Assessment of Taiwan's Growth and Current Competitiveness

CHU, Yun-eng, KAO, Yuang-kuang

Summary

The World Economic Forum assesses national competitiveness on the basis of three indexes: science and technology, public institution and system, and macroeconomic environment. Two more indexes – enterprise competitiveness and infrastructure construction – are included in an assessment of Taiwan's growth and current competitiveness. The resulting evaluation scheme comprises five factor indexes: science and technology, public institution and system, macroeconomic environment, enterprise competitiveness, and infrastructure construction.

The Delphi Method is adopted for this survey. Five groups of advisors have chosen by as many groups of scholars and experts as the respondents in the survey. Altogether 150 respondents have been selected.

The assessment of Taiwan's growth and current competitiveness on the basis of the five factor indexes results in an overall average rating of 4.9747. In two of them, public institution and system and macroeconomic environment, the scores are below the average. The scores in the other three – science and technology, enterprise competitiveness, and infrastructure construction – are above the average.

The WEF evaluation indexes are applied for a comparison in competitiveness among six nations (regions) in East Asia (Japan, South Korea, Taiwan, Hong Kong, Singapore and China). Their standings, as found in this study, are as follows:

- 1. Technology Index: Japan, South Korea, Taiwan, Singapore, Hong Kong and China.
- 2. Public Institution and System Index: Singapore, Japan, Hong Kong, Taiwan, South Korea and China.
- 3. Macroeconomic Environment Index: Singapore, South Korea, China, Hong Kong, Taiwan, and Japan.

| General Advisor | Chu, Yun-peng | President, Jin Wen Institute of Technology | | | | | |
|-----------------------------|------------------|--|--|--|--|--|--|
| General Monitor | Kao, Yuang-kuang | M.E.P.A Executive Director, College of Social Sciences, National Chengchi University | | | | | |
| Director | Liu, Pei-yi | Assistant Professor, Hsuan Chuang University | | | | | |
| Technology Index Panel | Chien, Chao-hsin | Lecturer, Da Han Institute of Technology | | | | | |
| Director | Song, Sheau-yuan | Professor and Chairman , Center for General | | | | | |
| Public Institution and | | Education, Central Police University | | | | | |
| System Index Panel | Kuo, Chung-ling | Lecturer, Kuang Wu Institute of Technology | | | | | |
| Director | Chao, Pi-hua | Associate Professor, Soochow University | | | | | |
| Macroeconomic | Yu, Yi-wen | Lecturer, National Taipei College of Business | | | | | |
| Environment Index Panel | | | | | | | |
| Director | Hsu, Shu-ming | Associate Professor, Taipei Municipal Teachers | | | | | |
| Enterprise Competitiveness | | College | | | | | |
| Index Panel | Wu, Ta-ping | Lecturer, Jin Wen Institute of Technology | | | | | |
| Director | Liu, Teng-chung | Dean for Student Affairs, Kang Ning Jr. College of | | | | | |
| Infrastructure Construction | | Nursing | | | | | |
| Index Panel | Niu, Tso-chien | Lecturer, Providence University | | | | | |

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.Background

With the forthcoming of the Earth Village, the commodities, services, information, technology, manpower and capital are moving from country to country at a fast speed. Each nation will have to work on promoting its national competitiveness so as to take a position here. National competitiveness is an ability of a nation to create and accumulate national wealth. The stronger the competitiveness is, the more the national wealth will become, vice versa. The units to create the national wealth include individuals, enterprises and the governments. Governments can perfect legal system, strengthen financial system, reform administration and improve infrastructure, thereby creating the sustainable environment in which enterprises operate, arouse the vigor of non-governmental societies, eventually for national sustainable development.

As regards the definition of the national competitiveness, according to Michael E. Porter, of Harvard University, it means that a nation has a good industrial development environment, thus ensure its ability to obtain competitive advantage. So how to raise productivity is an essential factor to strengthen competitiveness¹. According to International Institute for Management Development located in Loussane, Switzerland, the national competitiveness means an ability of a nation to create added value and accumulate national wealth 2 . However, according to World Economic Forum, loated Geneva, Switzerland , national competitiveness refers to an overall ability of a nation in the high sustained economic growth rate and high national income 3 .

Since the national competitiveness is differently defined, different patterns are employed in its rating principles, rating indexes and index statistical data application. Of the patterns, the annual competitiveness reports produced by WEF and IMD have been given high weight on by the governments and enterprises, and used as their reference for decision making. So they are the most authoritative.

National competitiveness is an ability to assess whether a nation has an environment favorable for enterprises to maintain its competitiveness, thus obtain the sustainable development of the whole nation. In this case, rating indexes and methods must be expanded, so that their assessment results will be representative and generally accepted. Both WEF and IMD employ measure-based Multiple Index Overall Rating as their rating pattern for national competitiveness assessment. Their index pattern employs multi-story Tree-like Structure. The first story is overall national competitiveness. The second story is the competitiveness of major factors rating indexes. The third story is the competitiveness of sub-factor rating index. The fourth story is the competitiveness of the components rating of the subindex.

The calculation method employed by WEF and IMD for national competitiveness rating index is step integration. That is, the rating values of each component index from all the nations are calculated by weighted average method, to obtain the rankings of each nation in subindex and major index. Thus the global ranking in the overall competitiveness is given. The two organizations are quite subjective on weighted average method and weighted average set, thus naturally some controversies often arise among the rated nations.

WEF report has revealed the rankings of all the economies on two major factor indexes. In addition to the growth competitiveness index of economic growth potential in the next five years, it describes current

¹ Michael E. Porter, The Competitive Advantage of Nations, New York: The Free Press, 1990.

² IMD, The World Competitiveness Yearbook 2001.

³ WEF, The Global Competitiveness Report 2001-2002.

competitiveness index of the current productivity and economy from economical angle. Of them, growth competitiveness index is divided into three major factor indexes, i.e. science and technology, public institution and system, and macroeconomic environment. The current competitiveness index introduced in 2000 is also divided into two major factor indexes, i.e, enterprise operation and strategy maturity and quality of business environment. Each major factor index is composed of subindexes and component indexes. This project is based on the WEF assessment design slightly corrected. It divides Taiwan's Growth and Current Competitiveness into 5 major factor indexes for assessment, namely, science and technology, public institution and system, macroeconomic environment, enterprise competitiveness, and infrastructure construction. Among them, the former three items respond to the Growth Competitiveness Index of the WEF and the latter two items respond to the Current Competitiveness Index of the WEF. Therefore, for Taiwan's growth and current competitiveness, the index structure for the assessment is illustrated as follows (Table 1):

| | Major factor index | Subindex and compone indexes | ent index under ma | ajor factor | Remarks | | |
|---|------------------------|---------------------------------|--------------------|----------------------|----------------------|--|--|
| | | Subindices | Component | indices | | | |
| | | Education | 8 | | | | |
| | | Patents | 6 | | 5 subindices | | |
| ب | Technology index | Information | 12 | | | | |
| Taiwan's growth and current competitiveness index | | Government | 11 | | 49 component indices | | |
| 'an' | | Enterprises | 12 | | | | |
| s gr | | Personnel | 8 | | | | |
| owt | Public institution and | Quality | 6 | | 4 subindices | | |
| h an | system index | Fairness | 12 | | 34 component indices | | |
| d cu | | Efficiency | 8 | | | | |
| urrer | Macroeconomic | Market | 14 | | 3 subindices | | |
| it co | environment index | Society | 14 | | | | |
| mpe | | Government | 8 | | 36 component indices | | |
| etiti | | Human resource | 2 | | | | |
| vene | | Marketing | 3 | | | | |
| SS i | Enterprise | R&D | 4 | | 6 subindices | | |
| nde | competitiveness index | Finance | 1 | | 14 component indices | | |
| × | | Information | 1 | | | | |
| | | Operation strategy | 3 | | | | |
| | | Environment | 5 | | | | |
| | Infrastructure | safety | | | 3 subindices | | |
| | construction index | Quality | | 28 component indices | | | |
| | | Fairness | 3 | | | | |

