

**AN ECONOMETRICS ANALYSIS ON THE  
EFFECT OF SATISFACTION FOR  
FOREIGN GRADUATE STUDENTS'  
ACADEMIC PERFORMANCE IN TAIWAN**

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**ABSTRACT**

*Taiwan has proven and continues to prove its economic prowess as a fast and well developed nation. One theory to account for this accomplishment is its continued success in developing its best natural resource - its people - through education. A continuum of this practice is the implementation of Higher Education and then International Higher Education. Since early 1990s, foreign students have been studying in Taiwan obtaining degrees in various academic disciplines at both undergraduate and graduate levels. However, a foreign student, like any other expatriate, may have problems adjusting to a new country. Therefore, this study examines the factors that cause foreign students' satisfaction or dissatisfaction in adapting and adjusting to life in Taiwan and how those factors may further affect their academic performance. The research method used for data collection is a quantitative case study using the Student Satisfaction Questionnaire that was developed and piloted by the researchers. The population is ICDF higher education students who have been studying for at least one year in Taiwan and are doing courses in English. The response rate was 73.1%. The results indicate that a majority of the international students are satisfied ( $M = 3.63$ ,  $SD = .66$ ) where 60.5% could be described satisfied to very satisfied and only 7% as dissatisfied. Students' nationalities, age and gender have no statistical significance to their performance. The main findings of this research should assist ICDF, the education institutions, and the Ministry of Education in making the transition and life of foreign students smoother. It may also assist future foreign students in preparation for adjusting and adapting to Taiwan. Finally, the study offers recommendations for all the parties involved and the researchers provide suggestions for future research that could aid in learning about the lives of foreign students in Taiwan.*

*Keywords: International Higher Education, Foreign Graduate Student, Adaptation/Adjustment, Academic Performance, ICDF (International Cooperation and Development Fund)*

## INTRODUCTION

The internationalization of higher education is being adopted by many nations. UNESCO (2005) stated that there is an upward of 2 million students annually that are now studying in countries other than their own and that the number is increasing. There is hardly any country that is unaffected by the presence of international students in its institutions of higher learning, or the pressure to send some students to study abroad (Paige, 1990). Rationale behind the increasing number of international students is the assumption that students can serve as cultural carriers and resources (Klineberg and Hull, 1979; Paige, 1990). They can also serve as citizens with professional qualifications, international experience, language proficiency and cross-cultural understanding. It has also been assumed that these cultural links could help reduce inter-group tension, prejudice, hostility and discriminatory behaviors and increase international understanding and co-operation (Baron and Bachman, 1987).

These assumptions, however, have not always been supported. For decades researchers have been investigating the student sojourner's life and the problems that have caused stress on them, which may ultimately affect their academic performance. Mental health problems such as depression, psychosomatic complaints, anxiety and paranoid reactions (Heikinheimo and Shute, 1986; Jou and Fukada, 1997; Manese, Sedlacek, & Leong, 1988; Sam and Eide, 1991; Ying and Liese, 1991) have been suggested to characterize international students. These are in addition to socio-cultural problems (e.g., language difficulties, difficulties in negotiating day-to-day social activities, racial and ethnic discrimination) (Furnham and Bochner, 1982, 1986; Kagan and Cohen, 1990; Pedersen, 1991; Ward and Kennedy, 1993) and academic problems such as failure and slower academic progress than host nationals (Barker, Child, Gallos, Jones and Callan, 1991, Suinn, Khoo, and Ahuana, 1995; Wan, Chapman, and Biggs, 1992) have been documented as characterizing international students' overseas sojourn.

Many countries try to lessen these problems but have never totally eradicated them. The problem lies in the fact that the internationalization of

education must be achieved not simply or solely by giving the student the opportunity to cross physical borders, but by providing the necessary tools to ensure that both students and teachers learn to work and study in an academic environment that is diverse from an international point of view. An easy but somewhat costly solution would be for host countries, while attracting foreign students, to sensitize the potential students to the culture of the host country. This is hardly the approach taken at present; and as a result, there are many cultural complications to the foreign students in cultural settings totally oblivious to them.

Despite these conclusions, Taiwan still has internationalized its higher education. Many higher education institutions in Taiwan are attracting more and more foreign students through exchange programs, government scholarships, and private scholarships. One of the institutions that provide scholarships to international students is ICDF (International Cooperation and Development Fund).

