

INVESTIGATION SERVICE ON IMPACT OF OIST TO THE ECONOMIC SOCIETY OF OKINAWA AND JAPAN

**Okigin Economic Research Institute Co.,Ltd
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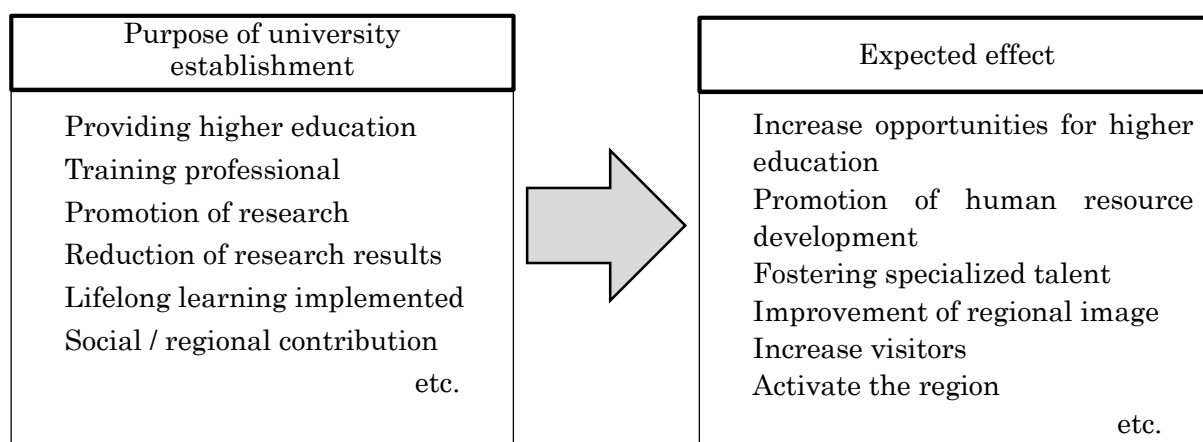
CHAPTER 1: REVIEW OF THE METHODOLOGY FOR ANALYZING THE IMPACTS OF UNIVERSITY PRESENCE

Okinawa Institute of Science and Technology Graduate University (hereinafter referred to as OIST) was launched with the enactment of the Okinawa Institute of Science and Technology Promotion Corporation Act in fiscal year (FY) 2005, and became the Okinawa Institute of Science and Technology School Corporation in 2011. Today, construction of OIST facilities is still ongoing. Therefore, this survey examined the economic impacts of the presence of OIST, as well as its facility development.

1. Overview of the Economic Impacts of University Presence

Universities, as institutions of higher education, have significant impacts to the local economy due to its function and size. A university provides opportunities for higher education; develops specialized personnel; publishes the fruits of research that originated from the local region; and vitalizes the community through student and faculty activities. Many of these impacts, however, are difficult to assess quantitatively. Given this background, Japan's Ministry of Education, Culture, Sports, Science, and Technology (MEXT) in 2007 studied the methodology for analyzing the impacts of university presence in its publication, *Report on Analysis of Economic Impacts of Regional Universities on the Local Community* (Japan Economic Research Institute Inc.). The report validated the use of inter-industry analysis (input-output analysis) to measure the economic ripple effects as a means to quantify economic impacts. Presence of a university in the region is expected to have a wide range of social and economic impacts as summarized in the figure below.

Figure 1-1-1-1 Various effects by university location



Source : Japan Economic Research Institute 「Economic Impact analysis report on regional universities」 Heisei era 2007

Inter-industry analysis measures economic ripple effects under the premise that university activities give rise to new demands in the region. There are four economic activities that bring forth new demands.

(1) Effect of Education and Research Activities

Education and research activities at a university involve various expenditures, to include purchase of textbooks, research supplies and equipment, lease of office equipment, and maintenance of university facilities. Such expenditures to operate the university create new demands for local industries, and induce new production to meet the new demands.

(2) Effect of Spending by Faculty, Staff and Students

Presence of a university results in employment of many faculty and staff, as well as gathering of students. Students, faculty and their family members living in the local community results in spending, which gives rise to new demands in the local economy and induce new production to meet the new demands.

(3) Effect of Other Activities

Universities hold academic conferences, symposiums and lectures that are open to the public to present the outcomes of education and research, and to contribute to the society and the local community. Open campuses and entrance exam orientations are held for high school students and those preparing to take entrance examinations. Furthermore, many universities offer their various facilities for public use. Visitors to the university bring about consumption and new demands, which induce new production in the local area.

(4) Effect of Facility Development

It has been seven years since inauguration of OIST, but construction of new laboratory buildings and other facilities is still ongoing within its spacious premises. The campus has various types of facilities, and there will continue to be new construction of additional laboratory buildings, as well as renovations, maintenance and repairs of existing facilities. These facility development and maintenance activities will create new demands in the local construction industry, and induce production.

2. Economic Impact Calculation Method

Expenditures from each of the aforementioned activities are considered the final demand, based on which the value of induced production per industry is calculated using the Input-Output Table.

(1) Calculation Factors

The following three factors are quantified: induced production, employment, and tax revenue.

(i) Induced production

The value of new production induced by expenditures from each activity is estimated, as well as the induced added value.

- Value of induced production
- Induced added value

(ii) Employment

Labor input coefficient is used to estimate the number of jobs created to meet the increase in production value.

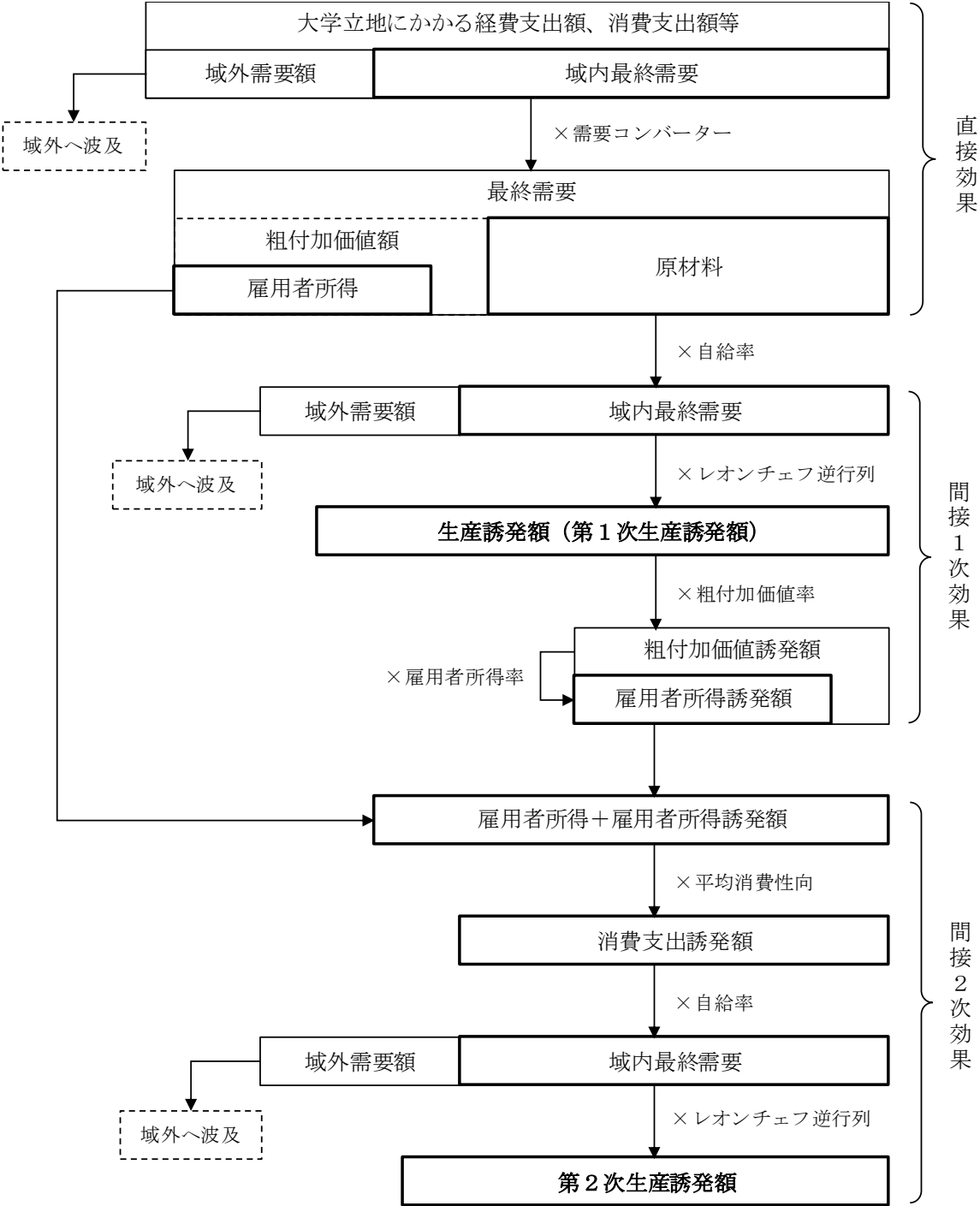
(iii) Tax revenue

Increased production value leads to increased income. Tax revenue coefficient is used to estimate the increase in tax revenue (of taxes related to earnings) resulting from such income increase.

(2) Calculation Method

The Input-Output Tables for Japan are used to calculate the Primary Ripple Effect (consumption (final demand) giving rise to intermediate demand which leads to increased production) and the Secondary Ripple Effect (increased production leading to increased income, which in turn leads to increased consumption and induces new production). Sum of Direct Effect, Primary Ripple Effect, and Secondary Ripple Effect are referred to as Total Effect.

Figure 1-1-2-1 Chart of Calculation flow of Economic Impact



※「域外へ波及」は沖縄県から県外への経済効果の波及であり、日本の場合は海外からの輸入の発生になる。

CHAPTER 2: ECONOMIC IMPACTS CALCULATION RESULTS

1. Direct Effect

(1) Effect of Education and Research Activities

Economic Impact of the university's operating expenses was calculated to measure the effect of education and research activities. In addition to the operating expenses listed in the profit and loss statement, competitive funds such as grants-in-aid for scientific research were also included in the calculation.

1) Overview of the Expenses Subject to Calculation

Expenses were categorized based on detailed information provided by OIST on each account item listed in the profit and loss statement. Of the operating expenses, personnel costs (Personnel Costs for Executives, Personnel Costs for Faculty, and Personnel Costs for Employees) and expenses equivalent to personnel costs (those deemed to be remuneration or part-time personnel costs) were considered income that paid for living expenditures and therefore categorized as expenses subject to calculation of the “effects of living expenditures by faculty and students”. All other expenses were subject to calculation of the “effects of education and research activities”. Expenses for research and education such as intangible fixed assets and leases are included in depreciation expenses as items other than construction. Taxes and Dues and Overseas Travel Expenses were excluded from the calculation of economic impact.

Table2-1-1-1 Relationship between financial statements and effects

(Unit: Thousand Yen)

項目		(A) 金額	(B) Personnel expenses etc.	(C) Expense excluding personnel expenses (A) – (B)	(D) Not covered	(E) Target expenses (C) – (D)
Research and education expenses	Educational Expenses	525,951	0	4,519,127	0	
	Research Expenses	2,159,997				
	Educational Support Expenses	820,427				
	Sponsored Research Expenses	962,716				
	Sponsored Project Expenses	50,036				
	Personnel Costs for Executives	123,103	6,332,276	0		
	Personnel Costs for Faculty	4,955,753				
	Personnel Costs for Employees	1,253,420				
General Administrative Expenses		2,492,229	0	6,010,791	634,927	634,927
Financial Expenses		49,745				
Depreciation		3,468,817				
Taxes and Dues		65,981				
Overseas Travel and Import Costs		568,946	6,332,276	11,164,845	634,927	10,529,918
Operating expenses total		17,497,121				

Of the account items subject to calculation (Educational Expenses, Research Expenses, Educational Support Expenses, Sponsored Research Expenses, Sponsored Project Expenses, Personnel Costs for Executives, Personnel Costs for Faculty, Personnel Costs for Employees, General Administrative Expenses, Financial Expenses, Depreciation, Taxes and Dues, Overseas Travel and Import Costs), Personnel Costs for Executives, Personnel Costs for Faculty, and Personnel Costs for Employees were excluded for the purpose of this analysis because they were personnel costs. Taxes and Dues were excluded because they would not create demand. International Travel and Import Costs were also excluded because the demand was overseas. The remainder, Educational Expenses, Research Expenses, Educational Support Expenses, Sponsored Research Expenses, Sponsored Project Expenses, General Administrative Expenses, Financial Expenses, and Depreciation were subject to calculation of Direct Effect.