 Table 1
 Taiwan's Growth and Current Competitiveness Index Structure

1.Methodology

The project adopts Delphi Method, which is based on the following basic principles:

- Structuring of information flow: In order to have an effective communication among participants, Delphi Method offers a kind of structured infomration flow, featuring repeated investigations by way of a continuous structured questionnaire.
- (2) Anonymity for the participants' decisions. Delphi Method offers a series of inquiries, usually by means of questionnaires. Each subsequent inquiry is accompanied by information regarding the preceding round of replies. It is a kind of research method existing between questionnaire and meeting.
- (3) Expert judgment. After each survey, the respondents make new judgments based on feedback materials. Repeat such steps until the opinion discrepancies

between experts are reduced to minimum level. The final conclusion and opinion analysis presented by the participants can reflect their common recongnition as well as their different opinion areas.

2.Procedures

The respondents of this assessment project consist of 5 groups of scholars and experts selected by 5 groups of advisors (Table 2). The assessment for each major factor index requires 30 experts. There are a total number of 150 scholars and experts selected for the assessment of Taiwan' s growth and current competitiveness (Tables $1 \sim 5$). Their specialty background covers management, economy, law, politics, society and education. They work in 17 different departments and institutes. For the experts and scholars who accepted the invitations as the respondents to the questionnaire, please see Table 3, Table 4, Table 5, Table 6 and Table 7.

| Full Names | Abbreviations |
|---------------------------------|---------------|
| Academia Sinica | SINICA |
| Chinese Culture University | PCCU |
| Fu Jen Catholic University | FJU |
| National Central University | NCU |
| National Cheng Kung University | NCKU |
| National Chengchi University | NCCU |
| National Chiao Tung University | NCTU |
| National Chung Cheng University | CCU |
| National Sun Yat-Sen University | NSYSU |
| National Taipei University | NTPU |
| National Taiwan University | NTU |
| National Tsinghua University | NTHU |
| Soochow University | SCU |
| Tamkang University | TKU |
| Tunghai University | THU |

Abbreviations of Institutions

| | Table 2 List of Advisors | | | | | | | |
|------------------|---|--|--|--|--|--|--|--|
| | Advisors of Technology Index Panel | | | | | | | |
| Chen, Yu -wu | Former President, Chuang-Shan Institute of Science and Technology | | | | | | | |
| Chao, Pi-hua | Chao, Pi-hua Associate Professor, Department of Social Work, Soochow University | | | | | | | |
| | Advisors of Public Institution and System Index Panel | | | | | | | |
| Chou, Yu -jen | Professor, Department of Public Administration & Policy, National Taipei University | | | | | | | |
| Chiang, Min-hsiu | Professor, Department of Public Administration, National Chengchi University | | | | | | | |
| | Advisors of Macroeconomic Environment Index Panel | | | | | | | |
| Kao, An-pang | Dean, College of Social Sciences, National Chengchi University | | | | | | | |
| Cheng, Jen-hung | Secretary General, Consumers' Foundation, Taiwan | | | | | | | |
| Huang, Jr-tsung | Assistant Professor, Sun Yat-Sen Graduate Institute of Social Sciences and Humanities | | | | | | | |
| | Advisors of Enterprise Competitiveness Index Panel | | | | | | | |
| Jacob Y.H. Jou | Dean, College of Business Administration, National Chiayi University | | | | | | | |
| Cheng, Hsing-ti | Professor, Department of Public Administration, National Chengchi University | | | | | | | |
| | Advisors of Infrastructure Construction Index Panel | | | | | | | |
| Liang, Chi-yuan | Research Fellow, Institute of Economics, Academia Sinica | | | | | | | |
| Feng, Cheng-ming | Professor, Institute of Traffic and Transportation, National Chiao Tung University | | | | | | | |
| Chen, Yin-yan | Chairman, Department of Political Science, National Chengchi University | | | | | | | |

Table 2List of Advisors

| Schools | NTU | NCCU | TPU | SCU | PCCU | NTHU | NCTU | CCU | NCKU | NSYSU | Total |
|---|--------|------|--------|-----|------|------|------|--------|--------|-------|--------|
| Number of Respondents | 4 | 6 | 1 | 2 | 1 | 2 | 2 | 5 | 5 | 1 | 30 |
| Number of respondents selected by advisors | 24 | 25 | 4 | 5 | 4 | 5 | 4 | 15 | 6 | 8 | 100 |
| Percentage | 16.67% | 24% | 25% | 40% | 25% | 40% | 50% | 33.33% | 83.33% | 12.5% | 30% |
| Schools | NTU | NCCU | TPU | SCU | PCCU | NTHU | NCTU | CCU | NCKU | NSYSU | Total |
| Departments and institutes in which respondents work | 4 | 6 | 1 | 2 | 1 | 1 | 1 | 4 | 3 | 1 | 24 |
| Number of respondents | 4 | 6 | 1 | 2 | 1 | 1 | 1 | 4 | 3 | 1 | 24 |
| Number of departments and institutes selected by advisors | | 10 | 3 | 4 | 4 | 2 | 1 | 6 | 3 | 4 | 46 |
| Number of respondents selected by advisors | 9 | 10 | 3 | 4 | 4 | 2 | 1 | 6 | 3 | 4 | 46 |
| Percentage | 44.44% | 60% | 33.33% | 50% | 25% | 50% | 100% | 66.67% | 100% | 25% | 52.17% |

 Table 3 Technology Index Questionnaire

| Schools | NTU | NCCU | TPU | SCU | PCCU | SINICA | THU | CCU | NSYSU | TOTAL |
|---|--------|--------|--------|--------|--------|--------|-------|--------|--------|--------|
| Number of respondents | 5 | 6 | 4 | 4 | 2 | 2 | 1 | 1 | 5 | 30 |
| Number of respondents selected by advisors | 53 | 47 | 19 | 14 | 5 | 2 | 11 | 8 | 9 | 168 |
| Percentage | 9.43% | 12.77% | 21.05% | 28.57% | 40% | 100% | 9.09% | 12.50% | 55.56% | 17.86% |
| Schools | NTU | NCCU | TPU | SCU | PCCU | SINICA | THU | CCU | NSYSU | TOTAL |
| Departments and institutes in which respondents work | 3 | 3 | 1 | 3 | 2 | 2 | 1 | 1 | 3 | 19 |
| Number of departments and institutes selected by advisors | 7 | 8 | 2 | 4 | 3 | 2 | 1 | 2 | 3 | 32 |
| Percentage | 42.86% | 37.50% | 50% | 75% | 66.67% | 100% | 100% | 50% | 100% | 59.38% |

