376.2	12250840	15916350	29980443	365608817
Degree of freedom	φ	24	29	18	24	25	8	18	27
Larger variance	V1	46062554.56		211258376.2		15916350		365608817	
Smaller variance	V2	12824778.57		18033611.56		12250840		29980443	
First degree of freedom	φ1	24		24		8		27	
Second degree of freedom	φ2	29		18		25		18	
Significant level	α	0.05		0.05		0.05		0.05	
Test statistics	F value	3.5916842		11.71470149		1.299204789		12.19491043	
Rate of rejection (two-tailed)	F (φ1, φ2; α/2)	2.154010303		2.502702046		2.753111517		2.470613936	
Rate of rejection（one-tailed)	F (φ1, φ2; α)	1.900531288		2.149661782		2.337060323		2.126242293	
Two-tailed probability	p value	0.0013		0.0000		0.5775		0.0000	
One-tailed probability（Upper）	p value	0.0006		0.0000		0.2887		0.0000	
One-tailed probability（Lower）	p value	0.9994		1.0000		0.7113		1.0000	

Table C-22 Difference in variance of average beginning salary between Generation 3 graduates of STOU and CU

		Business		Law		Economics		Political Science	
		STOU	CU	STOU	CU	STOU	CU	STOU	CU
Number of samples	n	31	30	24	25	24	9	18	28
Variance	V	8732438.7	12824778.57	83705847.83	211258376.2	9096075.04	15916349.62	5317128.69	365608816.8
Degree of freedom	φ	30	29	23	24	23	8	17	27
Larger variance	V1	12824778.57		211258376.2		15916349.62		365608816.8	
Smaller variance	V2	8732438.7		83705847.83		9096075.04		5317128.69	
First degree of freedom	φ1	29		24		8		27	
Second degree of freedom	φ2	30		23		23		17	
Significant level	α	0.05		0.05		0.05		0.05	
Test statistics	F value	1.468636541		2.523818606		1.749804124		68.76057326	
Rate of rejection (two-tailed)	F (φ1, φ2; α/2)	2.082657602		2.298904178		2.80769541		2.527954734	
Rate of rejection（one-tailed)	F (φ1, φ2; α)	1.847428877		2.005009492		2.374811459		2.166594015	
Two-tailed probability	p value	0.3007		0.0298		0.2801		0.0000	
One-tailed probability（Upper）	p value	0.1504		0.0149		0.1401		0.0000	
One-tailed probability（Lower）	p value	0.8496		0.9851		0.8599		1.0000	

Table C-23 Difference in variance of current average salary between Generation 1 graduates of RU and CU

		Business		Law		Economics		Political Science	
		RU	CU	RU	CU	RU	CU	RU	CU
Number of samples	n	23	10	22	16	16	13	27	13
Variance	V	1713513737	819600173.4	1827461611	1330244715	839641029.4	1781359098	1516529210	2348698232
Degree of freedom	φ	22	9	21	15	15	12	26	12
Larger variance	V1	1713513737		1827461611		1781359098		2348698232	
Smaller variance	V2	819600173.4		1330244715		839641029.4		1516529210	
First degree of freedom	φ1	22		21		12		12	
Second degree of freedom	φ2	9		15		15		26	
Significant level	α	0.05		0.05		0.05		0.05	
Test statistics	F value	2.090670296		1.373778517		2.121572238		1.548732603	
Rate of rejection (two-tailed)	F (φ1, φ2; α/2)	3.638291446		2.740264904		2.963275847		2.490850193	
Rate of rejection（one-tailed)	F (φ1, φ2; α)	2.91693425		2.316319581		2.475310623		2.147928058	
Two-tailed probability	p value	0.2528		0.5344		0.1702		0.3392	
One-tailed probability（Upper）	p value	0.1264		0.2672		0.0851		0.1696	
One-tailed probability（Lower）	p value	0.8736		0.7328		0.9149		0.8304	

Table C-24 Difference in variance of current average salary between Generation 2 graduates of RU and CU

		Business		Law		Economics		Political Science	
		RU	CU	RU	CU	RU	CU	RU	CU
Number of samples	n	20	15	27	27	25	41	29	16
Variance	V	210012557.1	868571670	2312229736	647983498.5	223041978.5	2780632185	1516892177	909895853.7
Degree of freedom	φ	19	14	26	26	24	40	28	15
Larger variance	V1	868571670		2312229736		2780632185		1516892177	
Smaller variance	V2	210012557.1		647983498.5		223041978.5		909895853.7	
First degree of freedom	φ1	14		26		40		28	
Second degree of freedom	φ2	19		26		24		15	
Significant level	α	0.05		0.05		0.05		0.05	
Test statistics	F value	4.135808268		3.568346634		12.46685581		1.667105275	
Rate of rejection (two-tailed)	F (φ1, φ2; α/2)	2.64692801		2.194305182		2.146002487		2.660172527	
Rate of rejection（one-tailed)	F (φ1, φ2; α)	2.255610809		1.929212345		1.891955037		2.258659038	
Two-tailed probability	p value	0.0048		0.0018		0.0000		0.2996	
One-tailed probability（Upper）	p value	0.0024		0.0009		0.0000		0.1498	
One-tailed probability（Lower）	p value	0.9976		0.9991		1.0000		0.8502	