These students come from all over the world with many expectations and diverse cultural backgrounds and they are all non-speakers of Mandarin Chinese or have had little exposure to it. As a result, issues will arise that may cause the international students to experience dissatisfaction - primarily with communication and also with conditions pertaining to Taiwan's culture - and this dissatisfaction can further affect their academic performance.

As a result, the researchers want to provide meaningful information to foreign students, their home support, host schools in Taiwan, the Taiwanese government, and especially ICDF. One area of concern, and of which this study sought to explore, was to ascertain the level of satisfaction among international students, the factors accounting for it, and how these affect their academic performance. According to the Ministry of Education of Taiwan, the training of individuals in higher education is the key to Taiwan's survival and internationalization (Weng, 2001; Law, 2003 cited in Mok, 2003). Failure to cope with international competition and demand for academic innovation and consolidation will lead to loss of academic advantages to neighboring Asian nations, and the loss

of the opportunity to pursue further excellence will result in Taiwan lagging behind in this international competitive trend. This training can only be fully effective if Taiwan can identify and solve any problems which will hinder its progress. This has prompted the researchers to study and analyze foreign graduate students in Taiwan. Therefore, this research has two purposes:

1. To explore what factors may affect foreign students' satisfaction and its effect on their education.
2. To identify and propose the necessary interventions that may assist the students' cultural and academic life in Taiwan.

The research questions for this study are:

1. To what extent are ICDF students satisfied in Taiwan?
2. What is the academic performance of ICDF Graduate students?
3. Do the demographic factors (age, gender, nationality) and students' degree have any statistical significance to ICDF Graduate students' academic performance?
4. What specific satisfaction factors affect ICDF students' academic performance?

## RESEARCH BACKGROUND

In an attempt to better understand the satisfaction level of international students in Taiwan, and to develop a questionnaire that will cover the predictors of satisfaction, the research looked at consistencies in variables found in a number of researches.

One major problem is communication. Language proficiency level of students in host country deters communication with peers, teachers, and counselors (Bochner, Hutnik, & Furnham, 1985; Furnham & Alibhai, 1985; Heikinheimo & Shute, 1986). Likewise, the interactive class discussions may work against international stu-

dents and limit the potential benefits they could bring to domestic students (Huxur et al., 1996). In Australia, for example, some Asian students were exposed to negative experiences in the classroom in that they experienced suppression of "voice," (Edgeworth & Eiseman 2007). Devos (2003) concluded that communication and the lack of learning host countries' language affect the students' academic performance.

The ability to socialize is another factor. Host nationals are often insensitive to the needs of the international students for conversation (Beaver and Tuck 1998; Bochner, Hutnik, & Furnham, 1985; Edgeworth & Eiseman 2007; Furnham & Alibhai, 1985; Volet & Ang, 1998). Cunningham's (1991) survey of 53 Canadian universities indicated two categories of barriers to integration: barriers related to international students themselves and barriers related to the institutional community. Their lack of familiarity with the educational and social systems was listed as a barrier.

Financial pressures or restrictions hindered some international students who reported that the hardest part of adjusting to college was meeting the financial expenses (Boyer and Sedlacek, 1986; Cunningham, 1991). Some feel insecure financially with high tuition and limited financial aid; they are also restricted in seeking employment in most cases and have limited access to employment (Lyakhovetska, 2003). In an 11-nation study among international students, financial difficulties were found to be ranked as the greatest problem in all the countries (Klineberg and Hull, 1979).

The need for institutional support is a factor that directly affects international students academically. Cunningham (1991) reported that 59% of administrators indicated that unless there was a problem, their institution did not care about international students. Lyakhovetska, (2003) and De Vita (2000) found that support services, institutional policies, and the role of international students were not fully met.

The living conditions of students seem to have a significant impact on their adjustment and profound influence on the quality of their social and academic adjustment experience (Cunningham, 1991; Edgeworth & Eiseman, 2007;

Lyakhovetska, 2003). Another concern of international students is the choice of food offered in dining halls and food courts in campus facilities (Alazzi and Chiodo, 2006; Dillard and Chisolm, 1983; Edgeworth & Eiseman, 2007; Heikinheimo & Shute, 1986).