Table2-1-1-2 Education and research expenditure

Unit: Thousand yen

Scope of measurement	10,529,918
Education expenses	525,951
Research expenses	2,159,997
Educational support spending	820,427
Sponsored research expenses	962,716
Sponsored project expenses	50,036
General and administrative expenses	2,492,229
Financial expenses	49,745
Depreciation	3,468,817

(2) Living Expenditures of Faculty and Students

1) Living Expenditures of Faculty and Staff

Living expenditures of executives, faculty and staff were calculated based on the personnel expenses shown in OIST's financial statement. To calculate the amount of personnel expenses paid within and outside of Okinawa Prefecture, personnel expense per faculty member was determined, then multiplied by the number of personnel residing outside Okinawa to estimate the amount paid to those outside of Okinawa. This amount was then subtracted from the total personnel expenses to estimate the amount paid to personnel residing in Okinawa. Spending by faculty and staff are the key source of demand generated from OIST's personnel expenses. The Okinawa Prefecture Table shows demand created by residents of Okinawa Prefecture; the National Table shows the economic ripple effects to include those residing outside Okinawa. Based on OIST records, the number of people who will spend in Okinawa Prefecture is 881; the nationwide total is 886.

Table2-1-2-1 Executives and employees

		Unit: person			
		Executives	Faculty	Staff	total
Onna village	Full time	3	43	204	250
	Part time			7	7
Within prefecture	Full time		11	581	592
	Part time	1		31	32
Outside Okinawa Prefecture	Full time			4	4
	Part time		7	1	8
Subject to calculation	Subtotal	4	55	827	886
Overseas	Full time			1	1
	Part time		6		6
	total	4	61	828	893

Note: Including part-timers working for OIST for staff

Table2-1-2-2 Estimated amount of direct expenditure

		Unit: Thousand yen	
		Within prefecture	total
Executive salaries		122,904	122,904
Salaries –Exe commutation		199	199
Salaries –Base		4,980,495	5,008,761
Salaries –Allowance		311,882	313,652
Salaries –Commutation		63,424	63,784
Salaries –Over time		104,797	105,392
Salaries –Others		76,100	76,532
Periodic Retirement benefits		13,776	13,854
	total	5,673,577	5,705,078

Amount of spending by personnel residing in Okinawa Prefecture, estimated based on OIST's financial statement, is shown in Table 2-1-2-2. The total expenditure in Okinawa Prefecture is estimated to be 5,673,577,000 yen. Based on the assumptions described above, expenditure per household for FY 2017 was taken from the Family Income and Expenditures Survey of Okinawa Prefecture, and allocated to the respective industrial sectors in accordance with the Input-Output Tables for Japan. The results are shown in Table 2-1-2-3 below.

Table2-1-2-3 Demand by industry sector by consumption expenditure of resident faculty staff
in prefecture

Unit: Thousand yen

Family income and Expenditure Survey item	Sector Classification	Demand amount
Foods	Foods	1,445,282
Housing	Housing	634,965
Fuel, light and water charges	Electricity	221,695
	Gas supply	120,922
	Oter energy	7,750
	Water supply & Sewage disposal	118,104
Furniture and household utensils	Household durable goods	110,115
	Interior equipment, accessories	12,449
	Beddings	17,233
	Household goods	68,864
Clothing and footwear	Clothing and Footwear	182,902
Medical care	Medical, health care	170,813
Transportation and communication	Transport	78,845
	Self-transport	437,711
	Communications	360,207
Education	Education	235,777
Culture and recreation	Amusement and recreational tangible goods	30,353
	Amusement and recreational services	86,701
	Books and Publishing	45,170
	Culture and recreational services	194,611
	Hotels, traveling	49,977
Other consumption expenditures	Barber shops, Beauty shops	209,453
	Daily necessities	43,926
	Tobacco	33,956
	Various sundry expens	415,401
	Pocket money	340,397
total amount		5,673,577

2) Living Expenditures of Students

For the purpose of this analysis, only the living expenditures by students from outside Okinawa Prefecture were included in the estimate of student expenditures. Students from outside Okinawa Prefecture were considered as migrants and their expenditures were equated to revenues from outside Okinawa. Expenditure amounts were taken from the “PhD/National University/Student Dormitory/Housing Type-Others” columns of the *FY 2016 Student Life Survey Results* by Japan Student Services Organization (JASSO).

Table2-1-2-4 Number of students in 2017

Unit: people

	Village	prefecture	Outside the prefecture	overseas	total
Number of students	148	16	1	5	170
lived in the prefecture					16
outside the prefecture					154

A at the time of admission and living outside the prefecture do not mean prefectural grad students

Table2-1-2-5 Contents of student living expenses

Unit: yen

	National	
	Dormitory	ratio
Tuition fees	318,800	0.1889
Other school payments	400	0.0002
School fee	119,200	0.0706
Extra-curricular activities	18,600	0.0110
Transportation expenses	31,700	0.0188
Sub-total	488,700	0.2895
Food expenses	458,500	0.2716
Housing and utility expenses	244,600	0.1449
Health and sanitation expenses	56,000	0.0332
Entertainment and Favorable Cost	166,500	0.0986
Other daily expenses	273,600	0.1621
Sub-total	1,199,200	0.7105
total	1,687,900	1.0000

Source: Japan Student Services Organization (JASSO)

(http://www.jasso.go.jp/about/statistics/gakusei_chosa/index.html)

Based on the above, the amount of expenditures generated from 154 students that migrated from outside Okinawa Prefecture upon entrance to OIST is as summarized in Table 2-1-2-6.

Table2-1-2-6 Demand by industry sector of student consumption

Unit: Thousand yen

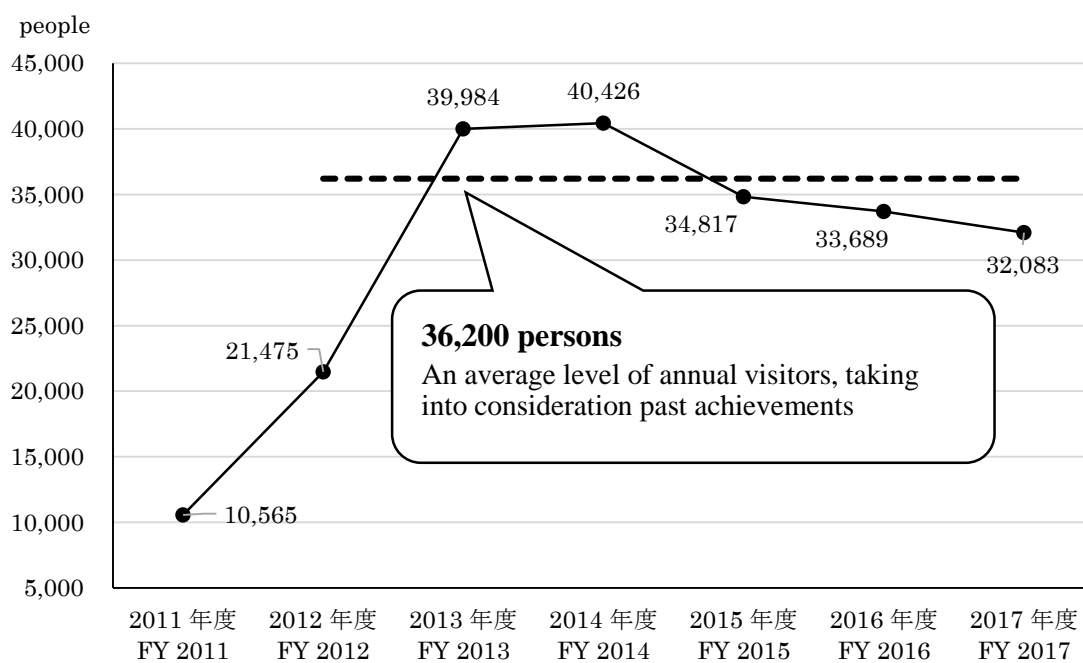
Sector Classification	Outside Okinawa Prefecture	All students Demand amount
Food	68,325	75,424
Housing, Fuel, light and water charges		
Electricity	8,817	18,244
Water supply	2,043	4,228
Sewage disposal	739	1,529
House rent	24,851	51,422
Medical care		
Medical service (except hospitalization)	5,839	6,446
Medical service (dentistry)	743	820
Medical service (pharmacy dispensing)	1,509	1,666
Medical service (miscellaneous medical service)	254	281
Entertainment / luxury goods		
Movie theaters	739	816
Performances (except movie theaters), theatrical companies	830	916
Stadiums and companies of bicycle, horse, motorcar and motorboat races	107	118
Sport facility service, public gardens and amusement parks	2,793	3,083
Amusement and recreation facilities	18,674	20,614
Miscellaneous amusement and recreation services	1,669	1,842
Other daily expenses	40,771	45,007
total amount	178,703	232,456

(3) Other Activities

1) Elementary, Middle, and High School Students Visiting from Outside Okinawa Prefecture

Many elementary, middle and high school students visit OIST to participate in events such as Weekend Campus Tours Led by Students, Open Campus and Science Festival, Children's School of Science (Onna Village/OIST), OIST Summer Festival, and SCORE! Science in Okinawa: Research for Enterprise Science Fair. The number of visitors reached 10,565 in the first school year and 40,426 in 2014. Average number of visitors in the last five years was 36,200. Assuming that this is the average number of visitors per year, and that approximately 10% are from outside Okinawa Prefecture, the average number of visitors from outside Okinawa Prefecture per year is estimated to be 3,620. Since the number of school teachers, staff and parents are not included in this calculation, the actual number of visitors is likely to be greater.

Figure2-1-3-1 Number of visitors to OIST for primary school students, junior high school students, high school students.



2) Visitors from Outside Okinawa Prefecture for Workshops and Academic Conferences

In addition to workshops, symposiums and academic conferences sponsored or co-sponsored by OIST, external parties also use OIST facilities for non-academic purposes. The number of people using OIST facilities per year is 46,793 of which 9,212 are from other parts of Japan and 2,459 from overseas. Since visitors from outside Japan are often accompanied by friends or families, the actual number is likely to be greater.

Table2-1-3-1 Estimated number of visitors from prefecture and overseas

	Unit: people			
	Number of participants	Within prefecture	Outside Okinawa Prefecture	overseas
OIST sponsored or involved WS etc.	5,018	1,204	2,649	1,165
Provide facilities such as academic conferences and symposiums	5,575	1,338	2,943	1,294
Student	36,200	32,580	3,620	
Total	46,793	35,121	9,212	2,459

Note: Based on the data provided by OIST, the number of participants from outside the prefecture was clearly counted.