Table C-25 Difference in variance of current average salary between Generation 2 graduates of STOU and CU

		Business		Law		Economics		Political Science	
		STOU	CU	STOU	CU	STOU	CU	STOU	CU
Number of samples	n	28	15	24	27	24	41	24	16
Variance	V	360745824.8	868571670	883065023.3	647983498.5	448498789.3	2780632185	266589542.1	909895853.7
Degree of freedom	φ	27	14	23	26	23	40	23	15
Larger variance	V1	868571670		883065023.3		2780632185		909895853.7	
Smaller variance	V2	360745824.8		647983498.5		448498789.3		266589542.1	
First degree of freedom	φ1	14		23		40		15	
Second degree of freedom	φ2	27		26		23		23	
Significant level	α	0.05		0.05		0.05		0.05	
Test statistics	F value	2.407710943		1.362789369		6.199865532		3.413096577	
Rate of rejection (two-tailed)	F (φ1, φ2; α/2)	2.394855869		2.230322593		2.176342662		2.466450155	
Rate of rejection（one-tailed)	F (φ1, φ2; α)	2.078145656		1.956024676		1.913939229		2.128217602	
Two-tailed probability	p value	0.0486		0.4436		0.0000		0.0081	
One-tailed probability（Upper）	p value	0.0243		0.2218		0.0000		0.0041	
One-tailed probability（Lower）	p value	0.9757		0.7782		1.0000		0.9959	

Table C-26 Difference in variance of current average salary between Generation 3 graduates of RU and CU

		Business		Law		Economics		Political Science	
		RU	CU	RU	CU	RU	CU	RU	CU
Number of samples	n	19	22	13	17	26	8	24	25
Variance	V	174721075.6	94891561.91	128435529	146125304.5	2327492220	330541488.6	62014050.01	153891716.2
Degree of freedom	φ	18	21	12	16	25	7	23	24
Larger variance	V1	174721075.6		146125304.5		2327492220		153891716.2	
Smaller variance	V2	94891561.91		128435529		330541488.6		62014050.01	
First degree of freedom	φ1	18		16		25		24	
Second degree of freedom	φ2	21		12		7		23	
Significant level	α	0.05		0.05		0.05		0.05	
Test statistics	F value	1.841270942		1.137732726		7.041452586		2.4815621	
Rate of rejection (two-tailed)	F (φ1, φ2; α/2)	2.461831627		3.151527039		4.404540732		2.298904178	
Rate of rejection（one-tailed)	F (φ1, φ2; α)	2.123194065		2.59888111		3.403613391		2.005009492	
Two-tailed probability	p value	0.1807		0.8353		0.0127		0.0328	
One-tailed probability（Upper）	p value	0.0903		0.4177		0.0064		0.0164	
One-tailed probability（Lower）	p value	0.9097		0.5823		0.9936		0.9836	

Table C-27 Difference in variance of current average salary between Generation 3 graduates of STOU and CU

		Business		Law		Economics		Political Science	
		STOU	CU	STOU	CU	STOU	CU	STOU	CU
Number of samples	n	29	22	31	17	26	8	28	25
Variance	V	45779973.89	94891561.91	599652348.8	146125304.5	16269658114	330541488.6	1412829929	153891716.2
Degree of freedom	φ	28	21	30	16	25	7	27	24
Larger variance	V1	94891561.91		599652348.8		16269658114		1412829929	
Smaller variance	V2	45779973.89		146125304.5		330541488.6		153891716.2	
First degree of freedom	φ1	21		30		25		27	
Second degree of freedom	φ2	28		16		7		24	
Significant level	α	0.05		0.05		0.05		0.05	
Test statistics	F value	2.072774487		4.10368588		49.22122842		9.180675633	
Rate of rejection (two-tailed)	F (φ1, φ2; α/2)	2.215827521		2.567816182		4.404540732		2.236077989	
Rate of rejection（one-tailed)	F (φ1, φ2; α)	1.946222739		2.193843329		3.403613391		1.959122642	
Two-tailed probability	p value	0.0722		0.0044		0.0000		0.0000	
One-tailed probability（Upper）	p value	0.0361		0.0022		0.0000		0.0000	
One-tailed probability（Lower）	p value	0.9639		0.9978		1.0000		1.0000	

Table C-28 Comparison of average beginning salary between Generation 1 graduates of RU and CU, a Welch t test

		Business		Law		Economics		Political Science	
		RU	CU	RU	CU	RU	CU	RU	CU
Number of samples	n	29	25	26	28	26	28	29	26
Average (Mean)		4057.93	3049.38	5159.09	2687.50	2723.85	3266.43	2652.76	2568.08
Squared deviations	S	1753865230	41099043.12	1013992571	76501743.03	63164345.75	45998589.42	114109843.8	49468715.56
Variance	V	62638043.94	1712460.13	40559702.82	2833397.89	2526573.83	1703651.46	4075351.563	1978748.622
Degree of freedom	φ	28	24	25	27	25	27	28	25
Mean difference		1008.55		2471.59		-542.58		84.68	
Equivalent degree of freedom		29.76917078		28.23855659		48.50147355		50.08689074	
Significant level	α	0.05		0.05		0.05		0.05	
Test statistics	t value	0.675612759		1.917643646		-1.3649191		0.181935085	
Rate of rejection	t (φ*, α)	2.045230758		2.048409442		2.01063358		2.008559932	
Rate of rejection（Upper）	t (φ*, 2α)	1.699127097		1.701130259		1.677224191		1.675905423	
Rate of rejection（Lower）	-t (φ*, 2α)	-1.6991271		-1.70113026		-1.67722419		-1.67590542	
Two-tailed probability	p value	0.504638736		0.065409068		0.178642565		0.856369271	
One-tailed probability（Upper）	p value	0.252319368		0.032704534		0.910678718		0.428184636	
One-tailed probability（Lower）	p value	0.747680632		0.967295466		0.089321282		0.571815364	