Table 4 Public Institution and System Index Questionnaire

Table 5 Macroeconomic Environment Index Questionnaire

| Table 5 Macrocconomic Environment muck Questionnane | | | | | | | | | | | | |
|---|--------|--------|------------|------------|------------|--------|--------|------------|-----|------------|--------|--------|
| Schools | NTU | NCCU | TPU | SCU | FJU | SINICA | NTHU | THU | CCU | NCKU | NSYSU | TOTAL |
| Number of respondents | 3 | 9 | 1 | 3 | 2 | 2 | 1 | 1 | 5 | 2 | 1 | 30 |
| Number of respondents selected by Advisors | 26 | 27 | 8 | 5 | 14 | 4 | 3 | 4 | 10 | 3 | 3 | 107 |
| Percentag | 11.54% | 33.33% | 12.5% | 60% | 14.29 % | 50% | 33.33% | 25% | 50% | 66.67 % | 33.33% | 28.04% |
| Schools | NTU | NCCU | TPU | SCU | FJU | SINICA | NTHU | THU | CCU | NCKU | NSYSU | TOTAL |
| Departments and institutes in which respondents work | 3 | 6 | 1 | 2 | 1 | 1 | 1 | 1 | 3 | 2 | 1 | 22 |
| Number of departments and institutes selected by advisors | 9 | 11 | 3 | 3 | 1 | 3 | 2 | 3 | 4 | 2 | 2 | 43 |
| Percentage | 33.33% | 54.55% | 33.33 % | 66.67 % | 100% | 33.33% | 50% | 33.33 % | 75% | 100% | 50% | 51.16% |

| Schools | NTU | NCCU | FJU | SINICA | NCU | THU | CCU | NCKU | NSYSU | TOTAL |
|---|--------|--------|--------|--------|--------|-----|-----|------|--------|--------|
| Number of respondents | 5 | 5 | 4 | 4 | 2 | 1 | 5 | 2 | 2 | 30 |
| Number of respondents selected by advisors | 58 | 43 | 34 | 25 | 16 | 2 | 10 | 10 | 22 | 220 |
| Percentage | 8.62% | 11.63% | 11.76% | 16% | 12.50% | 50% | 50% | 20% | 9.09% | 13.64% |
| School | NTU | NCCU | FJU | SINICA | NCU | THU | CCU | NCKU | NSYSU | TOTAL |
| Departments and institutes in which respondents work | 3 | 3 | 3 | 1 | 2 | 1 | 3 | 2 | 2 | 20 |
| Number of departments and institutes selected by advisors | 11 | 11 | 3 | 3 | 3 | 2 | 4 | 5 | 6 | 48 |
| Percentage | 27.27% | 27.27% | 100% | 33.33% | 66.67% | 50% | 75% | 40% | 33.33% | 41.67% |

 Table 6 Enterprise Competitiveness Index Questionnaire

 Table 7
 Infrastructure Construction Index Questionnaire

| Tuble / Influbric Constitución Index Questionnaire | | | | | | | | | | | | | | |
|---|------------|------------|-----|------|------------|--------|------|------------|-----|-----|-----|------------|--------|--------|
| Schools | NTU | NCCU | SCU | PCCU | TKU | SINICA | NTHU | NCTU | NCU | THU | CCU | NCKU | NSYSU | TOTAL |
| Number of respondents | 7 | 2 | 2 | 1 | 1 | 2 | 1 | 3 | 2 | 1 | 2 | 4 | 2 | 30 |
| Number of respondents selected by advisors | 17 | 15 | 5 | 5 | 6 | 8 | 2 | 7 | 5 | 2 | 5 | 9 | 6 | 97 |
| Percentage | 41.18 % | 13.33 % | 40% | 20% | 16.67 % | 25% | 50% | 42.86 % | 40% | 50% | 40% | 44.44 % | 33.33% | 30.93% |
| Schools | NTU | NCCU | SCU | PCCU | TKU | SINICA | NTHU | NCTU | NCU | THU | CCU | NCKU | NSYSU | TOTAL |
| Departments and institutes in which respondents work | 5 | 1 | 2 | 1 | 1 | 1 | 1 | 3 | 2 | 1 | 2 | 3 | 2 | 25 |
| Number of departments and institutes selected by advisors | | 12 | 5 | 5 | 5 | 3 | 2 | 5 | 4 | 2 | 5 | 6 | 5 | 70 |
| Percentage | 45.45 % | 8.33% | 40% | 20% | 20% | 33.33% | 50% | 60% | 50% | 50% | 40% | 50% | 40% | 35.71% |

We have carried out two surveys for this project. The first survey took place on Jan.19-29, 2003. We collected 141 copies of questionnaires at the rate of 94%, including 29 copies for technology index, 28 copies for public institution and system index, 27 for macroeconomic environment index, 30 for enterprise competitiveness and 27 for infrastructure construction. The second survey took place on Jan.31- Feb.20, 2003. We collected 143 copies of questionnaires at the rate of 95.33%, including 29 copies for technology index, 27 for macroeconomic environment index, and 30 for enterprise competitiveness, 28 for infrastructure

construction.

Each index was evaluated at full score of 10. The higher the score is, the better this index performs and the higher the competitiveness is, and vice versa. By 10-score expression, it suggests that 10 scores indicates competitiveness extremely high. 9 scores indicates very high towards extremely high, 8 scores for very high, 7 scores for higher toward very high, 6 scores for higher, 5 scores for Ordinary, 4 scores for lower, 3 scores for lower towards very low, 2 scores for very low, one score for very low to very low and Zero for quite low (see Fig.1 below).

| | | | | Fig.1 | l 10- | Score 2 | Expr | ession | | | |
|-------------|-----------------------|----------|-----------------------|-------|----------|----------|--------------------------|----------------|---------------------------------|-------------------------|----|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | | 7 | 8 | 9 | 10 |
| Quite low + | Very low to quite low | Very low | Lower toward very low | Lower | Ordinary | Higher - | Higher towards Very high | r Very high | Very high toward extremely high | - Extremely hgih - + | |

3. Overall Assessment of Taiwan's Growth and Current Competitiveness

From the above, the project has obtained the average value of 4.9747 based on overall assessment on five major factor indexes, including technology, public institution and system, enterprise competitiveness, infrastructure construction, and macroeconomic environment. This suggests that the performance of **Taiwan's Growth and Current Competitiveness is**

Ordinary. The competitiveness performance of the 5 major factor indexes is described in 5 chapters as follows.