Table2-1-3-2 Per capita expenditure of tourists

	Unit: yen, days, thousand yen				
	Domestic (yen)	overseas (yen)	Demand outside the prefecture (Thousand yen)	Overseas demand (Thousand yen)	Total (Thousand yen)
Accommodation	23,934	28,525	220,484	70,152	290,636
Transport	10,376	11,750	95,584	28,897	124,481
Shopping	13,821	29,805	127,323	73,300	200,623
Restaurant, fast food, café, etc.	15,769	20,157	145,264	49,572	194,837
Amusement services	7,104	6,000	65,442	14,756	80,198
Other	1,279	4,027	11,782	9,904	21,686
Total	72,284	100,264	665,880	246,581	912,461
Average stay days	3.75	4.23			

Source: Okinawa prefecture Government, General Information of Tourism Statistics in Okinawa

Table2-1-3-3 Demand by outside of Okinawa and overseas tourists

Unit: Thousand yen

Expenditure	Basic Sector Classification	Demand amount
Accommodation	Accommodation	290,636
Transport	Transport	124,481
Shopping		200,623
	Fruits	12,630
	Dairy cattle farming	473
	Beef cattle	11,669
	Hen eggs	5,551
	Marine fishery	14,634
	Marine aquaculture	13,086
	Meat	17,045
	Processed meat products	2,346
	Bottled or canned meat products	628
	Frozen fish and shellfish	635
	Salted, dried or smoked seafood	13
	Fish paste	466
	Miscellaneous processed seafood	2,676
	Flour and miscellaneous grain milled products	46
	Noodles	484
	Bread	2,132
	Confectionery	33,695
	Bottled or canned vegetables and fruits	1,316
	Preserved agricultural foodstuffs (except bottled or canned)	512
	Sugar	32,180
	Starch	1,135
	Dextrose, syrup and isomerized sugar	625
	Animal oil and fats, vegetable oil and meal	13
	Condiments and seasonings	200
	Miscellaneous foods	3,206
	Malt liquors	6,279
	Miscellaneous liquors	20,453
	Tea and roasted coffee	1,038
	Soft drinks	7,114
	Woven fabric apparel	998
	Miscellaneous wearing apparel and clothing accessories	0
	Miscellaneous furniture and fixtures	609
	Printing, plate making and book binding	2,933
	Leather and fur skins	11
	Pottery, china and earthenware	1,420
	Toys and games	48
	Sporting and athletic goods	225
	Jewelry and adornments	200
	Stationery	114
	Miscellaneous manufacturing products	1,788
food, drink	food, drink	194,837
Amusement services	Amusement services	80,198
Other	Other	21,686
	total	912,461

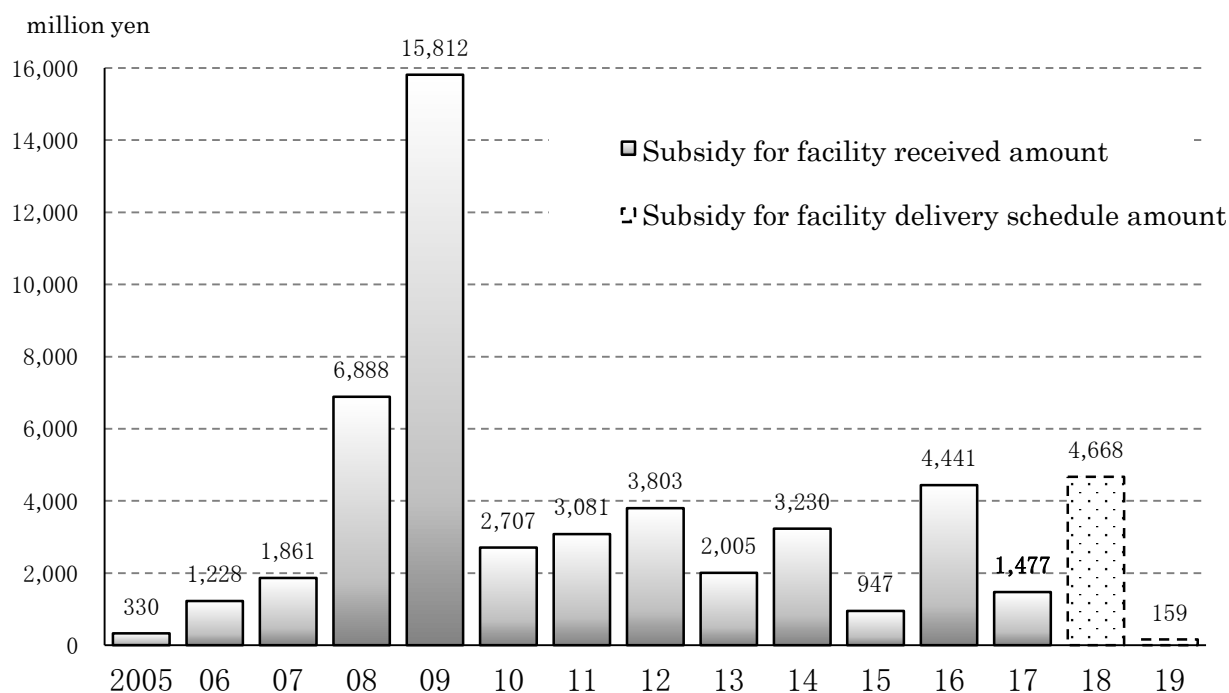
Source : Okinawa Prefecture 「I/O table 2011」

(4) Expenditures Associated with Facility Development

With facility development currently ongoing, OIST has a large capital stock for facility development. Facility development cost allocated in FY2017 for construction of Lab 4 and the Child Development Center was 1.477 billion yen, which is considered direct effect.

For most public works projects, a single year flow analysis does not fully reflect the actual condition. Therefore, cumulative total of the actual amounts spent on construction and facility development from the first year of construction to FY2017 and the cumulative total of amounts programmed to be spent through FY2019 on projects currently in progress were both considered to be direct effects for calculating the economic impacts.

Figure2-1-4-1 Transition of execution amount and budget pertaining to facility maintenance



2. Calculation Results of the Economic Impacts on the National Economy

Input-Output Analysis was used to estimate the economic effects of OIST activities. Calculation was based on the 393-sector table which matched and integrated the rows and columns of the Basic Sector Table (518 rows x 397 columns) for Transactions Valued at Producers' Prices from the 2011 Input-Output (IO) Table issued by the Ministry of Internal Affairs and Communication (MIC).

(1) Effect of Education and Research Activities

Table2-2-1-1 Economic Impact by economic activity of education and research activity

Unit: million yen										
	Direct effect	Demand increase	in regional	Primary Economic Impact	GVA Inducing effect	Income Inducing effect	Secondary Economic Impact	GVA Inducing effect	Income Inducing effect	Total effect
Crop cultivation	0	0	0	2	1	0	68	38	4	70
Livestock	0	4	3	5	1	0	41	14	5	50
Forestry	0	0	0	2	1	0	3	1	0	5
Fishery	0	0	0	0	0	0	15	8	3	15
Mining	0	2	0	5	2	1	2	1	0	9
Beverages and Foods	0	5	4	9	1	0	376	125	44	390
Manufacturing	0	1,705	1,470	2,967	899	455	838	240	97	5,510
Construction	337	70	70	138	60	41	78	34	23	286
Electricity, gas and water supply	633	305	305	474	147	47	235	72	24	1,014
Wholesale and retail trade	0	381	374	662	462	204	735	497	266	1,778
Finance and insurance	65	65	63	163	106	35	316	209	73	545
Real estate	0	68	68	170	114	24	839	686	36	1,077
Transport and postal	179	377	362	650	323	144	404	224	92	1,431
Service	6,898	1,780	1,730	2,822	1,698	796	1,384	775	364	5,986
Public administration	2,418	8	8	44	24	9	40	26	13	91
Miscellaneous non-profit services	0	38	37	51	23	19	104	75	57	192
gross value added sectors	(5,116)									
Compensation of employees	(3,075)									
total	10,530	4,806	4,493	8,163	3,864	1,775	5,479	3,024	1,103	24,171

(2) Living Expenditures of Faculty and Students

1) Living Expenditures of Faculty and Staff

Table2-2-2-1 Economic Impact by economic activity of Faculty and Staff

Unit: million yen

	Direct effect	Demand increase	in regional	Primary Economic Impact	GVA Inducing effect	Income Inducing effect	Secondary Economic Impact	GVA Inducing effect	Income Inducing effect	Total effect
Crop cultivation	69	30	27	55	30	3	32	18	2	116
Livestock	16	8	8	42	11	4	19	6	2	69
Forestry	6	3	2	5	2	1	1	1	0	8
Fishery	28	12	10	15	8	3	7	4	1	34
Mining	254	1	0	3	1	0	1	0	0	5
Beverages and Foods	703	294	258	315	118	30	176	58	21	785
Manufacturing	1,144	447	370	939	265	111	391	112	45	1,777
Construction	141	70	70	111	48	33	37	16	11	218
Electricity, gas and water supply	423	210	210	306	112	39	110	34	11	626
Wholesale and retail trade	725	354	350	496	343	162	343	232	124	1,194
Finance and insurance	190	87	81	144	94	33	148	97	34	378
Real estate	223	111	111	171	115	23	391	320	17	673
Transport and postal	460	223	219	385	196	76	188	105	43	796
Service	1,284	627	619	1,169	633	287	645	361	170	2,442
Public administration	11	5	5	22	12	5	19	12	6	46
Miscellaneous non-profit services	28	13	13	20	9	8	48	35	27	82
gross value added sectors	(2,880)									
Compensation of employees	(1,444)									
total	5,705	2,495	2,352	4,198	1,998	817	2,555	1,410	514	12,458

2) Living Expenditures of Students

Table2-2-2-2 Economic Impact by economic activity of Students

Unit: million yen

	Direct effect	Demand increase	in regional	Primary Economic Impact	GVA Inducing effect	Income Inducing effect	Secondary Economic Impact	GVA Inducing effect	Income Inducing effect	Total effect
Crop cultivation	0	2	2	3	2	0	1	1	0	6
Livestock	0	0	0	2	1	0	1	0	0	4
Forestry	0	0	0	0	0	0	0	0	0	0
Fishery	0	1	1	1	0	0	0	0	0	2
Mining	0	0	0	0	0	0	0	0	0	0
Beverages and Foods	0	18	16	19	7	2	7	2	1	43
Manufacturing	0	9	7	25	7	3	15	4	2	49
Construction	0	3	3	4	2	1	1	1	0	8
Electricity, gas and water supply	15	10	10	13	5	2	4	1	0	28
Wholesale and retail trade	0	14	13	19	13	6	13	9	5	46
Finance and insurance	0	3	3	5	4	1	6	4	1	14
Real estate	32	4	4	6	4	1	15	12	1	26
Transport and postal	0	6	6	12	5	3	7	4	2	25
Service	185	16	16	34	19	9	25	14	7	75
Public administration	0	0	0	1	0	0	1	0	0	1
Miscellaneous non-profit services	0	1	1	1	1	0	2	1	1	4
gross value added sectors	(136)									
Compensation of employees	(59)									
total	232	86	82	148	71	29	99	54	20	479

(3) Other Activities

Table2-2-3-1 Economic Impact by economic activity of Other Activities

Unit: million yen

	Direct effect	Demand increase	in regional	Primary Economic Impact	GVA Inducing effect	Income Inducing effect	Secondary Economic Impact	GVA Inducing effect	Income Inducing effect	Total effect
Crop cultivation	37	15	14	26	13	2	6	3	0	47
Livestock	37	18	17	31	8	3	3	1	0	52
Forestry	2	1	1	1	0	0	0	0	0	2
Fishery	12	5	4	6	3	1	1	1	0	12
Mining	0	0	0	0	0	0	0	0	0	1
Beverages and Foods	226	91	79	104	34	9	31	10	4	226
Manufacturing	109	43	36	120	34	14	69	20	8	232
Construction	7	4	4	10	4	3	6	3	2	20
Electricity, gas and water supply	97	46	46	63	25	10	19	6	2	129
Wholesale and retail trade	129	61	60	88	61	28	61	41	22	210
Finance and insurance	19	9	8	18	11	4	26	17	6	53
Real estate	20	9	9	18	12	3	69	57	3	97
Transport and postal	94	42	39	70	33	16	33	19	8	145
Service	115	54	53	130	71	33	114	64	30	298
Public administration	1	0	0	2	1	0	3	2	1	6
Miscellaneous non-profit services	7	3	3	4	2	2	9	6	5	16
gross value added sectors	(477)									
Compensation of employees	(272)									
total	912	400	376	691	313	128	453	250	91	2,056

(4) Expenditures Associated with Facility Development (F.Y 2017)

Table2-2-4-1 Economic Impact by economic activity of Facility Development

Unit: million yen

	Direct effect	Demand increase	in regional	Primary Economic Impact	GVA Inducing effect	Income Inducing effect	Secondary Economic Impact	GVA Inducing effect	Income Inducing effect	Total effect
Crop cultivation	3	1	1	1	1	0	11	6	1	14
Livestock	0	0	0	0	0	0	7	2	1	7
Forestry	0	0	0	2	1	1	0	0	0	3
Fishery	0	0	0	0	0	0	3	1	0	3
Mining	5	3	2	6	3	1	0	0	0	9
Beverages and Foods	0	0	0	0	0	0	63	21	7	64
Manufacturing	721	388	348	691	187	88	140	40	16	1,220
Construction	3	2	2	13	6	4	13	6	4	28
Electricity, gas and water supply	16	8	8	37	11	4	39	12	4	84
Wholesale and retail trade	155	84	83	140	98	42	123	83	45	347
Finance and insurance	59	29	28	49	32	10	53	35	12	131
Real estate	12	7	7	25	17	3	141	115	6	172
Transport and postal	114	61	60	119	50	25	68	38	15	248
Service	387	209	203	348	218	109	232	130	61	790
Public administration	0	0	0	8	5	2	7	4	2	15
Miscellaneous non-profit services	3	1	1	3	1	1	17	13	10	22
gross value added sectors	(683)									
Compensation of employees	(523)									
total	1,477	794	744	1,444	629	291	919	507	185	3,839

(5) Effect of OIST Overall

1) Induced Production

Direct effects of the various consumption and investment arising from the operation of OIST for one year totaled 18.857 billion yen. Demands generated by such consumption and investment induced production through inter-industry transactions for a total of 14.643 billion yen in primary ripple effects. Induced production led to economic activities and generated employee income as compensation for labor. This led to household spending for food, clothing and shelter, which further induced production. These secondary ripple effects totaled 9.504 billion yen. Overall, induced production generated by OIST operations was 43.003 billion: 2.28 times the direct effects (18.875 billion yen) of initial spending.