Table C-29 Comparison of average beginning salary between Generation 2 graduates of RU and CU, a Welch t test

		Business		Law		Economics		Political Science	
		RU	CU	RU	CU	RU	CU	RU	CU
Number of samples	n	29	23	26	29	24	45	27	27
Average (Mean)		4146.55	5220.83	5104.07	10787.66	4730.42	4925.00	5867.04	7422.22
Squared deviations	S	65289267.12	142425130.8	309708962	26355415923	499550984	187309848	851240650	1711306246
Variance	V	2331759.54	6473869.58	12388358.48	941264854.4	21719608	4257042	32740025	65819471
Degree of freedom	φ	28	22	25	28	23	44	26	26
Mean difference		-1074.28		-5683.59		-194.58		-1555.18	
Equivalent degree of freedom		34.17324491		28.82115869		27.90049163		46.735399	
Significant level	α	0.05		0.05		0.05		0.05	
Test statistics	t value	-1.7858145		-0.99037864		-0.19462043		-0.8139792	
Rate of rejection	t (φ*, α)	2.032243174		2.048409442		2.051829142		2.012893674	
Rate of rejection（Upper）	t (φ*, 2α)	1.690923455		1.701130259		1.703288035		1.678658919	
Rate of rejection（Lower）	-t (φ*, 2α)	-1.69092345		-1.70113026		-1.70328804		-1.67865892	
Two-tailed probability	p value	0.083051636		0.33047097		0.84714713		0.419850642	
One-tailed probability（Upper）	p value	0.958474182		0.834764515		0.576426435		0.790074679	
One-tailed probability（Lower）	p value	0.041525818		0.165235485		0.423573565		0.209925321	

Table C-30 Comparison of average beginning salary between Generation 2 graduates of STOU and CU, a Welch t test

		Business		Law		Economics		Political Science	
		STOU	CU	STOU	CU	STOU	CU	STOU	CU
Number of samples	n	24	23	15	29	22	45	17	27
Average (Mean)		10949.58	5220.83	5159.09	2687.50	2723.85	3266.43	2652.76	2568.08
Squared deviations	S	4226273875	142425130.8	1874963952	26355415923	2110058416	187309840.5	136825423.7	1711306244
Variance	V	183751038.0	6473869.584	133925996.6	941264854.4	100478972.2	4257041.83	8551588.98	65819470.93
Degree of freedom	φ	23	22	14	28	21	44	16	26
Mean difference		5728.75		2471.59		-542.58		84.68	
Equivalent degree of freedom		24.68732655		39.53940999		21.87447629		35.38868983	
Significant level	α	0.05		0.05		0.05		0.05	
Test statistics	t value	2.033343391		0.384194114		-0.25129608		0.049379721	
Rate of rejection	t (φ*, α)	2.063898137		2.022688932		2.079614205		2.030110409	
Rate of rejection（Upper）	t (φ*, 2α)	1.710882316		1.684875315		1.720743512		1.689572855	
Rate of rejection（Lower）	-t (φ*, 2α)	-1.71088232		-1.68487531		-1.72074351		-1.68957285	
Two-tailed probability	p value	0.053218701		0.70292145		0.804027881		0.960897411	
One-tailed probability（Upper）	p value	0.02660935		0.351460725		0.597986059		0.480448706	
One-tailed probability（Lower）	p value	0.97339065		0.648539275		0.402013941		0.519551294	

Table C-31 Comparison of average beginning salary between Generation 3 graduates of RU and CU, a Welch t test

		Business		Law		Economics		Political Science	
		RU	CU	RU	CU	RU	CU	RU	CU
Number of samples	n	25	30	19	25	26	9	19	28
Average (Mean)		9260.00	11495.33	8011.58	11288.80	8793.46	11982.14	8277.37	17010.71
Squared deviations	S	1105501309	371918578.5	324605008.1	5070201029	306271000	127330800	539647974	9871438059
Variance	V	46062554.56	12824778.57	18033611.56	211258376.2	12250840	15916350	29980443	365608817
Degree of freedom	φ	24	29	18	24	25	8	18	27
Mean difference		-2235.33		-3277.22		-3188.68		-8733.34	
Equivalent degree of freedom		34.87509694		29.20289355		12.54587146		33.19278911	
Significant level	α	0.05		0.05		0.05		0.05	
Test statistics	t value	-1.48364233		-1.0689413		-2.13068364		-2.28285553	
Rate of rejection	t (φ*, α)	2.032243174		2.045230758		2.178812792		2.03451691	
Rate of rejection（Upper）	t (φ*, 2α)	1.690923455		1.699127097		1.782286745		1.692360456	
Rate of rejection（Lower）	-t (φ*, 2α)	-1.69092345		-1.6991271		-1.78228674		-1.69236046	
Two-tailed probability	p value	0.147115631		0.293913399		0.054488469		0.029013036	
One-tailed probability（Upper）	p value	0.926442184		0.853043301		0.972755766		0.985493482	
One-tailed probability（Lower）	p value	0.073557816		0.146956699		0.027244234		0.014506518	