. Technology Index Assessment

1.Quantitive Analysis Results for Technology Index

Technology index is divided into 5 subindexes,

namely, education, patents, information, government and enterprise. Of them, education includes 8 component indexes; patents includes 6 component indexes; information includes 12 component indexes; government includes 11 component indexes; and enterprise includes 12 component indexes. Technology index contains a total of 49 component indexes. The statistic value of technology index and all of its subindexes is obtained based on its component index statistics. Analysis results show that average value of assessment on technology index is 5.2023. This indicates that the technology competitiveness under **Taiwan's growth and current competitiveness is Ordinary**. For the statistics, please see Table 8.

| Number | Valid cases | 24 |
|------------|---------------|--------|
| | Missing cases | 5 |
| Mean | | 5.2023 |
| Median | | 5.2803 |
| Mode | | 3.53a |
| Standard D | eviation | .82233 |
| Minimum V | /alue | 3.53 |
| Maximum | Value | 6.7 |
| Percentile | 25 | 4.8890 |
| | 50 | 5.2803 |
| | 75 | 5.4867 |

 Table 8 Technology Index Statistics

a. contains several modes, and the value shown here is the min.

2. Quantitative Analysis Results of Subindices under Technology Index

Education under technology index is evaluated at 5.7545 on average, which suggests education competitiveness higher. Patent is evaluated at 5.0494 on average, which suggests its competitiveness

Ordinary. Information is evaluated at 5.7619 on average, which suggests its competitiveness higher. Government is evaluated at 4.6477 on average, which suggests its competitiveness Ordinary. Enterprise is evaluated at 4.4483 on average, which suggests its competitiveness lower. For statistics, please see Table 9, Table 10, Table 11, Table 12, Table 13, and Fig.2.

Table 9 Technology Index--- Education Subindex Statistics

| Number | Valid cases | 28 |
|------------|---------------|--------|
| | Missing cases | 1 |
| Mean | | 5.7545 |
| Median | | 5.6875 |
| Standard I | Deviation | .95409 |
| Percentile | 25 | 5.1563 |
| | 50 | 5.6875 |
| | 75 | 6.0938 |

| Number | Valid cases | 27 |
|------------|---------------|--------|
| | Missing cases | 2 |
| Mean | | 5.0494 |
| Median | | 5.1667 |
| Standard D | 1.22894 | |
| Percentile | 25 | 4.3333 |
| | 50 | 5.1667 |
| | 75 | 5.6667 |

Table 10 Technology Index— Patent Subindex Statistics

| Table 11 | Technology | Index- | -Information | Subindex | Statistics |
|----------|------------|--------|--------------|----------|------------|
|----------|------------|--------|--------------|----------|------------|

| Number Valid cases | 28 |
|--------------------|--------|
| Missing cases | 1 |
| Mean | 5.7619 |
| Median | 5.7500 |
| Standard Deviation | .71604 |
| Percentile 25 | 5.2500 |
| 50 | 5.7500 |
| 75 | 6.1667 |

Table 12 Technology Index—Government Subindex Statistics

| Number | Valid cases | 28 |
|-------------|---------------|--------|
| | Missing cases | 1 |
| Mean | | 4.6477 |
| Median | | 4.7727 |
| Standard De | .89309 | |
| Percentile | 25 | 4.2045 |
| | 50 | 4.7727 |
| | 75 | 5.0682 |

Table 13 Technology Index—Enterprise Subindex Statistics

| Number | Valid cases | 29 |
|------------|---------------|--------|
| | Missing cases | 0 |
| Mean | | 4.4483 |
| Median | | 4.4167 |
| Standard D | eviation | .78535 |
| Percentile | 25 | 3.9583 |
| | 50 | 4.4167 |
| | 75 | 4.9583 |

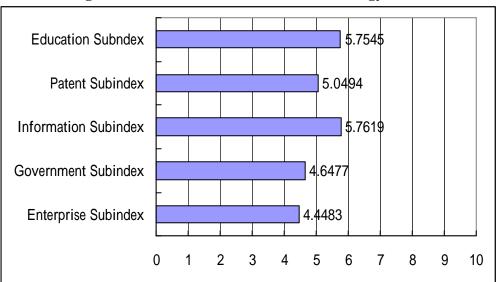


Fig.2 Subindexes Statistics under Technology Index

Since the aggregate average of 5 subindexes is 5.2023, we can see that in technology index, Taiwan's growth and current competitiveness was adversely affected by the subindexes of patent, government and enterprise.

3. Quantitative Analysis Results of Component Indices under Technology Index

Please see Table 14, Fig.3 to Fig.7. Competitiveness assessment is measured by the average, with median and Mode as the reference value.

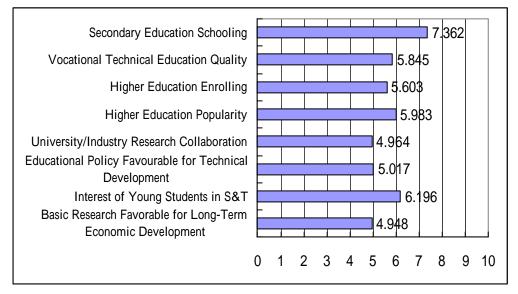
| Title | Index | Average | Assessment | Median | Assessment | Mode | Assessment |
|----------|---|---------|----------------------------|--------|------------|------|------------|
| 1. Educa | 1. Education sub-index | | | | | | |
| 1 | Secondary education schooling | 7.362 | Higher toward very high | 8 | Very high | 8 | Very high |
| 2 | Vocational Technological education quality | 5.845 | Higher | 6 | Higher | 6 | Higher |
| 3 | Higher education enrollment | 5.603 | Higher | 6 | Higher | 6 | Higher |
| 4 | Higher education popularity | 5.983 | Higher | 6 | Higher | 6 | Higher |
| 5 | University/industry research collaboration | 4.964 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 6 | Educational policy favorable for S&T development | 5.017 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 7 | Interest of young students in S&T | 6.196 | Higher | 6 | Higher | 6 | Higher |
| 8 | Basic research favorable for long-term economic development | 4.948 | Ordinary | 5 | Ordinary | 5 | Ordinary |

 Table 14 Component Indices Statistics under Technology Index

| 2 Patent | subindex | | | | | | |
|----------------|--|-------|------------------------------|---|------------------------------|---|----------------------------|
| 2. 1 atem 9 | Patent right protection | 3.914 | Lower | 4 | Lower | 4 | Lower |
| 10 | Domestic patent right | 4.155 | Lower | 4 | Lower | 5 | Ordinary |
| 10 | Patent acquisition | 5.339 | Ordinary | 6 | Higher | 6 | Higher |
| 12 | Overall ranking of number of international patents | 5.946 | Higher | 6 | Higher | 6 | Higher |
| 13 | Average ranking of international patent rights | 6.259 | Higher | 7 | Higher toward very high | 7 | Higher toward very high |
| 14 | Technological sophistication | 4.589 | Ordinary | 5 | Ordinary | 6 | Higher |
| 3. Inform | nation subindex | | | | • | | • |
| 15 | International phone cost | 3.983 | Lower | 4 | Lower | 3 | Lower toward very low |
| 16 | Indoor telecommunication popularity | 7.190 | Higher toward very high | 8 | Very high | 8 | Very high |
| 17 | Mobile communication | 8.328 | Very high | 8 | Very high | 8 | Very high |
| 18 | Internet access | 5.845 | Higher | 6 | Higher | 5 | Ordinary |
| 19 | Broad band utilization | 5.534 | Higher | 5 | Ordinary | 5 | Ordinary |
| 20 | Website proportion | 5.125 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 21 | Internet access in schools | 6.293 | Higher | 6 | Slightly high | 6 | Higher |
| 22 | Broad band networking cost | 6.259 | Higher | 6 | Higher | 6 | Higher |
| 23 | Quality of competition in ISP sector | 4.052 | Lower | 4 | Lower | 4 | Lower |
| 24 | PC popularity | 5.707 | Higher | 6 | Higher | 5 | Ordinary |
| 25 | ICT standardization | 5.500 | Higher | 5 | Ordinary | 5 | Ordinary |
| 26 | ICT internationalization | 5.500 | Higher | 6 | Higher | 6 | Higher |
| 4. Gover | nment subindex | | | | | | - |
| 27 | Overall expenditures on R&D | 3.362 | Lower towards very low | 3 | Lower towards very low | 2 | Very low |
| 28 | Rent and tax preferential treatment | 4.948 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 29 | Industrial water cost | 4.672 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 30 | Industrial electricity cost | 4.741 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 31 | Domestic R&D manpower | 3.603 | Lower | 4 | Lower | 4 | Lower |
| 32 | R&D manpower growth | 4.017 | Lower | 4 | Lower | 5 | Ordinary |
| 33 | R&D expenditure growth | 3.741 | Lower | 4 | Lower | 4 | Lower |
| 34 | Laws relating to ICT use | 3.983 | Lower | 4 | Lower | 4 | Lower |
| 35 | Government Prioritization of ICT | 6.411 | Higher | 6 | Higher | 6 | Higher |
| 36 | Production and technological development Prioritization | 6.362 | Higher | 6 | Higher | 6 | Higher |
| | | | | | 1 | | T |