All these problems lead to a greater factor which is psychological. The loss of social support and status, loss of familiar cues, loss of certainty, and self-worth consequentially creates threats to cultural identity, powerlessness, feelings of marginality, sense of inferiority, loneliness, hostility, and perceived alienation and discrimination become major mental health risks (Alazzi and Chiodo, 2006; Amoh, 1995; Chapman and Pyvis, 2006; Garrod & Davis, 1999; Ishii's, 1997; Leong & Sedlacek, 1986). But of greater psychological effect is the sense of discrimination that has been theorized to have a negative effect on their adjustment and consequently their academic life (Heikinheimo and Shute, 1986; Sadowsky and Plake, 1992; Spencer-Rogers, 2001).

Gender and age are perhaps the two most studied areas regarding demographic factors bearing on international students' adaptation and generally suggest that younger students adapt more easily than older ones (Ying and Liese, 1994), and female international students tend to be less easy to adapt than their male counterparts partly as a result of having to attend to domestic obligations while pursuing academic goals.

Another aspect of demographic characteristics that has received attention in the literature is the geographical origin of the international student (Furnham and Bochner, 1982; Sam and Eide, 1991; Zunin and Rubin, 1967). In a study by Furnham and Bochner (1982) it was found that adaptation difficulties were related to the cultural distance between the country the student originated from and the host country.

## METHODOLOGY

This research employed a quantitative method approach for data gathering. A quantitative questionnaire with some items taken from the Student Adaptation to College Questionnaire (SACQ) developed by Baker & Siryk, (1989) and other factors found through research will

be used to test foreign students' satisfaction on their performance. The test used a Likert-type scale. Responses were based on a five-point Likert scale: 1 = very dissatisfying, 2 = dissatisfying, 3 = NA/neutral, 4 = satisfying and 5 = very satisfying. The respondents were instructed to refer to their experience here in Taiwan and to fill out the questionnaire that has a range of selected items about their experiences as foreign students in Taiwan. Some of the items are in relation to Geert Hofstede's theory on power distance, individualism, uncertainty avoidance, and masculinity. The questionnaire is not that which was created by Geert Hofstede but the items are related to the meaning of each dimension as described by Hofstede.

## Participants

A total of 114 ICDF international students (83 males, 31 females) both at graduate and undergraduate levels enrolled at different universities in Taiwan participated in the study. The mean age of the students was 26.35 years (SD = 6.264) and had on average been living in Taiwan for one year. Graduate and Undergraduate students equaled at 57. Participants originated from 24 different countries with 21 students coming from Belize. Eight national countries had a student representative each. For brevity and statistical purposes, the countries have been categorized into four geographical regions: Latin American countries (n = 58, 51.8%), Belize and Caribbean countries (n = 28, 24.6%), Asia (n = 9, 8.8%), and Africa (n = 17, 14.9%). The categorization was inspired by regions, and Central America, because many of ICDF students come from that region, was divided into Latin American countries as one, and Belize (Non-Latin) and the Caribbean as the other.

## Procedure

First, a pilot test was conducted using 10 ICDF students (5 males and 5 females), 4 were Graduates and 6 Undergraduates and were from 10 different participating ICDF institutions. The samples also ensured that each region had at least two student representatives. These participants were mailed the questionnaire with a cover letter explaining the purpose, their ano-

nymity and that of the institution, and confidentiality. The pilot test was conducted for reliability and validity. Validity of the instrument was determined by content validity by investigating if the measurement questions in the questionnaire provided adequate coverage of the investigative questions. The researchers reached content validity by discussing the items and the meaning with experts. One expert provided an assessment of each item in the questionnaire by determining if they were useful or not. Validity was also reached by identifying the questions items to satisfaction problems found in other countries. Reliability showed a Cronbach Alpha of .948.

For the final test, participants were obtained through convenient sampling by visiting the institutions where ICDF students are enrolled. The questionnaires were hand delivered. The questionnaire included a cover letter informing the participants of the purpose of the study and that participation was voluntary. To ensure anonymity, neither the participants' names nor institutions' names were used. The participants were also ensured that the results were going to be treated confidentially. Participation was quite satisfactory with an overall response rate of 86.4%. Cronbach Alpha for the final test was .945.