Table C-32 Comparison of average beginning salary between Generation 3 graduates of STOU and CU, a Welch t test

		Business		Law		Economics		Political Science	
		STOU	CU	STOU	CU	STOU	CU	STOU	CU
Number of samples	n	31	30	24	25	24	9	18	28
Average (Mean)		6738.06	11495.33	8958.54	11288.80	6400.67	11982.14	6977.78	17010.71
Squared deviations	S	261973161	371918578.5	1925234500	5070201028	209209725.9	127330797	90391187.73	9871438054
Variance	V	8732438.7	12824778.57	83705847.83	211258376.2	9096075.04	15916349.62	5317128.69	365608816.8
Degree of freedom	φ	30	29	23	24	23	8	17	27
Mean difference		-4757.27		-2330.26		-5581.47		-10032.93	
Equivalent degree of freedom		56.21522031		40.67025309		11.6108982		28.21251628	
Significant level	α	0.05		0.05		0.05		0.05	
Test statistics	t value	-5.64908719		-0.67443044		-3.80875802		-2.74562193	
Rate of rejection	t (φ*, α)	2.003239388		2.021074579		2.200986273		2.048409442	
Rate of rejection（Upper）	t (φ*, 2α)	1.672522103		1.683852133		1.795883691		1.701130259	
Rate of rejection（Lower）	-t (φ*, 2α)	-1.6725221		-1.68385213		-1.79588369		-1.70113026	
Two-tailed probability	p value	5.61755E-07		0.503917162		0.002898989		0.010431197	
One-tailed probability（Upper）	p value	0.999999719		0.748041419		0.998550506		0.994784402	
One-tailed probability（Lower）	p value	2.80878E-07		0.251958581		0.001449494		0.005215598	

Table C-33 Comparison of current average salary between Generation 1 graduates of RU and CU, a Welch t test

		Business		Law		Economics		Political Science	
		RU	CU	RU	CU	RU	CU	RU	CU
Number of samples	n	23	10	22	16	16	13	27	13
Average (Mean)		56173.91	59400.00	44523.81	56561.88	54375.00	63769.23	47985.93	46516.15
Squared deviations	S	37697302215	7376401561	38376693839	19953670727	12594615441	21376309174	39429759464	28184378781
Variance	V	1713513737	819600173.4	1827461611	1330244715	839641029.4	1781359098	1516529210	2348698232
Degree of freedom	φ	22	9	21	15	15	12	26	12
Mean difference		-3226.09		-12038.07		-9394.23		1469.78	
Equivalent degree of freedom		24.51250467		34.9948095		20.54113715		19.74052178	
Significant level	α	0.05		0.05		0.05		0.05	
Test statistics	t value	-0.25791343		-0.93375418		-0.68241826		0.09550535	
Rate of rejection	t (φ*, α)	2.063898137		2.032243174		2.085962478		2.093024705	
Rate of rejection（Upper）	t (φ*, 2α)	1.710882316		1.690923455		1.724718004		1.729131327	
Rate of rejection（Lower）	-t (φ*, 2α)	-1.71088232		-1.69092345		-1.724718		-1.72913133	
Two-tailed probability	p value	0.79867245		0.357015088		0.502802562		0.924913551	
One-tailed probability（Upper）	p value	0.600663775		0.821492456		0.748598719		0.462456775	
One-tailed probability（Lower）	p value	0.399336225		0.178507544		0.251401281		0.537543225	

Table C-34 Comparison of current average salary between Generation 2 graduates of RU and CU, a Welch t test

		Business		Law		Economics		Political Science	
		RU	CU	RU	CU	RU	CU	RU	CU
Number of samples	n	20	15	27	27	25	41	29	16
Average (Mean)		26775.00	66000.00	48952.50	45106.67	25098.40	64782.61	36760.00	52187.50
Squared deviations	S	3990238585	12160003380	60117973134	16847570960	5353007483	1.11225E+11	42472980964	13648437805
Variance	V	210012557.1	868571670	2312229736	647983498.5	223041978.5	2780632185	1516892177	909895853.7
Degree of freedom	φ	19	14	26	26	24	40	28	15
Mean difference		-39225		3845.83		-39684.21		-15427.5	
Equivalent degree of freedom		19.07576885		39.51144723		49.78035237		38.04220117	
Significant level	α	0.05		0.05		0.05		0.05	
Test statistics	t value	-4.74261358		0.367291153		-4.53003179		-1.47650092	
Rate of rejection	t (φ*, α)	2.093024705		2.022688932		2.009574018		2.024394234	
Rate of rejection（Upper）	t (φ*, 2α)	1.729131327		1.684875315		1.676551165		1.685953066	
Rate of rejection（Lower）	-t (φ*, 2α)	-1.72913133		-1.68487531		-1.67655116		-1.68595307	
Two-tailed probability	p value	0.000141635		0.715387476		3.79384E-05		0.14804917	
One-tailed probability（Upper）	p value	0.999929183		0.357693738		0.999981031		0.925975415	
One-tailed probability（Lower）	p value	7.08173E-05		0.642306262		1.89692E-05		0.074024585	