Table2-2-5-1 Production inducement amount in each activity

Unit: million yen

	Education and Research	Faculty and Staff	Students	Other Activities	Facility Development	Total
Direct impact	10,530	5,705	232	912	1,477	18,857
Primary economic impact	8,163	4,198	148	691	1,444	14,643
Secondary economic impact	5,479	2,555	99	453	919	9,504
Total impact	24,171	12,458	479	2,056	3,839	43,003
Output multiplier	2.30	2.18	2.06	2.25	2.60	2.28

2) Induced Added Value

Looking at the induced added value out of the total induced production, education and research activities yielded direct effect of 5.116 billion yen and total effect of 12.004 billion yen; living expenditures by faculty and staff generated direct effect of 2.880 billion yen and total effect of 6.288 billion yen; living expenditures by students led to direct effect of 136 million yen and total effect of 261 million yen; other activities yielded direct effect of 477 million yen and total effect of 696 million yen; facility development generated direct effect of 683 million yen and total effect of 1.82 billion yen. In sum, induced added value was 21.069 billion yen.

Table2-2-5-2 Value added provision amount in each activity

Unit: million yen

	Education and Research	Faculty and Staff	Students	Other Activities	Facility Development	Total
Direct impact	5,116	2,880	136	477	683	9,291
Primary economic impact	3,864	1,998	71	128	629	6,690
Secondary economic impact	3,024	1,410	54	91	507	5,088
Total impact	12,004	6,288	261	696	1,820	21,069
Output multiplier	2.35	2.18	1.92	1.46	2.66	2.27

Table2-2-5-3 Gross domestic product equivalent value inducement

Unit: million yen

	Education and Research	Faculty and Staff	Students	Other Activities	Facility Development	Total
Compensation of employees	5,505	2,597	102	239	833	9,275
Operating surplus	1,439	1,046	52	72	98	2,709
Depreciation of fixed capital	1,680	1,220	51	79	92	3,122
Indirect taxes	606	657	38	38	131	1,471
(Less) Current subsidies	-29	-40	-1	-3	-1	-74
total	9,202	5,481	242	426	1,153	16,503

(6) Employment

Education and research activities, which involved purchase of goods and business-oriented services, generated the largest number of induced employment at 2,290 people. Living expenditures by faculty and staff, involving spending in the fields of food, clothing and housing, led to employment of 1,180 people. In sum, OIST generated employment of 4,074 people.

Table2-2-6-1 Number of employment inductions

Unit: people

	Education and Research	Faculty and Staff	Students	Other Activities	Facility Development	Total
employment inductions	2,290	1,180	45	195	364	4,074
OIST faculty staff total (Domestic)						886

Note: The number of OIST faculty staff was stated as a reference value.

(7) Tax Revenue

Tax revenues generated by the various university activities were estimated for profit-related taxes as presented in the table below. National taxes included corporate tax and income tax. Although tax laws require varying tax rates to be applied depending on the size of the business and income levels, tax revenue coefficients were applied to estimate the tax revenues for the purpose of this study.

Table2-2-7-1 Calculation method of tax revenue coefficient

		Calculation method	tax revenue coefficient	Calculation basis
National Tax	Corporation Tax	Operating surplus × tax revenue coefficient	15.0%	Tax rate for medium and small corporations
	Income tax	Compensation of employees × tax revenue coefficient	3.8%	Tax / Income

National Tax Agency Okinawa Regional Taxation Office, Tax Statistics

Corporate tax levied on OIST's operating surplus was estimated to be 406 million yen; income tax was estimated at 753 million yen. In sum, the total tax revenue was estimated at 1.159 billion yen.

Table2-2-7-1 Tax revenue effect

Unit: million yen

	Education and Research	Faculty and Staff	Students	Other Activities	Facility Development	Total
Corporation Tax	216	157	8	11	15	406
Income tax	209	499	4	9	32	753
Total	425	656	12	20	46	1,159

Note: The income tax on faculty staff consumption includes the withholding amount of OIST executive faculty staff

3. Calculation Results of the Economic Impacts on the Okinawa Economy

Input-Output Analysis was used to estimate the economic effects of OIST activities. Calculation was based on the 337-sector table which matched and integrated the rows and columns of the Basic Sector Table (401 rows x 343 columns) for Transactions Valued at Producers' Prices from the 2011 Input-Output (IO) Table issued by the Department of Planning, Okinawa Prefectural Government.

(1) Effect of Education and Research Activities

Table2-3-1-1 Economic Impact by economic activity of education and research activity

Unit: million yen

	Direct effect	Demand increase	in regional	Primary Economic Impact	GVA Inducing effect	Income Inducing effect	Secondary Economic Impact	GVA Inducing effect	Income Inducing effect	Total effect
Crop cultivation	0	0	0	4	2	2	12	6	4	16
Livestock	21	10	8	15	3	3	24	9	4	49
Forestry	0	0	0	0	0	0	1	0	0	1
Fishery	0	0	0	0	0	0	1	0	0	1
Mining	315	149	0	1	0	0	0	0	0	149
Beverages and Foods	5	2	2	4	1	0	198	71	33	204
Manufacturing	3,887	1,835	295	384	91	46	115	16	8	2,334
Construction	76	36	35	50	25	20	24	12	10	110
Electricity, gas and water supply	546	258	255	323	140	58	184	75	30	764
Wholesale and retail trade	696	328	212	255	169	95	571	324	187	1,155
Finance and insurance	140	66	58	87	65	30	172	128	62	326
Real estate	86	40	38	60	43	11	714	601	30	814
Transport and postal	751	354	261	402	252	117	359	222	96	1,116
Service	3,818	1,802	1,197	1,472	930	484	733	411	221	4,007
Public administration	0	0	0	25	16	15	80	62	56	105
Miscellaneous non-profit services	188	89	71	94	63	41	77	51	36	260
gross value added sectors	(5,560)									
Compensation of employees	(3,406)									
total	10,530	4,970	2,433	3,177	1,800	922	3,266	1,990	778	16,972

(2) Living Expenditures of Faculty and Students

1) Living Expenditures of Faculty and Staff

Table2-3-2-1 Economic Impact by economic activity of Faculty and Staff

Unit: million yen

	Direct effect	Demand increase	in regional	Primary Economic Impact	GVA Inducing effect	Income Inducing effect	Secondary Economic Impact	GVA Inducing effect	Income Inducing effect	Total effect
Crop cultivation	78	35	9	15	8	5	6	3	2	56
Livestock	19	9	8	48	14	7	12	4	2	68
Forestry	6	3	1	1	0	0	0	0	0	4
Fishery	41	19	3	3	2	1	0	0	0	22
Mining	130	59	2	2	1	1	0	0	0	61
Beverages and Foods	934	426	206	226	91	27	96	34	16	747
Manufacturing	1,113	507	142	197	43	25	56	8	4	760
Construction	82	37	36	49	25	20	12	6	5	98
Electricity, gas and water supply	459	209	207	271	124	54	89	36	14	568
Wholesale and retail trade	723	329	223	257	164	93	276	156	90	862
Finance and insurance	173	79	71	98	73	33	83	62	30	260
Real estate	333	152	142	157	119	25	344	290	15	653
Transport and postal	385	176	150	259	161	64	173	107	46	608
Service	1,081	493	306	462	259	129	353	198	106	1,309
Public administration	2	1	1	12	8	8	39	30	27	52
Miscellaneous non-profit services	113	52	44	56	38	25	37	25	18	145
gross value added sectors	(3,088)									
Compensation of employees	(1,571)									
total	5,674	2,586	1,551	2,114	1,131	516	1,575	960	375	9,362

2) Living Expenditures of Students

Table2-3-2-2 Economic Impact by economic activity of Students

Unit: million yen

	Direct effect	Demand increase	in regional	Primary Economic Impact	GVA Inducing effect	Income Inducing effect	Secondary Economic Impact	GVA Inducing effect	Income Inducing effect	Total effect
Crop cultivation	3	1	0	1	0	0	0	0	0	2
Livestock	1	0	0	2	1	0	0	0	0	3
Forestry	0	0	0	0	0	0	0	0	0	0
Fishery	2	1	0	0	0	0	0	0	0	1
Mining	5	2	0	0	0	0	0	0	0	2
Beverages and Foods	36	18	9	10	4	1	3	1	0	30
Manufacturing	29	14	4	6	1	1	2	0	0	22
Construction	2	1	1	2	1	1	0	0	0	3
Electricity, gas and water supply	18	9	9	11	5	2	3	1	0	22
Wholesale and retail trade	23	12	8	9	6	3	8	5	3	29
Finance and insurance	6	3	3	4	3	1	2	2	1	9
Real estate	11	5	5	6	4	1	10	9	0	21
Transport and postal	7	4	3	6	4	2	5	3	1	15
Service	31	15	11	16	9	5	10	6	3	42
Public administration	0	0	0	0	0	0	1	1	1	2
Miscellaneous non-profit services	4	2	2	2	1	1	1	1	1	5
gross value added sectors	(90)									
Compensation of employees	(44)									
total	179	89	55	75	39	18	47	28	11	300

(3) Other Activities

Table2-3-3-1 Economic Impact by economic activity of Other Activities

Unit: million yen

	Direct effect	Demand increase	in regional	Primary Economic Impact	GVA Inducing effect	Income Inducing effect	Secondary Economic Impact	GVA Inducing effect	Income Inducing effect	Total effect
Crop cultivation	72	35	25	33	10	12	1	0	0	69
Livestock	42	20	20	38	9	6	2	1	0	60
Forestry	2	1	0	0	0	0	0	0	0	1
Fishery	16	8	1	1	1	0	0	0	0	9
Mining	0	0	0	0	0	0	0	0	0	0
Beverages and Foods	212	101	48	57	20	7	16	6	3	174
Manufacturing	104	50	17	30	5	3	9	1	1	89
Construction	4	2	2	4	2	2	2	1	1	8
Electricity, gas and water supply	91	43	43	55	25	10	15	6	2	113
Wholesale and retail trade	126	60	41	50	32	18	45	26	15	156
Finance and insurance	18	9	8	12	9	4	14	10	5	34
Real estate	16	8	7	10	7	2	57	48	2	74
Transport and postal	67	32	19	37	23	12	28	18	8	97
Service	130	62	45	69	40	19	58	33	17	189
Public administration	0	0	0	1	1	1	6	5	4	7
Miscellaneous non-profit services	11	5	5	6	4	3	6	4	3	18
gross value added sectors	(476)									
Compensation of employees	(245)									
total	912	436	281	403	187	98	259	158	62	1,575

(4) Expenditures Associated with Facility Development (FY2017)

Table2-3-4-1 Economic Impact by economic activity of Facility Development (FY2017)

Unit: million yen										
	Direct effect	Demand increase	in regional	Primary Economic Impact	GVA Inducing effect	Income Inducing effect	Secondary Economic Impact	GVA Inducing effect	Income Inducing effect	Total effect
Crop cultivation	3	1	0	0	0	0	5	3	2	8
Livestock	0	0	0	0	0	0	4	1	1	4
Forestry	0	0	0	0	0	0	0	0	0	0
Fishery	0	0	0	0	0	0	0	0	0	0
Mining	5	3	2	3	2	1	0	0	0	8
Beverages and Foods	0	0	0	0	0	0	45	16	8	45
Manufacturing	721	388	139	121	36	21	45	8	4	886
Construction	3	2	2	4	2	2	3	2	1	10
Electricity, gas and water supply	16	8	8	20	9	3	24	10	4	60
Wholesale and retail trade	155	84	53	42	28	16	88	52	30	284
Finance and insurance	59	29	28	32	24	10	22	16	8	113
Real estate	12	7	6	9	7	1	87	73	4	108
Transport and postal	116	62	55	68	49	30	53	33	15	237
Service	383	207	158	152	100	58	101	56	30	635
Public administration	0	0	0	5	3	3	10	8	7	15
Miscellaneous non-profit services	5	3	2	3	2	1	10	6	5	18
gross value added sectors	(683)									
Compensation of employees	(523)									
total	1,477	794	451	459	262	146	496	283	117	2,432

(5) Effect of OIST Overall

1) Induced Production

Direct effects of the various consumption and investment arising from the operation of OIST for one year totaled 18.771 billion yen. Demands generated by such consumption and investment induced production through inter-industry transactions for a total of 6.227 billion yen in primary indirect impact. Induced production led to economic activities and generated employee income as compensation for labor. This led to household spending for food, clothing and shelter, which further induced production. These secondary indirect impact totaled 5.642 billion yen. Overall, induced production generated by OIST operations was 30.670 billion: 1.63 times the direct effects (18.771 billion yen) of initial spending.