### Instrument

The instrument (Student Satisfaction Questionnaire) for this study was either developed for this study or directly taken or with modifications from existing instruments. With the exception of the demographic variables, and the scale for GPA, all the items were answered on a 5-point Likert scale. The Demographics included age, gender, and country of origin. Student Grade Point Average was taken as levels A, B, and C which was given by the students. The Degree variable included graduate and undergraduates. Their Satisfaction was measured using the 35 questions whereby participants indicated their level of satisfaction from 1= very dissatisfied to 5= very satisfied. The questions in the questionnaire were developed based on problems (found by other researchers from other regions) that international students had in other countries. The specific factors identified in the items of the

questions and the demographic factors were discussed in the background of the research.

### Data analysis

Different statistical methods from Statistical Package for the Social Sciences (SPSS) PC version 18.0 was used to analyze satisfaction data and students' performance data. These methods include descriptive statistics, crosstab and chi-square, and linear regression analysis. Descriptive statistics, e.g., means, frequencies, and a histogram of student responses are often applied to detect the most and the least satisfaction items regarding college programs and services (Damminger, 2001). Chi-square method is used to identify the significant proportion difference for students' performance based on their degree. The linear regression method is a useful tool to analyze the relationship between multiple explanatory variables and student performance results. Linear regression allows the researcher to identify explanatory variables related to academic performance and how it contributes to the overall college satisfaction (Thomas and Galamos, 2002). This method also permitted the researchers to estimate the magnitude of the effect of the explanatory variables on the outcome variable. Therefore, regression methods seem to be superior in studying the relationship between the explanatory and outcome variables.

$$Y = f(x) = a_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + \epsilon$$

Where:

Y = GPA

x1 = Power Distance variables

x2 = Uncertainty Avoidance variables

x3 = Masculinity variables

x4 = Individualism variables

### EMPIRICAL RESULTS

Using the Student Satisfaction Questionnaire and on the 5-point Likert scale, the sample shows that the international students are at a very good satisfaction level ( $M = 3.63$ ,  $SD = .66$ ). This means that the score is above the midpoint of the scale which is 3. Using the scores below 2.5 and above 3.5 as cut-off points for poor satisfaction scores and very good satisfac-

tion scores, approximately 7% and 60.5% of the ICDF students studying in Taiwan could respectively be said to have poor and very good satisfaction scores.

To test Research Question 2, Cross tabular analysis and Chi-square test were used to test the academic performance of Graduate students. From the Cross tabular table we see that the Graduates are performing above their expected count at A and B levels.

To test Research Questions 3 and 4, a multiple linear regression analysis was used. Students' GPA is the dependent variable indicating students' academic performance and the demographic variables (age, gender, and nationality), degree and the 35 Questions are the independent variables. Students' nationalities were placed into geographic regions as aforementioned. The geographic regions were treated as dummy variables. Students from Latin America were used as the reference group. The process used in the Multiple Linear Regression Analysis in Table 2 is the backward elimination procedure, which examines the p-values for the 45 independent variables, and eliminates the highest insignificant variable in each equation. This process was repeated 35 times, in 36 equations, until all remaining independent variables reached at least the 10% level of significance. In the table, the independent variables accounted for 82.2% of the variance of GPA in Equation 1 and 79.9% of the variance of GPA in Equation 36. The researcher decided to show all variables and their significance in Equation 1 and how that changes because of the backward regression

process by Equation 36 where all remaining variables are significant.

In Equation 1, of the 45 independent variables, 23 have negative parameters of which only 2 have statistical significance explaining the variance of GPA. From the other 22 variables that have positive parameters 6 have statistical significance to GPA. For the Power Distance dimension, two questions show significance to GPA. The parameter for Q1 is positive (.176), with the t-ratio (3.429), indicating that it is significant at the 1% level and Q15 has a positive parameter (.088) and t-ratio 1.673 showing significance at 10%. The Individualism dimension only has one question that is statistically significant which is Q11 with a negative parameter (-.102) and a t-ratio of (-2.245) that is significant at 5%. For the Uncertainty Avoidance dimension, Q12 is the only significant question with a negative parameter of (-.090), t-ratio of (-1.690) that is significant at 10%. The final dimension Masculinity likewise only has one question Q28 significant with a positive parameter of (.071), t-ratio (2.069) that indicates a significance at 5%. From the demographic variables, Europe has a positive parameter (.388), t-ratio (2.192) that is significant at 5%, and South America also has a parameter (.303), t-ratio (1.756) that is significant at 10%. Students' degree shows significance to performance with a positive parameter of (.476) and t-ratio (4.623) indicating significance at 1%. These results changed from equation to equation.