Table C-35 Comparison of current average salary between Generation 2 graduates of STOU and CU, a Welch t test

		Business		Law		Economics		Political Science	
		STOU	CU	STOU	CU	STOU	CU	STOU	CU
Number of samples	n	28	15	24	27	24	41	24	16
Average (Mean)		28202.14	66000.00	37377.08	45106.67	31668.57	64782.61	27287.60	52187.50
Squared deviations	S	9740137269	12160003380	20310495536	16847570960	10315472153	1.11225E+11	6131559468	13648437805
Variance	V	360745824.8	868571670	883065023.3	647983498.5	448498789.3	2780632185	266589542.1	909895853.7
Degree of freedom	φ	27	14	23	26	23	40	23	15
Mean difference		-37797.86		-7729.59		-33114.04		-24899.9	
Equivalent degree of freedom		20.39941914		45.61987911		57.48942792		20.91174132	
Significant level	α	0.05		0.05		0.05		0.05	
Test statistics	t value	-4.49247512		-0.99134984		-3.56028422		-3.02008078	
Rate of rejection	t (φ*, α)	2.085962478		2.014103302		2.002466317		2.085962478	
Rate of rejection（Upper）	t (φ*, 2α)	1.724718004		1.679427442		1.672028702		1.724718004	
Rate of rejection（Lower）	-t (φ*, 2α)	-1.724718		-1.67942744		-1.6720287		-1.724718	
Two-tailed probability	p value	0.00022264		0.326815649		0.000755585		0.006762942	
One-tailed probability（Upper）	p value	0.99988868		0.836592176		0.999622207		0.996618529	
One-tailed probability（Lower）	p value	0.00011132		0.163407824		0.000377793		0.003381471	

Table C-36 Comparison of current average salary between Generation 3 graduates of RU and CU, a Welch t test

		Business		Law		Economics		Political Science	
		RU	CU	RU	CU	RU	CU	RU	CU
Number of samples	n	19	22	13	17	26	8	24	25
Average (Mean)		19597.89	24586.82	13636.92	16120.00	29846.92	30692.31	14104.58	20649.60
Squared deviations	S	3144979361	1992722800	1541226348	2338004872	58187305498	2313790420	1426323150	3693401189
Variance	V	174721075.6	94891561.91	128435529	146125304.5	2327492220	330541488.6	62014050.01	153891716.2
Degree of freedom	φ	18	21	12	16	25	7	23	24
Mean difference		-4988.93		-2483.08		-845.39		-6545.02	
Equivalent degree of freedom		32.68255473		26.76773404		30.32863817		40.86408318	
Significant level	α	0.05		0.05		0.05		0.05	
Test statistics	t value	-1.35735742		-0.57769074		-0.07390817		-2.2139383	
Rate of rejection	t (φ*, α)	2.036931619		2.055530786		2.042270353		2.021074579	
Rate of rejection（Upper）	t (φ*, 2α)	1.693888407		1.705616341		1.697260359		1.683852133	
Rate of rejection（Lower）	-t (φ*, 2α)	-1.69388841		-1.70561634		-1.69726036		-1.68385213	
Two-tailed probability	p value	0.184164338		0.568442663		0.941574064		0.032597092	
One-tailed probability（Upper）	p value	0.907917831		0.715778668		0.529212968		0.983701454	
One-tailed probability（Lower）	p value	0.092082169		0.284221332		0.470787032		0.016298546	

Table C-37 Comparison of current average salary between Generation 3 graduates of STOU and CU, a Welch t test

		Business		Law		Economics		Political Science	
		STOU	CU	STOU	CU	STOU	CU	STOU	CU
Number of samples	n	29	22	31	17	26	8	28	25
Average (Mean)		12177.93	24586.82	19887.74	16120.00	49086.90	30692.31	21461.46	20649.60
Squared deviations	S	1281839269	1992722800	17989570465	2338004872	4.06741E+11	2313790420	38146408084	3693401189
Variance	V	45779973.89	94891561.91	599652348.8	146125304.5	16269658114	330541488.6	1412829929	153891716.2
Degree of freedom	φ	28	21	30	16	25	7	27	24
Mean difference		-12408.89		3767.74		18394.59		811.86	
Equivalent degree of freedom		35.60743433		45.67505498		27.97483152		33.42986405	
Significant level	α	0.05		0.05		0.05		0.05	
Test statistics	t value	-5.11218146		0.712809874		0.712201987		0.107899562	
Rate of rejection	t (φ*, α)	2.030110409		2.014103302		2.051829142		2.03451691	
Rate of rejection（Upper）	t (φ*, 2α)	1.689572855		1.679427442		1.703288035		1.692360456	
Rate of rejection（Lower）	-t (φ*, 2α)	-1.68957285		-1.67942744		-1.70328804		-1.69236046	
Two-tailed probability	p value	1.14281E-05		0.479643519		0.48244912		0.914728738	
One-tailed probability（Upper）	p value	0.999994286		0.239821759		0.24122456		0.457364369	
One-tailed probability（Lower）	p value	5.71403E-06		0.760178241		0.75877544		0.542635631	