Table2-3-5-1 Production inducement amount in each activity

Unit: million yen

	Education and Research	Faculty and Staff	Students	Other Activities	Facility Development	Total
Direct impact	10,530	5,674	179	912	1,477	18,771
Primary economic impact	3,177	2,114	75	403	459	6,227
Secondary economic impact	3,266	1,575	47	259	496	5,642
Total impact	16,972	9,362	300	1,575	2,432	30,670
Output multiplier	1.61	1.65	1.68	1.73	1.65	1.63

2) Induced Added Value

Looking at the induced added value out of the total induced production, education and research activities yielded direct effect of 5.560 billion yen and total effect of 9.350 billion yen; living expenditures by faculty and staff generated direct effect of 3.088 billion yen and total effect of 5.178 billion yen; living expenditures by students led to direct effect of 90 million yen and total effect of 157 million yen; other activities yielded direct effect of 476 million yen and total effect of 821 million yen; facility development generated direct effect of 683 million yen and total effect of 1.228 billion yen. In sum, induced added value was 16.734 billion yen.

Table2-3-5-2 Value added provision amount in each activity

Unit: million yen

	Education and Research	Faculty and Staff	Students	Other Activities	Facility Development	Total
Direct impact	5,560	3,088	90	476	683	9,896
Primary economic impact	1,800	1,131	39	187	262	3,419
Secondary economic impact	1,990	960	28	158	283	3,419
Total impact	9,350	5,178	157	821	1,228	16,734
Output multiplier	1.68	1.68	1.76	1.72	1.80	1.69

Table2-3-5-3 Gross domestic product equivalent value inducement amount

Unit: million yen

	Education and Research	Faculty and Staff	Students	Other Activities	Facility Development	Total
Compensation of employees	3,406	2,462	73	405	938	7,284
Operating surplus	1,034	1,073	21	147	67	2,342
Depreciation of fixed capital	313	771	30	111	69	1,294
Indirect taxes	482	445	18	99	102	1,144
(Less) Current subsidies	-10	-25	-0	-7	-2	-44
total	5,225	4,725	141	754	1,174	12,020

(6) Employment

Education and research activities, which involved purchase of goods and business-oriented services, generated the largest number of induced employment at 1,608 people. Living expenditures by faculty and staff, involving spending in the fields of food, clothing and housing, led to employment of 887 people. In sum, OIST generated employment of 2,902 people.

Table2-3-6-1 Number of employment inductions

Unit: people

	Education and Research	Faculty and Staff	Students	Other Activities	Facility Development	Total
employment inductions	1,608	887	28	149	230	2,902
OIST faculty staff in Okinawa						881

Note: The number of OIST faculty staff was stated as a reference value.

(7) Tax Revenue

Tax revenues generated by the various university activities were estimated for profit-related taxes as presented in the table below. Local taxes included Business Tax and Prefectural Tax (Corporation) and Prefectural Tax (Individual). Tax revenue coefficients were applied to estimate the tax revenues for the purpose of this study.

Table2-3-7-1 Calculation method of tax revenue coefficient

		Calculation method	tax revenue coefficient	Calculation basis
Prefectural Tax	Business Tax	Indirect Tax × tax revenue coefficient	5.0%	Business Tax / Tax base person gross income
	Prefectural Tax(Corporation)	operating surplus × tax revenue coefficient	10.5%	Tax revenue / Tax base person gross income
	Prefectural Tax(Individual)	Wages and Compensation of employees × tax revenue coefficient	13.4%	Tax revenue / Tax base person gross income

Source: Okinawa Prefecture, Prefectural tax summary

Business tax levied on OIST's operating surplus was estimated to be 57 million yen; Prefectural tax (Corporation) was estimated at 246 million yen, Prefectural tax (Individual) was estimated at 1.146 billion yen; in sum, the total tax revenue was estimated at 1.449 billion yen.

Table2-3-7-1 Tax revenue effect

Unit: million yen

	Education and Research	Faculty and Staff	Students	Other Activities	Facility Development	Total
Business Tax	24	22	1	5	5	57
Prefectural Tax(Corporation)	109	113	2	15	7	246
Prefectural Tax(Individual)	456	555	10	54	70	1,146
Total	589	690	13	75	82	1,449

Note: The income tax on faculty staff consumption includes the withholding amount of OIST executive faculty staff

4. Calculation Results of the Economic Impacts on the Economy of Onna Village

Since an IO Table was not available for Onna Village, the economic ripple effect on Onna Village was estimated by taking the Onna Village's share of the gross municipal product (by economic activity and municipality) listed in the municipal income statistics and multiplying it by the total effect based on the IO Table for Okinawa Prefecture.

Onna Village's gross municipal product was 1.20% of all of Okinawa Prefecture. By industrial sector, Onna Village's share in the lodging and food service industry was relatively high at 7.01%; followed by forestry at 2.93%, education at 2.85%, and construction at 2.05%. These estimates were based on FY2015 figures, the latest municipal income statistics available.

Table2-4-1-1 Gross Prefectural domestic product

Unit: million yen

	Onna vil.	Okinawa pref.	Share of Onna village
Agriculture	740	44,893	1.65
Forestry	10	341	2.93
Fishing	176	9,899	1.78
Mining	43	3,677	1.17
Manufacturing	490	209,061	0.23
Electricity, gas and water supply and waste	383	161,100	0.24
Construction	7,949	388,660	2.05
Wholesale and retail trade	1,323	394,504	0.34
Transport and postal services	1,178	282,283	0.42
Accommodation and food service activities	12,796	182,440	7.01
Information and communications	111	206,693	0.05
Finance and insurance	128	157,225	0.08
Real estate	4,217	447,293	0.94
Professional, scientific and technical activities	4,035	385,241	1.05
Public administration	3,598	388,500	0.93
Education	6,442	226,368	2.85
Human health and social work activities	1,984	426,741	0.46
Other service activities	4,161	237,689	1.75
Sub-total	49,764	4,152,608	1.20

Source: Okinawa prefecture, financial calculation of residents in the municipal districts

Since the gross municipal product was based on added value, gross induced added value was used to estimate the gross municipal product of Onna Village. By industry, the service industry had the largest share at 66.1 million yen, followed by producers of government services at 31.6 million yen and the construction industry at 25 million yen. Overall, the gross municipal product was estimated to be 156.7 million yen.

The total effect included intermediate input and was not share based on added value; therefore it was calculated only for reference and not for comparison purposes. The estimate came out to be 367.5 million yen.

Employment effect was calculated by multiplying total effect by employment coefficient. As a result, the employment inducing effect was estimated to be about 39.9 people.

Table2-4-1-2 Estimated total village production by Onna village share

Unit: million yen, %, employee

	Estimate based on gross added value	Total Effect (Reference value)	Employment effect (Reference value)
Agriculture	2.3	5.5	0.8
Forestry	0.0	0.1	0.0
Fishing	0.6	1.3	0.1
Mining	0.1	0.3	0.0
Manufacturing	1.5	3.6	0.2
Construction	25.0	58.7	6.0
Electricity, gas and water supply and	1.2	2.8	0.1
Wholesale and retail trade	4.2	9.8	1.5
Finance and insurance	0.4	0.9	0.1
Real estate	13.3	31.1	1.0
Transport and postal services	4.1	9.5	0.5
Service	66.1	155.0	21.8
Public administration	31.6	74.2	6.1
Private non-profit institutions serving	6.2	14.7	1.8
Sub-total	156.7	367.5	39.9
Compared to total gross output value in	0.31	0.74	
Reference: OIST faculty staff living in Onna village			257

Based on the principle of the Equivalent of Three Aspects, gross municipal product was considered equivalent to income. Estimated income was used to estimate the tax revenue for the municipality. Municipal tax included corporate and individual resident taxes. Although tax laws require application of varying tax rates depending on the size of the business and income levels, tax revenue coefficients were used for the purpose of this calculation.

Table2-4-1-3 Calculation method of tax revenue coefficient

		Calculation method	tax revenue coefficient	Calculation basis
Village Tax	Inhabitant Tax, Corporation	operating surplus × tax revenue coefficient	20.0%	Tax revenue / Tax base person gross income
	Inhabitant Tax, Individual	Compensation of employees × tax revenue coefficient	18.9%	Tax revenue / Tax base person gross income

Source: Okinawa Prefecture, Prefectural tax summary

Tax revenue for Onna Village was estimated to be 12 million yen in corporate resident tax and 148.2 million yen in individual resident tax, for a total of 160.2 million yen in municipal tax revenue.

Table2-4-1-4 Tax revenue estimate by Onna village share

Unit: million yen

	Inhabitant Tax, Corporation	Inhabitant Tax, Individual	Total
Tax Revenue	12.0	148.2	160.2

Note: The number of OIST faculty staff was stated as a reference value.

When comparing the above results with major economic indicators of Onna village, the employment effect will be 39.9 people, 0.76% for 5,226 people in Onna village labor force. There are 257 OIST faculty staff living in Onna village, which is 4.9% of the number of workers in Onna Village labor force. As for the tax revenue effect, the ordinary tax of Onna village is 1,548 million yen, which is 160.3 million yen. This is 10.3%. Because the tax revenue effect is a large effect of employment, the tax revenue effect is also great.

Comparison with employment effect of whole Onna village (Unit: people)

	Real amount	Source
Onna village employed persons (A)	5,226	Ministry of Internal Affairs and Communications, Population census
Number of employment inductions (B)	39.9	
• B/A (%)	0.76	

Comparison with the tax revenue effect of the whole Onna village (Unit: million yen)

	Real amount	Source
Onna village Local tax Ordinary tax (A)	1,548	Ministry of Internal Affairs and Communications
Tax revenue effect (B)	160.2	
• B/A (%)	10.3	

CHAPTER 3: ECONOMIC IMPACTS WHEN THE NUMBER OF OIST FACULTY REACHES 100

1. Direct Effect

The economic impacts of when the number of OIST faculty reached 100 was estimated based on the 2017 calculation results when the number of faculty was 61.

(1) Effect of Education and Research Activities

Of the account items subject to calculation (Educational Expenses, Research Expenses, Educational Support Expenses, Sponsored Research Expenses, Sponsored Project Expenses, Personnel Costs for Executives, Personnel Costs for Faculty, Personnel Costs for Employees, General Administrative Expenses, Financial Expenses, Depreciation, Taxes and Dues, Overseas Travel and Import Costs), Personnel Costs for Executives, Personnel Costs for Faculty, and Personnel Costs for Employees were excluded for the purpose of this analysis because they were personnel costs. Taxes and Dues were excluded because they would not create demand. International Travel and Import Costs were also excluded because the demand was overseas. The remainder, Educational Expenses, Research Expenses, Educational Support Expenses, Sponsored Research Expenses, Sponsored Project Expenses, General Administrative Expenses, Financial Expenses, and Depreciation were subject to calculation of Direct Effect.