| 38 | Enterprise R&D reseachers | 5.017 | Ordinary | 5 | Ordinary | 6 | Higher |
|----|--|-------|----------|---|------------------------------|---|----------|
| 39 | Company spending on research and development | 3.534 | Lower | 3 | Lower towards very low | 2 | Very low |
| 40 | R&D expenditure percentage | 3.603 | Lower | 4 | Lower | 4 | Lower |
| 41 | Number of R&D personnel | 4.121 | Lower | 4 | Lower | 5 | Ordinary |
| 42 | Financial resources | 3.984 | Lower | 4 | Lower | 4 | Lower |
| 43 | Technical cooperation between enterprises | 4.397 | Lower | 4 | Lower | 4 | Lower |
| 44 | R&D growth | 4.534 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 45 | Increased R&D expenditure | 4.224 | Lower | 4 | Lower | 4 | Lower |
| 46 | Firm-level innovation | 5.362 | Ordinary | 6 | Higher | 6 | Higher |
| 47 | Gap between enterprise circle and advanced countries in R&D expenditure | 6.224 | Higher | 6 | Higher | 6 | Higher |
| 48 | Internet services | 4.328 | Lower | 4 | Lower | 4 | Lower |
| 49 | Training of technical talents | 4.086 | Lower | 4 | Lower | 4 | Lower |

Fig.3 Component Indices Statistics under Education Subindex



The average of education subindexes is 5.7545, which suggests higher competitiveness. Of the subindex, higher education enrollment, enterprise/school collaboration, educational policies favorable for the technological development and the basic research favorable for long-term economic development are below the average, while the secondary education schooling, vocational technical education quality, higher education popularity and the interest of young students in science and technology are higher than the average.

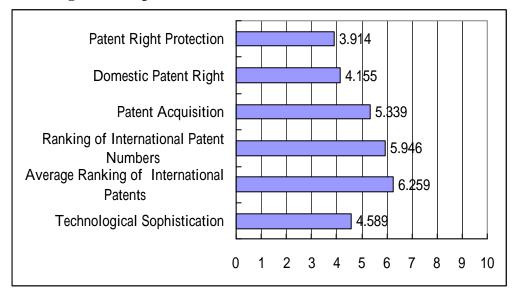
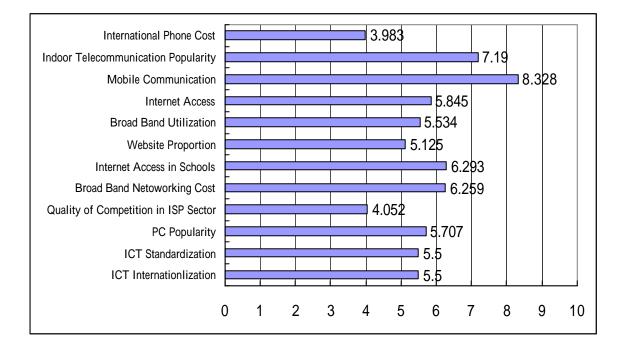


Fig.4 Component Indices Statistics under Patent Subindex

The average of patent subindex is 5.0494, which suggests Ordinary competitiveness. Of the subindex, patent right protection, domestic patent right and national technological level are below the average, while patent acquisition, the ranking of international patent numbers and the average ranking of international patent right are higher than the average.

Fig.5 Component Index Statistics under Information Subindex



The average of information subindex is 5.7619, which suggests higher competitiveness. Of them, International telephone cost, broad band utilization, website proportion, ISP level, personal computer popularity, ICT standardization and ICT internationalization are below the average, while indoor telecommunication popularity, mobile communication popularity, internet access popularity, internet access at school and broad band networking cost are higher than the average.

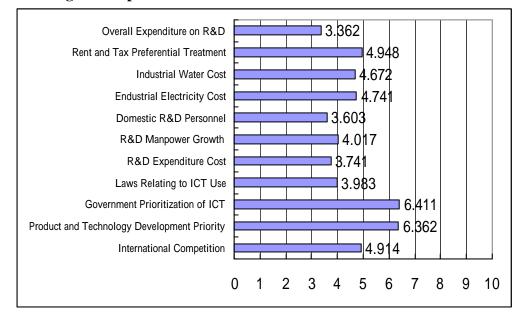
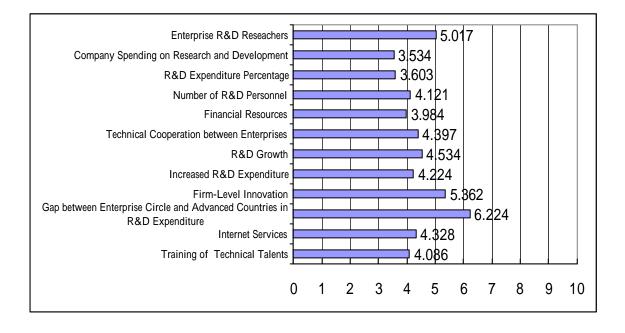


Fig.6 Component Index Statistics under Government Subindex

The average of government subindex is 4.6477, which suggests Ordinary competitiveness. Of the subindex, overall expenditure on R&D, domestic R&D manpower, R&D manpower growth, increased R&D expenditure and governmental decrees to protect technological research and development are below the average, while rent tax preference, industrial water cost, industrial power cost, information development prioritization, production and technological development prioritization and international competition are higher than the average.





The average of enterprise subindex is 4.4483, which suggests lower competitiveness. Enterprise expenditure on R&D, R&D expenditure percentage, the number of enterprise R&D personnel, enterprise financial resources, technological cooperation between enterprises, increased enterprise R&D expenditure, enterprise networking services and the chances for the enterprise to train technicians are below the average, while R&D excellent talents, enterprise R&D growth, enterprise innovation activities and the gap between enterprise circles and advanced nations in R&D expenditures are higher than the average.