Table C-38 Comparison of average beginning salary between RU and CU: The case of the Faculty of Economics, Generation 1, by Student t test

		A (RU)	B (CU)
Number of samples	n	26	28
Average (Mean)		2723.85	3266.43
Squared deviations	S	63164350	45998577
Variance	V	2526574	1703651
Degree of freedom	ϕ	25	27
Mean difference		-542.58	
Common variance		2099287.058	
Significant level	α	0.05	
Test statistics	t value	-1.37498094	
Rate of rejection	t (φ, α)	2.006645445	
Rate of rejection (Upper)	t (φ, 2α)	1.674688974	
Rate of rejection (Lower)	-t (φ, 2α)	-1.67468897	
Two-tailed probability	p value	0.17503	
One-tailed probability (Upper)	p value	0.912483	
One-tailed probability (Lower)	p value	0.087517	

Table C-39 Comparison of average beginning salary between RU and CU: The case of the Faculty of Political Science, Generation 1, by Student t test

		A (RU)	B (CU)
Number of samples	n	29	26
Average (Mean)		2652.76	2568.08
Squared deviations	S	114109856	49468725
Variance	V	4075352	1978749
Degree of freedom	φ	28	25
Mean difference		84.68	
Common variance		3086388.321	
Significant level	α	0.05	
Test statistics	t value	0.17846781	
Rate of rejection	t (φ, α)	2.005745046	
Rate of rejection (Upper)	t (φ, 2α)	1.674115993	
Rate of rejection (Lower)	-t (φ, 2α)	-1.674115993	
Two-tailed probability	p value	0.85904	
One-tailed probability (Upper)	p value	0.429518	
One-tailed probability (Lower)	p value	0.570482	

Table C-40 Comparison of average beginning salary between RU and CU: The case of the Faculty of Political Science, Generation 2, by Student t test

		A (RU)	B (CU)
Number of samples	n	27	27
Average (Mean)		5867.04	7422.22
Squared deviations	S	851240650	1711306246
Variance	V	32740025	65819471
Degree of freedom	φ	26	26
Mean difference		-1555.18	
Common variance		49279748	
Significant level	α	0.05	
Test statistics	t value	-0.813979201	
Rate of rejection	t (φ, α)	2.006645445	
Rate of rejection (Upper)	t (φ, 2α)	1.674688974	
Rate of rejection (Lower)	-t (φ, 2α)	-1.674688974	
Two-tailed probability	p value	0.41937	
One-tailed probability (Upper)	p value	0.790316	
One-tailed probability (Lower)	p value	0.209684	

Table C-41 Comparison of average beginning salary between RU and CU: The case of the Faculty of Economics, Generation 3, without the extreme data, by Student t test

		A (RU)	B (CU)
Number of samples	n	26	9
Average (Mean)		8793.46	11982.14
Squared deviations	S	306271000.3	127330797
Variance	V	12250840.01	15916349.62
Degree of freedom	φ	25	8
Mean difference		-3188.68	
Common variance		13139448.4	
Significant level	α	0.05	
Test statistics	t value	-2.274554134	
Rate of rejection	t (φ, α)	2.03451691	
Rate of rejection (Upper)	t (φ, 2α)	1.692360456	
Rate of rejection (Lower)	-t (φ, 2α)	-1.692360456	
Two-tailed probability	p value	0.02956	
One-tailed probability (Upper)	p value	0.985219	
One-tailed probability (Lower)	p value	0.014781	

Table C-42 Comparison of average beginning salary between STOU and CU: The case of the Faculty of Business, Generation 3, by Student t test

		A (STOU)	B (CU)
Number of samples	n	31	30
Average (Mean)		6738.06	11495.33
Squared deviations	S	261973161.1	371918578.5
Variance	V	8732438.70	12824778.57
Degree of freedom	φ	30	29
Mean difference		-4757.27	
Common variance		10743927.79	
Significant level	α	0.05	
Test statistics	t value	-5.666994837	
Rate of rejection	t (φ, α)	2.000997483	
Rate of rejection (Upper)	t (φ, 2α)	1.671091923	
Rate of rejection (Lower)	-t (φ, 2α)	-1.671091923	
Two-tailed probability	p value	0.00000	
One-tailed probability (Upper)	p value	1.000000	
One-tailed probability (Lower)	p value	0.000000	

Table C-43 Comparison of average beginning salary between STOU and CU: The case of the Faculty of Economics, Generation 3, without the extreme data, by Student t test

		A (STOU)	B (CU)
Number of samples	n	24	9
Average (Mean)		6400.67	11982.14
Squared deviations	S	261973161.1	127330797
Variance	V	9096075.04	15916349.62
Degree of freedom	φ	23	8
Mean difference		-5581.47	
Common variance		10856145.9	
Significant level	α	0.05	
Test statistics	t value	-4.333917748	
Rate of rejection	t (φ, α)	2.039514584	
Rate of rejection (Upper)	t (φ, 2α)	1.695518677	
Rate of rejection (Lower)	-t (φ, 2α)	-1.695518677	
Two-tailed probability	p value	0.00014	
One-tailed probability (Upper)	p value	0.999928	
One-tailed probability (Lower)	p value	0.000072	