Table3-1-1-1 Education and research expenditure

Unit: Thousand yen

Scope of measurement	17,262,161
Education expenses	862,215
Research expenses	3,540,979
Educational support spending	1,344,962
Sponsored research expenses	1,578,223
Sponsored project expenses	82,026
General and administrative expenses	4,085,621
Financial expenses	81,549
Depreciation	5,686,585

(2) Living Expenditures of Faculty and Students

1) Living Expenditures of Faculty and Staff

Based on the ratio of current staff to 61 faculty members as of 2017, the number of staff at the time when faculty member reaches 100 was estimated. The number of executives was 4, the same as the current situation, the number of faculty members was 100, and the number of staff was 1,170 for the research division and administrative division. Calculation for number of staff was conducted by using the growth rate of the number of staff of framework document II for each division. Furthermore, regarding the number of faculty and staff by residential places, it was allocated by the proportion of staff by location of residence at the end of FY2017.

Table3-1-2-1 Estimated number of executives and faculty staff

Unit: person

	Executives	Faculty	Staff	total
Onna village	3	78	298	379
Within prefecture	1	20	866	887
Outside Okinawa Prefecture		2	6	8
total	4	100	1,170	1,274

Table3-1-2-2 Estimated amount of direct expenditure

Unit: Thousand yen

	Within prefecture	total
Executive salaries	122,904	122,904
Salaries –Exe commutation	199	199
Salaries –Base	8,215,271	8,267,184
Salaries –Allowance	514,446	517,697
Salaries –Commutation	104,617	105,278
Salaries –Over time	172,862	173,954
Salaries –Others	125,526	126,319
Periodic Retirement benefits	22,723	22,867
total	9,278,548	9,336,402

2) Living Expenditures of Students

Furthermore, from the proportion of students residing within and outside the prefecture at the time of admission in 2017, it was estimated that 253 students were residing outside the prefecture at the time of admission.

Table3-1-2-3 Number of students at the time of 100 faculty members

Unit: person

	Village	prefecture	Outside the province	overseas	total
Number of students	243	26	2	8	279
lived in the prefecture					26
outside the prefecture					253

Note: Students residing in Okinawa and those residing outside the prefecture at the time of admission do not mean that they are students from Okinawa.

Table3-1-2-4 Demand by industry sector of student consumption

Unit: Thousand yen

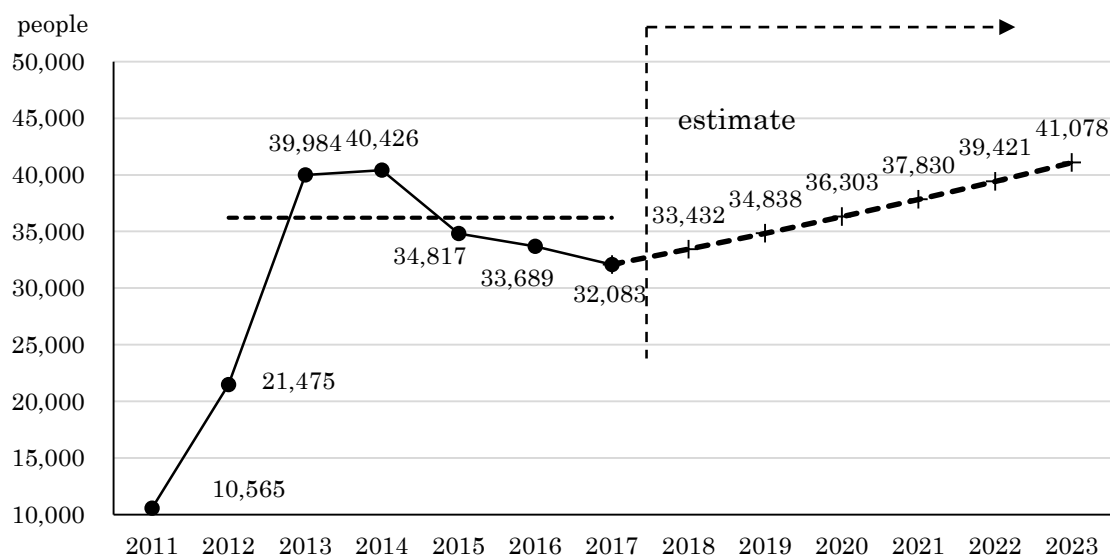
Sector Classification	Outside Okinawa Prefecture	All students Demand amount
Food	112,248	123,784
Housing,, Fuel, light and water charges		
Electricity	14,484	15,973
Water supply	3,357	3,702
Sewage disposal	1,214	1,339
House rent	40,826	45,022
Medical care		
Medical service (except hospitalization)	9,593	10,579
Medical service (dentistry)	1,220	1,345
Medical service (pharmacy dispensing)	2,479	2,734
Medical service (miscellaneous medical service)	418	461
Entertainment / luxury goods		
Movie theaters	1,215	1,340
Performances (except movie theaters), theatrical companies	1,364	1,504
Stadiums and companies of bicycle, horse, motorcar and motorboat races	175	193
Sport facility service, public gardens and amusement parks	4,588	5,059
Amusement and recreation facilities	30,679	33,832
Miscellaneous amusement and recreation services	2,742	3,023
Other daily expenses	66,982	73,865
total amount	293,583	323,754

(3) Other Activities

1) Elementary, Middle, and High School Students Visiting from Outside Okinawa Prefecture

The number of elementary, middle and high school students visiting OIST when the number of faculty reached 100 was estimated based on the number of student visitors currently being supported per OIST management division staff. Assuming that the number of visitors will increase proportionately to the number of OIST staff, the number of visitors in 2023 was estimated to be 41,078, an increase of 652 from 2014 when the number of visitors was 40,426.

Figure3-1-3-1 Estimated number of visitors to students' OIST



2) Visitors from Outside Okinawa Prefecture for Workshops and Academic Conferences

In 2017, when the number of faculty members who had 61 people increased to 100 faculty members, it can be assumed that it will be able to deal with events of 1.639 times magnitude. Assuming this, we asked for the increased number of visitors. As a result, the number of participants was 58,444, of which 13,275 people outside the prefecture and 4,032 overseas will be the number of visitors.

Table3-1-3-1 Estimated number of visitors from prefecture and overseas

	Number of participants	Within prefecture	Unit: person	
			Outside Okinawa Prefecture	overseas
OIST sponsored or involved WS etc.	8,226	1,974	4,343	1,910
Provide facilities such as academic conferences and symposiums	9,139	2,193	4,825	2,122
Student	41,078	36,970	4,108	
total	58,444	41,137	13,275	4,032

Table3-1-3-2 Demand by overseas and overseas tourists

Unit: Thousand yen

Expenditure	Basic Sector Classification	Demand amount
Accommodation	Accommodation	432,735
Transport	Transport	185,115
Shopping		303,644
	Fruits	19,115
	Dairy cattle farming	717
	Beef cattle	17,661
	Hen eggs	8,402
	Marine fishery	22,149
	Marine aquaculture	19,805
	Meat	25,797
	Processed meat products	3,550
	Bottled or canned meat products	950
	Frozen fish and shellfish	961
	Salted, dried or smoked seafood	20
	Fish paste	705
	Miscellaneous processed seafood	4,050
	Flour and miscellaneous grain milled products	70
	Noodles	732
	Bread	3,227
	Confectionery	50,997
	Bottled or canned vegetables and fruits	1,992
	Preserved agricultural foodstuffs (except bottled or canned)	775
	Sugar	48,705
	Starch	1,718
	Dextrose, syrup and isomerized sugar	946
	Animal oil and fats, vegetable oil and meal	19
	Condiments and seasonings	302
	Miscellaneous foods	4,853
	Malt liquors	9,503
	Miscellaneous liquors	30,955
	Tea and roasted coffee	1,571
	Soft drinks	10,767
	Woven fabric apparel	1,511
	Miscellaneous wearing apparel and clothing accessories	0
	Miscellaneous furniture and fixtures	922
	Printing, plate making and book binding	4,439
	Leather and fur skins	17
	Pottery, china and earthenware	2,149
	Toys and games	73
	Sporting and athletic goods	341
	Jewelry and adornments	302
	Stationery	172
	Miscellaneous manufacturing products	2,707
food, drink	food, drink	290,601
Amusement services	Amusement services	118,496
Other	Other	33,214
	total	1,363,806

Source : Okinawa Prefecture 「I/O table 2011」

(4) Expenditures Associated with Facility Development

Anticipating additional construction of OIST research labs and residential facilities, it was assumed that the budget will be about the same as the expenditures for Lab 4 construction. Budget for facility development was assumed to be 7.69 billion yen, same as 2015 to 2017. The amount of the direct effect used for calculation is the project cost for the 4th laboratory, which is 3-year average of 2.563 billion yen.

Table3-1-4-1 Project cost for facility improvement related to development of the fourth research building

Unit: million yen

	F.Y 2015	F.Y 2016	F.Y 2017	Cumulative	average
Fourth research building basic design	48			48	16
Infrastructure design	155			155	52
Infrastructure development	18	236		255	85
Implementation design of the fourth research building		190		190	63
Development of the 4th research building		3,081	3,081	6,161	2,054
Development of the 4th research building			881	881	294
total	221	3,507	3,962	7,690	2,563

2. Calculation Results of the Economic Impacts on the National Economy

The economic impact was calculated in the same way as in Chapter 2. The calculation results are as follows.

(1) Effect by industry sector

The overall effect of OIST was 30.849 billion yen as direct effect and the total effect of the production ripple effect was 69.051 billion yen. By industry sector, induced production effect for service industry was the largest, and manufacturing coming next and almost with the same level.

Table3-2-1-1 The effect of the university as a whole

Unit: million yen										
	Direct effect	Demand increase	in regional	Primary Economic Impact	GVA Inducing effect	Income Inducing effect	Secondary Economic Impact	GVA Inducing effect	Income Inducing effect	Total effect
Crop cultivation	294	103	95	155	83	9	188	104	11	446
Livestock	205	87	86	157	44	14	113	38	14	357
Forestry	9	3	3	12	7	2	8	4	1	24
Fishery	127	45	39	47	25	8	41	21	7	133
Mining	1,176	10	5	24	11	4	5	3	1	39
Beverages and Foods	1,201	434	379	503	158	46	1,038	344	122	1,974
Manufacturing	9,963	4,260	3,712	7,884	2,305	1,128	2,309	662	267	14,453
Construction	643	286	286	480	208	143	216	94	64	983
Electricity, gas and water supply	1,714	813	813	1,296	414	140	648	198	67	2,757
Wholesale and retail trade	2,525	1,199	1,178	2,023	1,411	626	2,028	1,371	734	5,250
Finance and insurance	909	389	377	689	448	141	872	576	203	1,950
Real estate	631	285	285	585	393	82	2,314	1,891	100	3,184
Transport and postal	2,391	1,097	1,060	1,925	918	419	1,113	618	253	4,136
Service	8,834	4,229	4,116	7,071	4,202	1,985	3,816	2,136	1,003	15,116
Public administration	48	22	22	123	69	26	110	71	36	255
Miscellaneous non-profit services	178	85	83	120	54	45	287	206	157	492
gross value added sectors	(15,981)									
Compensation of employees	(8,552)									
total	30,849	13,348	12,538	23,096	10,749	4,818	15,106	8,339	3,040	69,051

(2) Effect of OIST Overall

1) Induced Production

The estimated direct effect was 30.849 billion yen, and this consumption and investment demand induced inter-industry production creating a total of 23.096 billion yen as primary ripple effect. In addition, induced production led to economic activities and generated employee income as compensation for labor. This led to household spending for food clothing and shelter, which further induced production which totaled 15.106 billion yen as secondary ripple effects. Overall, induced production generated by OIST operations was 69.051 billion yen: 2.24 times the direct effect of the initial spending.

Table3-2-2-1 Production inducement amount in each activity

Unit: million yen

	Education and Research	Faculty and Staff	Students	Other Activities	Facility Development	Total
Direct impact	17,262	9,336	324	1,364	2,563	30,849
Primary economic impact	13,381	5,838	206	1,032	2,639	23,096
Secondary economic impact	8,982	3,775	137	677	1,535	15,106
Total impact	39,625	18,949	667	3,073	6,737	69,051
Output multiplier	2.30	2.03	2.06	2.25	2.63	2.24

2) Induced Added Value

Induced added value was estimated to be 35.069 billion yen, which is about 50% of the amount induced production. Induced added value mainly consists of employee income and sales surplus, and as a route of economic spread of these two items, an increase in consumption due to an increase in employee income, as well as an increase in business investment, etc., due to an increase in operating surplus were induced, and as a result the effect on the final demand sector is high.