. Public Institution and System

Assessment

1. Quantitative Analysis Results for Public Institutions and System Index

Public institutions and system index is composed of 4 subindexes, namely, personnel, quality, fairness, and efficiency. Of the subindexes, personnel contains 8 component indices, quality 6 component indices, fairness 12 component indices and efficiency 8 component indices. The component indices total 34.

The value of public institution and system index and all its subindex are based on their component index statistics. Analysis results show that public institution and system index is evaluated at 4.3500. This indicates that public institution and system competitiveness under <u>Taiwan's growth and current competitiveness</u> is rated as lower. For its statistics, please see Table 15 H

Table 15 Public Institutions and System Index Statistics

| Number Valid cases | 25 |
|--------------------|--------|
| Missing cases | 2 |
| Mean | 4.3500 |
| Median | 4.2813 |
| Mode | 4.05 |
| Standard Deviation | .58102 |
| Minimum Value | 2.83 |
| Maximum Value | 5.56 |
| Percentile 25 | 4.0417 |
| 50 | 4.2813 |
| 75 | 4.7708 |

2. Subindex Quantitative Analysis Results under Public Institution and System Index

In Public institutions and system index, the evaluation value of personnel subindex is 4.8889, which suggests Ordinary competitiveness. The evaluation value of quality subindex is 3.1543, which

suggests its competitiveness lower towards very low. The evaluation value of fairness subindex is 5.0733,which suggests Ordinary competitiveness. The evaluation value of efficiency subindex is 4.1389,which suggests lower competitiveness. For statistics, please see Table 16, Table 17, Table 18, Table 19, as well as Fig. 8.

| Number | Valid cases | 27 |
|------------|---------------|--------|
| | Missing cases | 0 |
| Mean | | 4.8889 |
| Median | | 4.8750 |
| Standard D | .86764 | |
| Percentile | 25 | 4.1250 |
| | 50 | 4.8750 |
| | 75 | 5.3750 |

Table 16 Public Institutions and System Index- Personnel Subindex Statistics

Table 17 Public Institutions and System Index – Quality Subindex Statistics

| Number | Valid cases | 27 |
|------------|---------------|--------|
| | Missing cases | 0 |
| Mean | | 3.1543 |
| Median | | 3.1667 |
| Standard D | 1.04792 | |
| Percentile | 25 | 2.1667 |
| | 50 | 3.1667 |
| | 75 | 3.8333 |

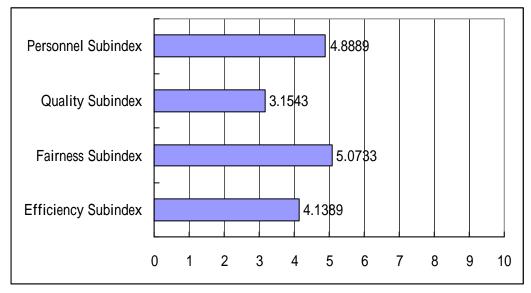
Table 18 Public Institutions and System Index – Fairness Subindex Statistics

| Number Valid cases | 25 |
|--------------------|---------|
| Missing cases | 2 |
| Mean | 5.0733 |
| Median | 5.0833 |
| Standard Deviation | 1.02213 |
| Percentile 25 | 4.7083 |
| 50 | 5.0833 |
| 75 | 5.5417 |

| Number | Valid cases | 27 |
|------------|---------------|--------|
| | Missing cases | 0 |
| Mean | | 4.1389 |
| Median | | 4.2500 |
| Standard D | Deviation | .63580 |
| Percentile | 25 | 3.7500 |
| | 50 | 4.2500 |
| | 75 | 4.6250 |

Table 19 Public Institution and System Index – Efficiency subindex Statistics





The average of public institutions and system subindexes is 4.35. It is obvious that in public institutions and system, the efficiency and quality are below the average.

3. Quantitative Analysis Results of Component Indices under Public Institution and System

Index

Please see Table 20, and Fig.9 to Fig.12. The competitiveness assessment is measured by the average, with median and mode as the reference values.

| Title | Index | Average | Assessment | Median | Assessment | Mode | Assessment |
|---------------|---|---------|------------------------------|--------|------------------------------|------|------------|
| 1.Pers | sonnel subindex | | | | | | |
| 1 | Public confidence | 2.037 | Very low | 2 | Very low | 2 | Very low |
| 2 | Ability of public servants | 4.944 | Ordinary | 5 | Ordinary | 4 | Lower |
| 3 | Performance merit fairness | 4.870 | Ordinary | 5 | Ordinary | 4 | Lower |
| 4 | Employment rules | 5.889 | Higher | 6 | Higher | 6 | Higher |
| 5 | Employment fairness | 5.407 | Ordinary | 6 | Higher | 6 | Higher |
| 6 | Promotion fairness | 4.889 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 7 | Reasonable retirement | 5.333 | Ordinary | 6 | Higher | 6 | Higher |
| 8 | Reasonable allowances | 5.741 | Higher | 6 | Higher | 5 | Ordinary |
| 2.Qua | llity subindex | | | | | | |
| 9 | Common ground of governmental policy | 3.000 | Lower toward very low | 3 | Lower toward very low | 4 | lower |
| 10 | Parliament legislation meets economic competition needs | 2.852 | Lower toward very low | 3 | Lower toward very low | 2 | Very low |
| 11 | Financial deterioration | 3.852 | Lower | 2 | Very low | 2 | Very low |
| 12 | Administration quality | 3.444 | Lower toward very low | 4 | Lower | 4 | Lower |
| 13 | Objective clearness of policy communication | 2.852 | Lower towards very low | 3 | Lower towards very low | 2 | Very low |
| 14 | Conflict between administration and legislation | 2.926 | Lower towards very low | 2 | Very low | 2 | Very low |
| 3. Fai | rness subindex | | - | | | | |
| 15 | Judicial independence | 3.407 | Lower towards very low | 4 | Lower | 4 | Lower |
| 16 | Judicial intervention | 6.333 | Higher | 6 | Higher | 8 | Very high |
| 17 | Corruption | 4.963 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 18 | Favoritism in decisions of government officials | 4.333 | Lower | 4 | Lower | 4 | Lower |
| 19 | Irregular payments in exports & imports | 5.080 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 20 | Irregular payments in government procurement | 6.370 | Higher | 6 | Higher | 8 | Very high |

| Table 20 | Component | t Index Statistic | s under Public | Institution and | d System Index |
|----------|-----------|-------------------|----------------|-----------------|----------------|
|----------|-----------|-------------------|----------------|-----------------|----------------|

| 21 | Irregular payments in tax collection | 5.778 | Higher | 6 | Higher | 6 | Higher |
|--------|---|-------|------------------------------|---|------------------------------|---|----------|
| 22 | Government procurement fairness | 4.370 | Lower | 4 | Lower | 4 | Lower |
| 23 | Election fairness | 5.889 | Higher | 6 | Higher | 4 | Lower |
| 24 | Government support for fair trade | 5.000 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 25 | Government service fairness | 5.630 | Higher | 5 | Ordinary | 5 | Ordinary |
| 26 | Policy transparency | 3.889 | Lower | 4 | Lower | 4 | Lower |
| 4.Effi | ciency subindex | | | | - | - | |
| 27 | Complicated Redtape operation | 3.481 | Lower towards very low | 4 | Lower | 4 | Lower |
| 28 | Public services cost | 3.815 | Lower | 4 | Lower | 4 | Lower |
| 29 | Government adaptability to economic challenge | 3.074 | Lower towards very low | 3 | Lower towards very low | 2 | Very low |
| 30 | Government fiscal stability | 3.370 | Lower towards very low | 3 | Lower towards very low | 2 | Very low |
| 31 | Public institution efficiency | 4.796 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 32 | Policy implementation efficiency | 4.296 | Lower | 4 | Lower | 4 | Lower |
| 33 | Facilitation of government service | 5.444 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 34 | Ease of access to government information | 4.833 | Ordinary | 5 | Ordinary | 5 | Ordinary |