Table C-44 Comparison of current average salary between RU and CU: The case of the Faculty of Business, Generation 1, by Student t test

		RU	CU
Number of samples	n	23	10
Average (Mean)		56173.91	59400.00
Squared deviations	S	37697302215	7376401561
Variance	V	1713513737.05	819600173.40
Degree of freedom	φ	22	9
Mean difference		-3226.09	
Common variance		1453990444	
Significant level	α	0.05	
Test statistics	t value	-0.223358586	
Rate of rejection	t (φ, α)	2.039514584	
Rate of rejection (Upper)	t (φ, 2α)	1.695518677	
Rate of rejection (Lower)	-t (φ, 2α)	-1.695518677	
Two-tailed probability	p value	0.82472	
One-tailed probability (Upper)	p value	0.587639	
One-tailed probability (Lower)	p value	0.412361	

Table C-45 Comparison of current average salary between RU and CU: The case of the Faculty of Law, Generation 1, by Student t test

		RU	CU
Number of samples	n	22	16
Average (Mean)		44523.81	56561.88
Squared deviations	S	38376693839	19953670727
Variance	V	1827461611.39	1330244715.15
Degree of freedom	φ	21	15
Mean difference		-12038.07	
Common variance		1620287905	
Significant level	α	0.05	
Test statistics	t value	-0.910207276	
Rate of rejection	t (φ, α)	2.02809133	
Rate of rejection (Upper)	t (φ, 2α)	1.688297289	
Rate of rejection (Lower)	-t (φ, 2α)	-1.688297289	
Two-tailed probability	p value	0.36877	
One-tailed probability (Upper)	p value	0.815616	
One-tailed probability (Lower)	p value	0.184384	

Table C-46 Comparison of current average salary between RU and CU: The case of the Faculty of Economics, Generation 1, by Student t test

		RU	CU
Number of samples	n	16	13
Average (Mean)		54375.00	63769.23
Squared deviations	S	12594615442	21376309174
Variance	V	839641029.43	1781359097.82
Degree of freedom	φ	15	12
Mean difference		-9394.23	
Common variance		1258182393	
Significant level	α	0.05	
Test statistics	t value	-0.709287091	
Rate of rejection	t (φ, α)	2.051829142	
Rate of rejection (Upper)	t (φ, 2α)	1.703288035	
Rate of rejection (Lower)	-t (φ, 2α)	-1.703288035	
Two-tailed probability	p value	0.48423	
One-tailed probability (Upper)	p value	0.757887	
One-tailed probability (Lower)	p value	0.242113	

Table C-47 Comparison of current average salary between RU and CU: The case of the Faculty of Political Science, Generation 1, by Student t test

		RU	CU
Number of samples	n	27	13
Average (Mean)		47985.93	46516.15
Squared deviations	S	39429759464	28184378781
Variance	V	1516529210.17	2348698231.76
Degree of freedom	φ	26	12
Mean difference		1469.78	
Common variance		1779319428	
Significant level	α	0.05	
Test statistics	t value	0.103216454	
Rate of rejection	t (φ, α)	2.024394234	
Rate of rejection (Upper)	t (φ, 2α)	1.685953066	
Rate of rejection (Lower)	-t (φ, 2α)	-1.685953066	
Two-tailed probability	p value	0.91833	
One-tailed probability (Upper)	p value	0.459167	
One-tailed probability (Lower)	p value	0.540833	

Table C-48 Comparison of current average salary between the Faculty of Business and the Faculty of Law of CU, Generation 1

		A (Business)	B (Law)
Number of samples	n	15	27
Average (Mean)		66000	45106.67
Squared deviations	S	12160003380	16847570960
Variance	V	868571670	647983498.5
Degree of freedom	φ	14	26
Mean difference		20893.33	
Equivalent degree of freedom		25.63841026	
Significant level	α	0.05	
Test statistics	t value	2.308631757	
Rate of rejection	t (φ*, α)	2.05953711	
Rate of rejection Upper	t (φ*, 2α)	1.708140189	
Rate of rejection Lower	-t (φ*, 2α)	-1.70814019	
Two-tailed probability	p value	0.029515901	
One-tailed probability Upper	p value	0.014757951	
One-tailed probability Lower	p value	0.985242049	
Reliability rate	1-α	0.95	
Upper limit of reliability		39532.33051	
Lower limit of reliability		2254.329495	

Table C-49 Comparison of current average salary between the Faculty of Economics and the Faculty of Law of CU, Generation 1

		A (Economics)	B (Law)
Number of samples	n	41	27
Average (Mean)		64782.61	45106.67
Squared deviations	S	1.11225E+11	16847570960
Variance	V	2780632185	647983498.5
Degree of freedom	φ	40	26
Mean difference		19675.94	
Equivalent degree of freedom		61.47512661	
Significant level	α	0.05	
Test statistics	t value	2.053371774	
Rate of rejection	t (φ*, α)	1.999624146	
Rate of rejection Upper	t (φ*, 2α)	1.670218808	
Rate of rejection Lower	-t (φ*, 2α)	-1.670218808	
Two-tailed probability	p value	0.044331009	
One-tailed probability Upper	p value	0.022165505	
One-tailed probability Lower	p value	0.977834495	