Table3-2-2-2 Value added provision amount in each activity

Unit: million yen

	Education and Research	Faculty and Staff	Students	Other Activities	Facility Development	Total
Direct impact	8,386	5,564	189	713	1,129	15,981
Primary economic impact	6,334	2,708	98	467	1,141	10,749
Secondary economic impact	4,958	2,084	76	374	847	8,339
Total impact	19,679	10,356	363	1,554	3,117	35,069
Output multiplier	2.35	1.86	1.92	2.18	2.76	2.19

Table3-2-2-3 Gross domestic product equivalent value inducement

Unit: million yen

	Education and Research	Faculty and Staff	Students	Other Activities	Facility Development	Total
Compensation of employees	9,024	3,795	141	686	1,554	15,201
Operating surplus	2,360	2,932	73	236	213	5,814
Depreciation of fixed capital	2,754	2,270	71	258	185	5,538
Indirect taxes	993	860	54	124	258	2,288
(Less) Current subsidies	-47	-48	-1	-11	-0	-107
total	15,085	9,809	338	1,293	2,210	28,734

(3) Employment

The total number of employees who induce employment is 6,542 people.

Table3-2-3-1 Number of employment inductions

Unit: person

	Education and Research	Faculty and Staff	Students	Other Activities	Facility Development	Total
employment inductions	3,754	1,795	63	292	638	6,542
OIST faculty staff total (Domestic)						1,274

Note: The number of OIST faculty staff was stated as a reference value.

(4) Tax Revenue

The tax revenue effect of OIST is estimated to be 872 million yen for corporate tax collected from operating surplus of added value induced by economic activity. The income tax is estimated at 1,234 million yen. Tax revenue combined with corporate tax and income tax will be 2,106 million yen.

Table3-2-3-1 Tax revenue effect

Unit: million yen

	Education and Research	Faculty and Staff	Students	Other Activities	Facility Development	Total
Corporation Tax	354	440	11	35	32	872
Income tax	343	801	5	26	59	1,234
Total	697	1,240	16	61	91	2,106

Note: The income tax on faculty staff consumption includes the withholding amount of OIST executive faculty staff

3. Calculation Results of the Economic Impacts on the Okinawan Economy

(1) Effect by industry sector

The overall effect of OIST was 30.761 billion yen, and the total production ripple effect was 49.166 billion yen. By industry sector, the effect on service industry was the largest, followed by manufacturing industry.

Table3-3-1-1 The effect of the university as a whole

Unit: million yen

	Direct effect	Demand increase	in regional	Primary Economic Impact	GVA Inducing effect	Income Inducing effect	Secondary Economic Impact	GVA Inducing effect	Income Inducing effect	Total effect
Crop cultivation	429	179	55	86	34	29	38	20	13	305
Livestock	222	95	89	169	46	26	66	24	12	330
Forestry	10	4	1	2	1	0	2	1	1	8
Fishery	68	29	5	5	3	1	3	1	1	37
Mining	1,266	539	4	8	4	2	0	0	0	552
Beverages and Foods	1,244	521	236	276	91	34	556	198	93	1,353
Manufacturing	9,381	4,416	988	1,211	293	156	353	51	26	6,536
Construction	304	131	126	174	88	70	64	32	26	372
Electricity, gas and water supply	1,731	767	760	978	419	172	488	199	79	2,238
Wholesale and retail trade	2,399	1,100	712	823	541	304	1,535	874	504	3,586
Finance and insurance	768	332	302	406	304	135	455	339	164	1,217
Real estate	598	254	239	305	225	53	1,882	1,584	80	2,451
Transport and postal s	2,736	1,214	947	1,357	880	438	962	594	259	3,620
Services	9,140	4,221	2,845	3,538	2,199	1,149	1,951	1,094	587	10,016
Public administration	5	2	2	72	45	44	211	164	148	284
Miscellaneous non-profit services	460	208	168	228	153	100	203	136	96	642
gross value added sectors	(16,749)									
Compensation of employees	(8,960)									
total	30,761	14,012	7,480	9,638	5,325	2,713	8,767	5,311	2,086	49,166

(2) Effect of OIST Overall

1) Induced Production

Direct effect of the various consumption and investment generated by the operation of OIST was 30.761 billion yen in total, 9.638 billion yen was newly induced as the primary ripple effect. Secondary ripple effect was to be 8.767 billion yen. The total effect was to be 49.166 billion yen, which was 1.60 times the direct effect.

Table3-3-2-1 Production inducement amount in each activity

Unit: million yen

	Education and Research	Faculty and Staff	Students	Other Activities	Facility Development	Total
Direct impact	17,262	9,279	293	1,364	2,563	30,761
Primary economic impact	5,208	2,847	123	603	858	9,638
Secondary economic impact	5,354	2,158	77	387	792	8,767
Total impact	27,823	14,283	493	2,354	4,213	49,166
Output multiplier	1.61	1.54	1.68	1.73	1.64	1.60

2) Induced Added Value

Looking at the amount of induced added value in induced production amount, the direct effect was 16.749 billion yen, and the total induced added value was 27.386 billion yen.

Table3-3-2-2 Value added provision amount in each activity

Unit: million yen

	Education and Research	Faculty and Staff	Students	Other Activities	Facility Development	Total
Direct impact	9,115	5,647	147	712	1,129	16,749
Primary economic impact	2,951	1,553	65	279	478	5,325
Secondary economic impact	3,262	1,315	47	236	452	5,311
Total impact	15,328	8,514	259	1,226	2,059	27,386
Output multiplier	1.68	1.51	1.76	1.72	1.82	1.64

Table3-3-2-3 Gross domestic product equivalent value inducement amount

Unit: million yen

	Education and Research	Faculty and Staff	Students	Other Activities	Facility Development	Total
Compensation of employees	8,370	3,373	120	605	1,291	13,759
Operating surplus	2,850	2,663	35	219	140	5,907
Depreciation of fixed capital	864	1,397	49	166	122	2,609
Indirect taxes	1,328	1,006	29	148	170	2,687
(Less) Current subsidies	-27	-20	-1	-10	-0	-58
total	13,385	8,436	232	1,128	1,724	24,904

(3) Employment

In total, OIST generated employment of 4,658 people.

Table3-3-3-1 Number of employment inductions

Unit: person

	Education and Research	Faculty and Staff	Students	Other Activities	Facility Development	Total
employment inductions	2,636	1,353	47	223	399	4,658
OIST faculty staff in Okinawa						1,266

Note: The number of OIST faculty staff was stated as a reference value.

(4) Tax Revenue

Tax revenue effect of OIST was estimated to be 113 million yen for business tax collected from operating surplus among added value induced by economic activity, corporate prefectural tax is 620 million yen, individual prefectural tax collected from employee income was estimated at 2.213 billion yen. Prefectural tax revenue was estimated to be 2.946 billion yen from this.

Table3-3-4-1 Tax revenue effect

Unit: million yen

	Education and Research	Faculty and Staff	Students	Other Activities	Facility Development	Total
Business Tax	66	29	1	7	9	113
Prefectural Tax(Corporation)	299	280	4	23	15	620
Prefectural Tax(Individual)	1,122	821	16	81	173	2,213
Total	1,487	1,130	21	111	196	2,946

Note: The income tax on faculty staff consumption includes the withholding amount of OIST executive faculty staff

4. Calculation Results of the Economic Impacts on the Economy of Onna Village

As for the gross municipal product by industry, the service industry at 138.4 million yen was the largest, followed by 66.2 million yen for public administration and 52.4 million yen for construction. The total was estimated to be 328.2 million yen. Although it is a reference value, the total effect was 589.2 million yen.

Employment effect was calculated by multiplying the total effect of reference value by employment coefficient. As a result, the employment inducing effect is estimated to be about 64.0 people.

Table3-3-4-1 Estimated total village production by Onna village share

Unit: million yen, %, employee

	Estimate based on gross added value	Total Effect (Reference value)	Employment effect (Reference value)
Agriculture	4.9	8.8	1.2
Forestry	0.1	0.1	0.0
Fishing	1.2	2.1	0.1
Mining	0.3	0.5	0.0
Manufacturing	3.2	5.8	0.3
Construction	52.4	94.1	9.6
Electricity, gas and water supply and waste management service	2.5	4.5	0.1
Wholesale and retail trade	8.7	15.7	2.5
Finance and insurance	0.8	1.5	0.1
Real estate	27.8	49.9	1.6
Transport and postal services	8.5	15.3	0.8
Service	138.4	248.5	34.8
Public administration	66.2	118.9	9.8
Private non-profit institutions serving households	13.1	23.5	2.9
Sub-total	328.2	589.2	64.0
Compared to total gross output value in Onna village, %	0.55	0.98	

The tax revenue effect of OIST to Onna Village was estimated to be 19.7 million yen for corporate resident tax and 242.8 million yen for individual resident tax, and municipal tax revenue in total was estimated to be 262.5 million yen.

Table2-4-1-4 Tax revenue estimate by Onna village share

Unit : million yen

	Inhabitant Tax, Corporation	Inhabitant Tax, Individual	Total
Tax Revenue	19.7	242.8	262.5

Note: The number of OIST faculty staff was stated as a reference value.

5. List of Economic Impact key indicators

The main results on economic impact throughout the country and economic effects of Okinawa Prefecture and Onna village are summarized in the table below.

Production inducement effect (Unit: billion yen)

	FY2017		when number of faculty is 100	
	Production inducement	Gross value added Induced	Production inducement	Gross value added Induced
Nationwide	43,003	21,069	69,051	35,069
Okinawa prefecture	30,670	16,734	49,166	27,386
Onna village (million yen)	367.5	156.7	589.2	328.2

Employment (Unit: person)

	FY2017			when number of faculty is 100		
	Nationwide	Okinawa prefecture	Onna village	Nationwide	Okinawa prefecture	Onna village
Number of employment inductions	4,074	2,902	39.9	6,542	4,658	64.0

Tax Revenue (Unit: billion yen)

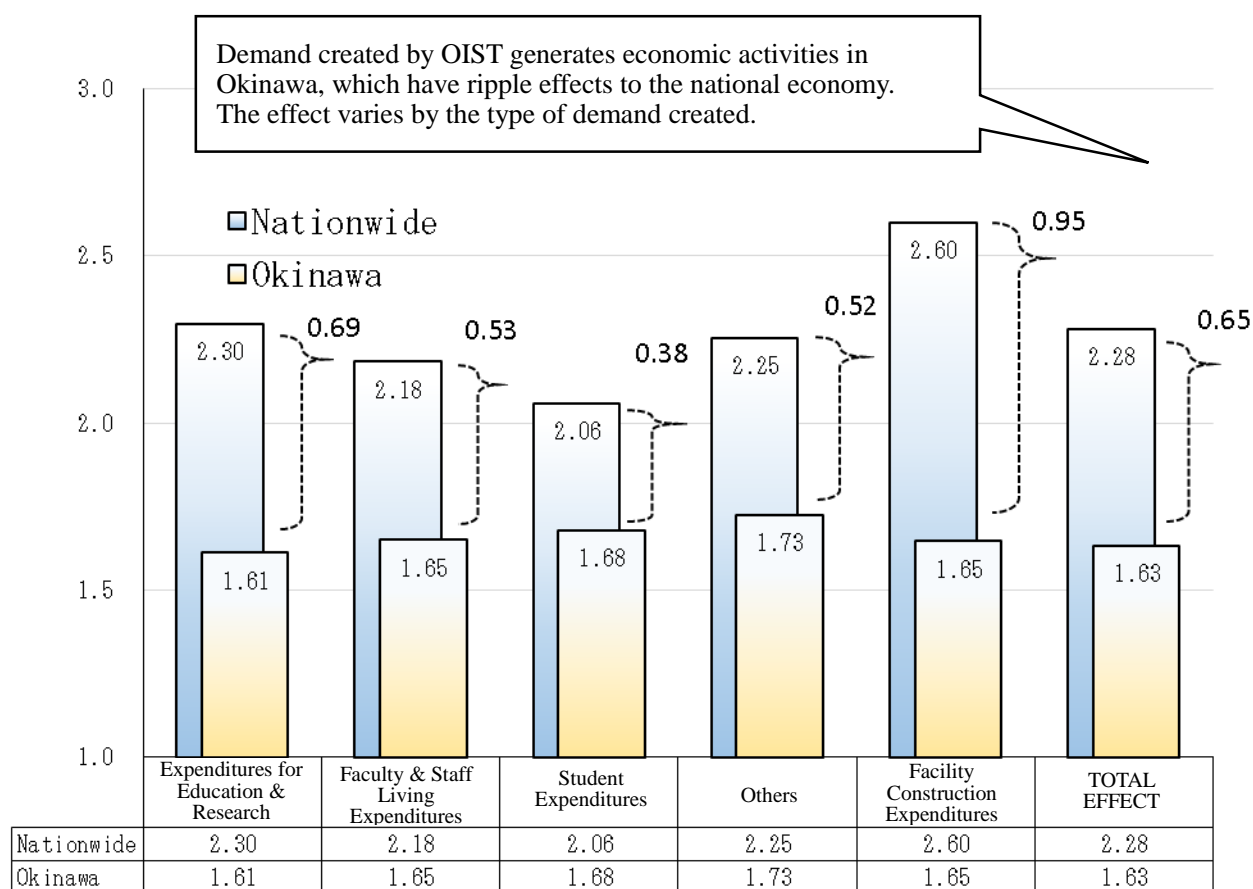
	FY2017			when number of faculty is 100		
	Nationwide	Okinawa prefecture	Onna village (million yen)	Nationwide	Okinawa prefecture	Onna village (million yen)
Tax Revenue	1.159	1.449	160.2	2.106	2.946	262.5