In Equation 36, 10 variables show statistical significance to students GPA. Of those 10 variables, 3 have negative parameters and 7 have positive parameters.

Q1 has a positive parameter of (.201) and a t-ratio of (6.025) which is significant at 1% level. This is indicating that an increase in the students' opportunity to freely express their opinions in class will lead to an increase in the performance. Q12 with negative parameter (-.066) and t-ratio (-1.975) significant at 5% is suggesting that an increase in the students feeling that their instructors have genuine interest in their learning will lead to a decrease in their performance. Q11 with a negative parameter (-.087) and a t-ratio (-2.493) which is significant at 5% suggests that an increase in students' sat-

Statistics	GPA			
	C = 70-79	B = 80-89	A = 90-100	Total
Count	4	38	15	57
Expected Count	11.5	35.5	10.0	57.0
% within GPA	17.4%	53.5%	75.0%	50.0%
Chi-square value is 15.135 (p = .001)				

**TABLE 2**  
**MULTIPLE REGRESSION OF INDEPENDENT VARIABLES AS PREDICTORS FOR GPA**

	Variables	Equation 1		Equation 36	
		$\beta$ value <sup>1</sup>	t-value	$\beta$ value <sup>1</sup>	t-value
Power Distance	Q1	<b>.176***</b>	<b>3.429</b>	<b>.201</b>	<b>6.025***</b>
	Q4	-.070	-1.441		
	Q7	-.022	-.447		
	Q10	-.058	-1.139		
	Q13	-.013	-.275		
	Q15	<b>.088*</b>	<b>1.673</b>		
	Q18	.067	1.287	<b>.085</b>	<b>2.127**</b>
Uncertainty Avoidance	Q12	<b>-.090*</b>	<b>-1.690</b>	<b>-.066</b>	<b>-1.975**</b>
	Q14	.008	.167		
	Q17	.037	.650		
	Q20	.078	1.485		
	Q21	.047	.811		
	Q23	-.019	-.333		
	Q24	.061	1.168		
	Q26	.008	.175		
	Q30	-.031	-.565		
	Q31	.012	.227		
Masculinity	Q3	.042	.893		
	Q6	.048	1.123		
	Q9	-.036	-.867		
	Q16	-.049	-.920	<b>-.060</b>	<b>-1.739*</b>
	Q19	.040	.899	<b>.059</b>	<b>1.824*</b>
	Q22	-.045	-1.114		
	Q25	.046	1.289	<b>.059</b>	<b>2.007**</b>
	Q28	<b>.071**</b>	<b>2.069</b>		
Individualism	Q35	-.006	-.119		
	Q2	.053	1.037		
	Q5	-.002	-.041		
	Q8	-.041	-.916		
	Q11	<b>-.102**</b>	<b>-2.245</b>	<b>-.087</b>	<b>-2.493**</b>
	Q27	-.038	-1.026		
	Q29	-.048	-1.063		
	Q32	.059	.985		
Demographic	Q33	-.050	-1.100		
	Age	-.001	-.075		
	Gender	-.009	-.105		
	Asia	.009	.064		
	NAmerica	.150	.885		
	SAmerica	<b>.303*</b>	<b>1.756</b>	<b>.292</b>	<b>2.309**</b>
	Europe	<b>.388**</b>	<b>2.192</b>	<b>.411</b>	<b>3.209***</b>
Africa	-.131	-.885			
AOceania	-.143	-.811			
Status	ICDF/Non-ICDF	-.032	-.297		
Degree	Grads/Undergrads	<b>.467***</b>	<b>4.623</b>	<b>.477</b>	<b>6.951***</b>
R <sup>2</sup>		<b>.882</b>		<b>.799</b>	

Note: \* = p < .1, \*\* = p < .05, \*\*\* = p < .01

<sup>1</sup> The value of the beta here is from the Unstandardized Coefficients.

isfaction that they have equal opportunities to participate in campus activities will result in a decrease in their academic performance. Q18 with a positive parameter (.085) t-ratio (2.127) significant at 1% suggests that an increase in the students' recognition for their performance and contributions will lead to an increase in their performance. Of the demographic variables, Degree was significant with a positive parameter (.477) t-ratio (6.591) significant at 1% which implies as students move from undergraduate to graduate, their performance will increase.