Reliability rate	1-α	0.95	
Upper limit of reliability		38836.85631	
Lower limit of reliability		515.0236863	

Table C-50Comparison of current average salary between RU and CU: The case of the Faculty of Political Science, Generation 2, by Student t test

		A (RU)	B (CU)
Number of samples	n	29	16
Average (Mean)		36760.00	52187.50
Squared deviations	S	42472980964	13648437805
Variance	V	1516892177.29	909895853.67
Degree of freedom	φ	28	15
Mean difference		-15427.5	
Common variance		1305149274	
Significant level	α	0.05	
Test statistics	t value	-1.371254909	
Rate of rejection	t (φ, α)	2.016690814	
Rate of rejection (Upper)	t (φ, 2α)	1.681071353	
Rate of rejection (Lower)	-t (φ, 2α)	-1.681071353	
Two-tailed probability	p value	0.17741	
One-tailed probability (Upper)	p value	0.911295	
One-tailed probability (Lower)	p value	0.088705	

Table C-51Comparison of current average salary between STOU and CU: The case of the Faculty of Law, Generation 2, by Student t test

		A (STOU)	B (CU)
Number of samples	n	24	27
Average (Mean)		37377.08	45106.67
Squared deviations	S	20310495536	16847570960
Variance	V	883065023.29	647983498.47
Degree of freedom	φ	23	26
Mean difference		-7729.59	
Common variance		758327887.7	
Significant level	α	0.05	
Test statistics	t value	-1.000530563	
Rate of rejection	t (φ, α)	2.009574018	
Rate of rejection (Upper)	t (φ, 2α)	1.676551165	
Rate of rejection (Lower)	-t (φ, 2α)	-1.676551165	
Two-tailed probability	p value	0.32197	
One-tailed probability (Upper)	p value	0.839015	
One-tailed probability (Lower)	p value	0.160985	

Table C-52 Comparison of current average salary between RU and CU: The case of the Faculty of Business, Generation 3, by Student t test

		A (RU)	B (CU)
Number of samples	n	19	22
Average (Mean)		19597.89	24586.82
Squared deviations	S	3144979361	1992722800
Variance	V	174721075.60	94891561.91
Degree of freedom	φ	18	21
Mean difference		-4988.93	
Common variance		131735952.8	
Significant level	α	0.05	
Test statistics	t value	-1.387878552	
Rate of rejection	t (φ, α)	2.022688932	
Rate of rejection (Upper)	t (φ, 2α)	1.684875315	
Rate of rejection (Lower)	-t (φ, 2α)	-1.684875315	
Two-tailed probability	p value	0.17305	
One-tailed probability (Upper)	p value	0.913474	
One-tailed probability (Lower)	p value	0.086526	

Table C-53 Comparison of current average salary between RU and CU: The case of the Faculty of Law, Generation 3, by Student t test

		A (RU)	B (CU)
Number of samples	n	13	17
Average (Mean)		13636.92	16120.00
Squared deviations	S	1541226348	2338004872
Variance	V	128435529.04	146125304.53
Degree of freedom	φ	12	16
Mean difference		-2483.08	
Common variance		138543972.2	
Significant level	α	0.05	
Test statistics	t value	-0.572575029	
Rate of rejection	t (φ, α)	2.048409442	
Rate of rejection (Upper)	t (φ, 2α)	1.701130259	
Rate of rejection (Lower)	-t (φ, 2α)	-1.701130259	
Two-tailed probability	p value	0.57150	
One-tailed probability (Upper)	p value	0.714249	
One-tailed probability (Lower)	p value	0.285751	

Table C-54 Comparison of current average salary between STOU and CU:
The case of the Faculty of Business, Generation 3, by Student t test

		A (STOU)	B (CU)
Number of samples	n	29	22
Average (Mean)		12177.93	24586.82
Squared deviations	S	1281839269	1992722800
Variance	V	45779973.89	94891561.91
Degree of freedom	φ	28	21
Mean difference		-12408.89	
Common variance		66827797.33	
Significant level	α	0.05	
Test statistics	t value	-5.368829506	
Rate of rejection	t (φ, α)	2.009574018	
Rate of rejection (Upper)	t (φ, 2α)	1.676551165	
Rate of rejection (Lower)	-t (φ, 2α)	-1.676551165	
Two-tailed probability	p value	0.00000	
One-tailed probability (Upper)	p value	0.999999	
One-tailed probability (Lower)	p value	0.000001	

Biography

Yoshinobu Onishi is a Japanese national and is currently serving as Programme Officer, United Nations University, Tokyo. As Programme Officer, he is currently responsible for the Financial Assistance Programme for students from developing countries studying in Japan. He received a B.A. in Economics from Keio University, Tokyo, and also graduated from Columbia University, New York, with a Master of Public Administration. He has much experience in higher education reform projects in Southeast Asia gained through working as a Program Officer for the Sasakawa Peace Foundation. He is also a media expert who has worked at NHK (Japan Broadcasting Corporation) for six years.