CHAPTER 4: ECONOMIC IMPACTS ON THE OKINAWAN ECONOMY AND CONSEQUENTIAL ECONOMIC IMPACTS ON THE NATIONAL ECONOMY

1. Economic Impacts on the Okinawa Economy and Consequential Economic Impacts on the National Economy

The economic effects of OIST's presence on Okinawa and Japan were estimated as follows: new demands created within Okinawa Prefecture had the effect of increasing demand in the Okinawan economy by 1.63 times. At the same time, new demands created in Okinawa had economic impact on the national economy, increasing demand in the Japanese economy by 2.28 times and in the Okinawan economy by 1.63 times.

(1) Expenditures for Education & Research (University's operating expenses):	$2.30 - 1.61 = 0.69$
(2) Living Expenditures of Faculty and Staff (household consumption):	$2.18 - 1.65 = 0.53$
(3) Student Expenditures (household consumption):	$2.06 - 1.68 = 0.38$
(4) Others (visits by elementary, middle and high school students, open campuses, academic conferences, MICE, etc.)	$2.25 - 1.73 = 0.52$
(5) Facility construction expenditures (based on Construction IO Tables; cumulative expenditures through for FY2017)	$2.60 - 1.65 = 0.95$
Total of Induced Effects (1) – (5):	$2.28 - 1.63 = 0.65$



2. Economic Impacts of OIST Facility Construction

OIST's graduate program commenced in September 2011 and celebrated its inaugural graduation ceremony in February 2018. Being a relatively new institution, OIST's facility construction project was launched in 2005 and the laboratory buildings and other facilities are still being expanded. OIST's economic effect on the construction industry has a significant impact on the Okinawan economy. Therefore, the economic ripple effects of the capital stock for construction were estimated separately from the flow of university operating expenditures. The cumulative direct effect from 2005 to 2019 was estimated to be ¥52.637 billion. The total effect on the entire nation was estimated at ¥133.701 billion, while the total effect to the Okinawan economy was estimated at ¥87.873 billion.

Figure4-2-1 Cumulative amount of facility construction expenses

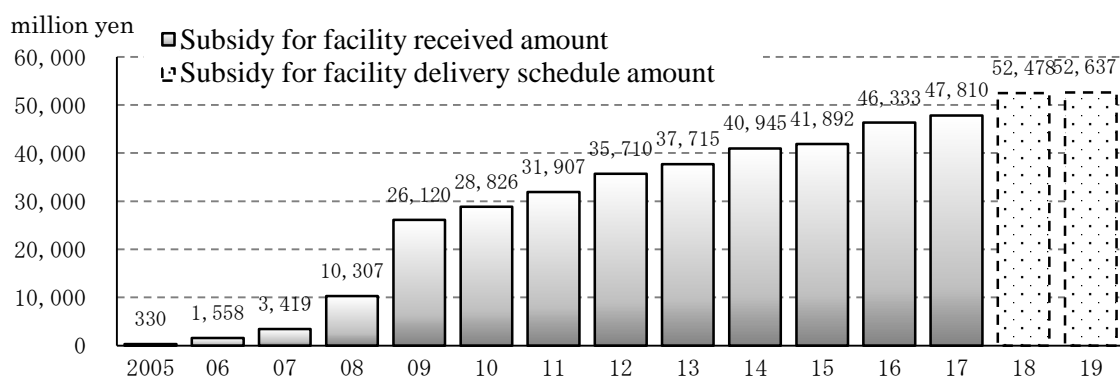


Table4-2-1 Economic Impact of the construction economy on the overall Japanese economy based on the IO table for Japan

	Unit: million yen		
	2005-2017	2018-2019	2005-2019
Direct Effect	47,810	4,827	52,637
Primary Indirect Impact	45,513	4,744	50,256
Secondary Indirect Impact	28,045	2,763	30,808
Total Impact	121,367	12,334	133,701

Table4-2-2 Economic Impact of the construction economy on the overall Japanese economy based on the IO table for Okinawa prefecture

	Unit: million yen		
	2005-2017	2018-2019	2005-2019
Direct Effect	47,810	4,827	52,637
Primary Indirect Impact	15,001	1,566	16,567
Secondary Indirect Impact	17,043	1,627	18,669
Total Impact	79,853	8,020	87,873

3. Comparison of Employment inducing effects

We compared the number of employers who induced employment in Japan and Okinawa Prefecture and Onna village.

The number of people who induce employment is 4,074 people nationwide and 2,902 people in Okinawa prefecture, the difference being 1,172 people. The number of employers who induce employment in secondary industries nationwide is 22.7%, Okinawa prefecture is 8.57%. And the tertiary industry is 76.08% nationwide and 89.93% in Okinawa prefecture. This is because the industrial structure of Okinawa is different from the whole country. Onna village employment induction number is 39.9 people, of which tertiary industry is 38.9 people. The effect on this department is high.

Table4-3-1 Induced employment in Japan and Okinawa Prefecture and Onna village.

Unit: People, %

	Economic Impact of OIST						Onna vil. Employees	
	All Japan		Okinawa pref.		Onna vil.			
Primary industry	50	1.22	44	1.50	0.8	2.10	847	10.6
Secondary industry	925	22.70	249	8.57	0.2	0.52	153	1.9
Tertiary industry	3,099	76.08	2,610	89.93	38.9	97.38	6,976	87.5
Total	4,074	100.00	2,902	100.00	39.9	100.00	7,976	100.00

Source: Statistics Bureau, Population Census

4. Comparison of the Measured Results to GDP-Related Indices

The economic ripple effect of OIST was measured for “FY2017 actual” and “when the number of faculty reached 100”. The results were compared against demand creation effects (equivalent to primary indirect effects per definition used in this report) of “academic research institutions” and “school education” nationwide. For demand creation effect per MIC IO Table, the column sum from Leontief’s inverse matrix was used as the production multiplier. According to IO Table of Japan, OIST’s production multiplier was 1.78; slightly lower than 1.86 of the academic research institutions nationwide, but higher than that of school education nationwide which was 1.25. According to the IO Table of Okinawa Prefecture, OIST’s production multiplier was lower at 1.33. The rate of gross value added for OIST was 49%, which was higher compared to that of academic research institutions nationwide.

Table4-5-1 COMPARISON OF THE PRODUCTION ECONOMIC IMPACT
(INDIRECT PRIMARY EFFECTS)

Unit: million yen, %

	Production Multiplier (Induction Rate)	Production Value	Gross Value Added (GVA)	GVA Rate
OIST (2017 actual) per IO Table for Japan	1.78	43,003	21,069	49.0
OIST (when number of faculty is 100) per IO Table for Japan	1.75	69,051	35,069	50.8
OIST (2017 actual) per IO Table for Okinawa Pref.	1.33	30,670	16,730	54.6
OIST (when number of faculty is 100) per IO Table for Okinawa Pref.	1.31	49,166	27,386	55.7
Academic Research Institution per MIAC IO Table	1.86	2,275,857	1,061,827	46.7
School Education Per MIAC IO Table	1.25	19,991,191	17,134,126	85.7
Output Value for Okinawa Prefecture * (SNA)	—	7,064,754	4,141,564	58.6

*Output Value for Okinawa Prefecture was taken from *FY2015 Prefectural Accounts of Okinawa Prefecture*, Okinawa Prefectural Government.

Of Okinawa’s net prefectural product, the total impact of OIST’s economic ripple effect accounted for 0.51% in FY2017, and will comprise 0.85% when the number of faculty reaches 100. For northern Okinawa alone, the total impact of OIST’s economic ripple effect accounted for 5.7% of the net product in FY2017, and will make up 9.48% when the faculty reaches 100. These estimates indicate that OIST’s economic effects will account for a relatively large percentage in the local area.

Table4-5-2 Comparison with Okinawa Prefecture regional net production within prefecture

Unit: million yen, %

	Gross Value Added	Okinawa Pref., Total	Northern Okinawa Pref.	Central Okinawa Pref.	Southern Okinawa Pref.	Naha
OIST (2017 actual) per IO Table for Japan	21,069	0.51	5.70	1.37	3.76	1.57
OIST (when faculty is 100) per IO Table for Japan	35,069	0.85	9.48	2.28	6.25	2.61
OIST (2017 actual) per IO Table for Okinawa Pref.	16,734	0.40	4.53	1.09	2.98	1.24
OIST (when faculty is 100) per IO Table for Okinawa Pref.	27,386	0.66	7.41	1.78	4.88	2.04
Net production in Okinawa Prefecture (million yen)	-	4,141,564	369,772	1,537,250	560,963	1,344,316

Note: Regional classification of Okinawa main island.

Northern Okinawa Pref.: Nago C., Kunigami V., Ogimi V., Higashi., Nakijin V., Motobu T., Onna V., Ginoza V., Kin T., Ie V., Iheya V., Izena V.

Central Okinawa Pref.: Ginowan C., Urasoe C., Okinawa C., Uruma C., Yomitan V., Kadena T., Chatan T., Kitamakagusuku V., Nakagusuku V., Nishihara T.

Southern Okinawa Pref.: Itoman C., Tomigusuku C., Nanjo C., Yonabaru T., Haeburu T., Tokashiki V., Zamami V., Aguni V., Tonaki V., Minamidaito V., Kitadaito V., Kumejima T., Yaese T.

Naha: Naha C.: Naha C.

Source : "Prefectural Accounts" 1993SNA, Benchmark year = 2005, Okinawa Prefecture

Economic Impact of OIST (FY2017 year gross value added induced amount 16.734 billion yen) in terms of the ratio of Okinawa Prefecture's economic activity to total gross output in the prefecture, it is 30.4% for agriculture, forestry and fisheries. And the manufacturing industry is 8.0%, accommodation and food service is 9.2%, and finance and insurance industry is 10.6%.

Table4-5-3 OIST Gross value added inducement amount and Gross Regional Product classified by Economic Activities

Unit: million yen, %

	Gross Regional Product classified by Economic Activities	Percentage of OIST economic impact
Agriculture, forestry and fishery	55,133	30.4
Mining	3,677	455.1
manufacturing industry	209,061	8.0
Electricity, gas and heat supply	161,100	10.4
Construction	388,660	4.3
Commerce	394,504	4.2
Transport and postal services	282,283	5.9
Accommodation and food service	182,440	9.2
Information and communications	206,693	8.1
Finance and insurance	157,225	10.6
Real estate	447,293	3.7
Research	385,241	4.3
Public administration	388,500	4.3
Education and research	226,368	7.4
Medical, health care and welfare	426,741	3.9
services	237,689	7.0

Source: Economic and Social Research Institute, Cabinet Office