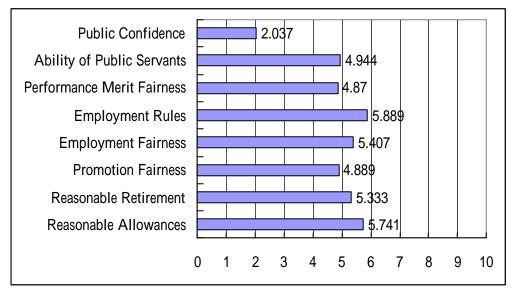


Fig.9 Component Index Statistics under Personnel Subindex

The average of personnel subindexes is 4.8889, which suggests Ordinary competitiveness. Of them, the public confidence and performance merit fairness are below the average, and promotion fairness is equal to the average, while the ability of public servants , permanent employment system, employment fairness, promotion fairness, reasonable retirement and reasonable allowance are higher than average.

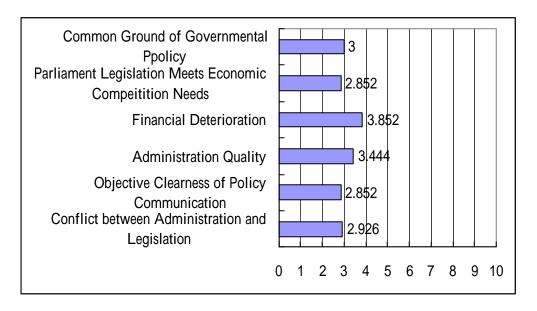


Fig. 10 Component indexes statistics under Quality Subindex

The average of quality subindex is 3.1543, which suggests lower towards very low competitiveness. Of the subindexes, the common ground of governmental policy, legislation meets the needs of economic competition, objective clearness of policy communication and conflict between administration and legislation are below the average, while financial deterioration and administration quality are higher than the average.

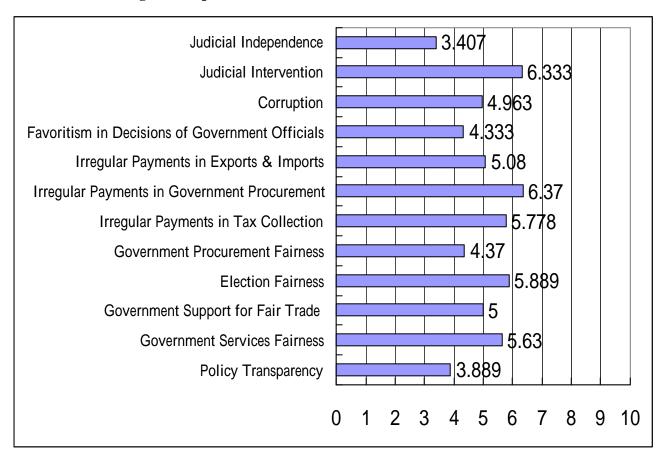


Fig.11 Component Index Statistics under Fairness Subindex

The average of fairness subindex is 5.0733, which suggests Ordinary competitiveness. Of the index, judicial independence, corruption, election fairness, governmental procurement fairness, governmental support for fair trade and policy transparency are below the average, while governmental intervention in judicial system, irregular payment for issuing output license, irregular payment for application for water and electricity, irregular payment for tax collection, election fairness and governmental services fairness are higher than average.

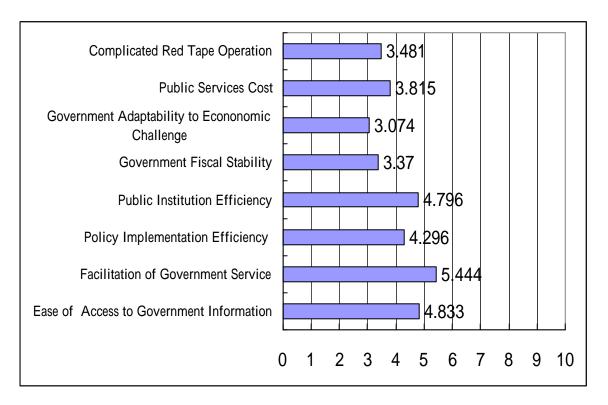


Fig. 12 Component Index under Efficiency Subindex

The average of efficiency subindexes is 4.1389, which suggests lower competitiveness. Of them, the complicated red tape operation, the cost of official duty, the ability of government meeting economical challenge and financial stability are below the average, while public institution efficiency, policy implementation efficiency, facilitation of government services and ease of access to government information are higher than the average.

. Macroeconomic Index Assessment

1. Macroeconomic Environment Index Analysis Results

Macroeconomic environment index is divided into

three subindexes, namely, market, society and government. Of them, market subindex contains 14 component indices, society 14 component indices and Government 8 component indices. Component indices total 36.

The values for macroeconomic environment index and all of its subindices are based on its component indices statistics. The analysis results show that macroeconomic environment index is evaluated at 4.2738. This indicates that in <u>Taiwan's growth and</u> <u>current competitiveness, the competitiveness for the</u> <u>macroeconomic environment is rated as lower</u>. For statistics, please see Table 21.

| Number | Valid cases | 27 |
|------------|---------------|--------|
| | Missing cases | 2 |
| Mean | | 4.2738 |
| Median | | 4.4107 |
| Mode | | 4.23a |
| Standard I | Deviation | .54839 |
| Minimum | 2.99 | |
| Maximum | Nalue | 5.05 |
| Percentile | e 25 | 4.0952 |
| | 50 | 4.4107 |
| | 75 | 4.5357 |

Table 21 Macroeconomic Environment Index Statistics

a contains several modes, and the value shown here is the min.

2. Subindices Analysis Results under Macroeconomic Environment Index

In macroeconomic environmental index, market subindex is evaluated at 4.1336, which indicates lower market competitiveness. Society subindex is evaluated at 5.1342, which indicates Ordinary social competitiveness. Government subindex is evaluated at 3.5388, which indicates lower governmental competitiveness. For analysis statistics, please see Table 22, Table 23, Table 24 and Fig.13.