## DISCUSSION

The results of this study are very favorable to ICDF indicating that a majority of their scholarship students in Taiwan are satisfied with their lives here where more than 60% could be described as satisfied to very satisfied. The results seem to be consistent with many researchers' conclusions that in spite of the difficulties international students may face during their sojourn, they still adapt very well and are satisfied. Only a minority of the ICDF students could be classified as dissatisfied. This was based on an arbitrary cut off point established by the researchers that has not been validated so it needs to be qualified. However, it satisfied this research.

The result of most importance to ICDF is the students' academic performance. From the Crosstab table, 91 of the students are at A and B levels. However, ICDF should be concerned about their Undergraduate students. Their academic performance is poorer than that of the Graduate students. At C level there were 19 Undergraduate students, far poorer than what is expected. The multiple regression analysis also shows students' degree to be significant to performance. The positive parameter shows that graduates categorized as 1 are performing better than undergraduates categorized as 0. There are certainly many factors that can cause this poor performance.

From the multiple regression analysis, we got very valuable data for ICDF. Age and gender were of no statistical significance. This evidence is very beneficial to ICDF in that they do not have to worry about younger students coming to Taiwan or about female students finding it

harder to adapt. Of equal contribution to ICDF is that the nationality of students does not determine their academic performance. While using regional dummy variables and students from Latin America as the reference group, none proved significant to academic performance.

In using the 35 questions as independent variables only nine had significance. Five of the questions have positive effects on students' performance. These students become satisfied with voicing their opinions in class and with the grading systems. They become satisfied with the adequate opportunities to demonstrate their competencies of their course materials in class. They love being recognized for their performance and contributions as international students. Finally they feel that they fit well in their school's environment. Once these are met the students' academic performances are better. Though ICDF does not have control over the universities' methodologies, results like these can be passed on from ICDF to the institutions so that they can implement them for the betterment of the foreign students.

Dissatisfying to the students, and that have negative impacts are: the instructors' interest in their learning; expressing their opinions to teachers; equal opportunity to participate in campus activities, clubs; counseling and psychological services offered. These as implied by the regression may cause the students' academic performances to fall if they are increased. It appears that international students do not want to have much interaction with their professors, nor do they want to socialize much and visit counseling services. ICDF has no control over issues like these that are evidently personal; however, ICDF can only make their stay here more pleasing. Either these students refuse to assimilate Taiwan's culture and the schools' culture, or they just focus on learning and want to be left alone free of any interaction with teachers, local students and other foreign students. Mostly, it may be refusing to assimilate assumingly due to cultural differences.

## CONCLUSION

Taiwan ICDF is a very effective organization that evidently has met the students' financial



and educational needs while studying in Taiwan. Being scholarship students, an assumption would have been financial constraints. However, unlike other research findings that finance hinders students' performance, this study shows no evidence that finance is a factor. The students on average are quite satisfied and are academically performing to acceptable standards. The factors that do affect the students are more personal and are quite difficult to address on individual levels. ICDF can, however, make the students' stay more relaxed by providing, and assisting the institutions with ways to make the students' sojourn as conducive as possible. In the end, it is their academic prowess that is sought along with a sense of cultural appreciation and cultural unity.

The issue that ICDF needs to address is the academic performance of the undergraduate students. The research indicates their poorer performance when compared to Graduate students. This could be due to a number of factors. In fact, other research needs to be done maybe addressing age and length of stay in Taiwan. Whatever the case is, future research will provide some relevant evidences to ICDF.

The researchers will like to highlight the following limitations to this research. One is that the research is limited only to ICDF scholarship students so the results cannot be generalized to other international students in Taiwan. Another limitation is that the majority of ICDF students come from Latin America and the Caribbean so the results are biased to their contributions. A third limitation is that the instrument was developed by the researchers and was only piloted using 10 samples. The research was also limited only to students' age, gender, and nationality. Other demographics were not of interest by the researchers.

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