 Table 22
 Macroeconomic Environment Index--- Market Subindex Statistics

| Number | Valid cases | 27 |
|-------------|---------------|--------|
| | Missing cases | 2 |
| Mean | | 4.1336 |
| Median | | 4.1429 |
| Standard De | eviation | .60525 |
| Percentile | 25 | 3.8571 |
| | 50 | 4.1429 |
| | 75 | 4.5714 |

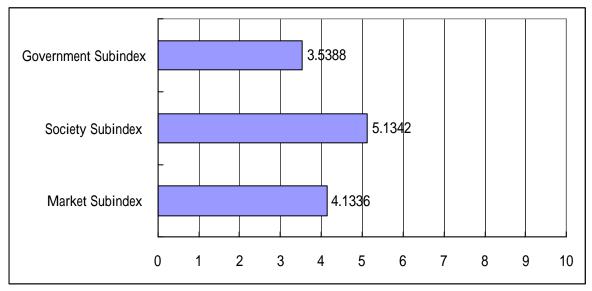
| | Table 23 | Macroeconomic | Environment | Index | Society | Subindex Statistics |
|--|----------|---------------|-------------|-------|---------|---------------------|
|--|----------|---------------|-------------|-------|---------|---------------------|

| Number | Valid cases | 29 |
|------------|---------------|--------|
| | Missing cases | 0 |
| Mean | | 5.1342 |
| Median | | 5.1429 |
| Standard D | eviation | .72414 |
| Percentile | 25 | 4.7143 |
| | 50 | 5.1429 |
| | 75 | 5.6071 |

| Number | Valid cases | 29 |
|------------|---------------|--------|
| Ν | Missing cases | 0 |
| Mean | | 3.5388 |
| Median | | 3.6250 |
| Standard D | .65814 | |
| Percentile | 25 | 3.1250 |
| | 50 | 3.6250 |
| | 75 | 3.9375 |

 Table 24 Macroeconomic Environment Index---Government Subindex Statistics

Fig. 13 Subindices Statistics under Macroeconomic Environment Index



The average of macroeconomic environment subindices is 4.2738. It is obvious that in macroeconomic environment, government and market subindices are below average. Of them, government is the most unfavorable factor.

3. Component Indices Analysis Results of Macroeconomic Environment Index

Please see Table 25, Fig.14 to Fig.16. (The competitiveness assessment is measured by the average, with the median and mode as the reference values.)

| Title | Index | Average | Assessment | Median | Assessment | Mode | Assessment |
|-----------|--|---------|---------------------------|---------|------------------------|------|---------------------------|
| | et Subindex | Twendge | Assessment | Weedlah | Assessment | Mode | Assessment |
| 1 | Exchange rate fluctuation | 4.776 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 2 | Exchange rate subsidy | 4.648 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 3 | Financial market openness | 4.621 | Ordinary | 5 | Ordinary | 4 | Lower |
| 4 | Soundness of insurance practices | 4.017 | Lower | 4 | Lower | 4 | Lower |
| 5 | Soundness of bond markets | 3.983 | Lower | 4 | Lower | 4 | Lower |
| 6 | Stock interval transaction | 2.552 | Lower towards very low | 3 | Lower towards very low | 3 | Lower towards very low |
| 7 | Access to credit | 4.586 | Ordinary | 4 | Lower | 4 | Lower |
| 8 | Attracting foreign capital | 4.155 | Lower | 4 | Lower | 4 | Lower |
| 9 | Ease of FDI | 4.534 | Ordinary | 4 | Lower | 4 | Lower |
| 10 | Government intervention in market | 3.879 | Lower | 4 | Lower | 4 | Lower |
| 11 | Soundness of banks | 3.103 | Lower towards very low | 3 | Lower towards very low | 3 | Lower towards very low |
| 12 | International call cost | 4.483 | Lower | 5 | Ordinary | 5 | Ordinary |
| 13 | Industrial water | 3.793 | Lower | 4 | Lower | 3 | Lower towards very low |
| 14 | Industrial electricity | 4.793 | Ordinary | 5 | Ordinary | 4 | Lower |
| 2. Societ | y Index | | | | | | |
| 15 | Living cost | 3.931 | Lower | 4 | Lower | 5 | Ordinary |
| 16 | Manpower utilization | 3.966 | Lower | 4 | Lower | 5 | Ordinary |
| 17 | Unemployment rate | 3.103 | Lower towards very low | 3 | Lower towards very low | 3 | Lower towards very low |
| 18 | Well-educated people emigrate abroad | 4.862 | Ordinary | 5 | Ordinary | 4 | Lower |

Table 25 Component Indices Statistics under Macroeconomic Environment Index

| 19 | Running water drinking | 2.000 | Very lower | 2 | Very lower | 2 | Very lower |
|----------|---|-------|----------------------------|---|--|---|--|
| 20 | Living quality | 3.690 | Lower | 4 | Lower | 4 | Lower |
| 21 | Inflation | 5.414 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 22 | Higher education enrollment | 6.586 | Higher toward very high | 6 | Higher | 6 | Higher |
| 23 | Weight on technical courses | 6.397 | Higher | 7 | Higher toward very high | 6 | Higher |
| 24 | Loss resulting from labor disputes | 5.052 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 25 | Mobile phone subscribers | 8.466 | Very high | 9 | Very high towards extremely high | 9 | Very high towards extremely high |
| 26 | Social value for hardworking and innovation | 6.379 | Higher | 6 | Higher | 6 | Higher |
| 27 | Adaptability to challenge | 6.103 | Higher | 6 | Higher | 6 | Higher |
| 28 | Bank saving rate | 5.931 | Higher | 6 | Higher | 6 | Higher |
| 3. Gover | rnment subindex | | | | | | |
| 29 | Governmental subsidy | 3.845 | Lower | 4 | Lower | 4 | Lower |
| 30 | Legislation activities meet economic competition | 2.603 | Lower towards very low | 2 | Very low | 2 | Very low |
| 31 | Government fiscal management | 2.586 | Lower towards very low | 3 | Lower towards very low | 2 | Very low |
| 32 | Recession expectations | 2.448 | Very low | 2 | Very low | 2 | Very low |
| 33 | Stable monetary rules | 3.414 | Lower towards very low | 4 | Very low | 4 | Very low |
| 34 | Environment laws obstruct enterprise development | 4.724 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 35 | Tax percentage in GDP | 4.172 | Very low | 4 | Very low | 4 | Very low |
| 36 | Rent and tax incentives attracting investment | 4.517 | Ordinary | 5 | Ordinary | 5 | Ordinary |

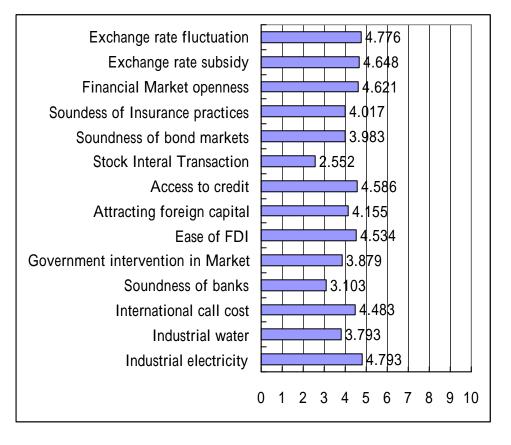


Fig. 14 Component Indices Statistics under Market Subindex

The average of market subindexes is 4.1336, which suggests lower competitiveness. Of the subindexes, soundness of insurance practices, soundness of bond market, the internal transaction of stocks, government intervention in market, soundness of banks and industrial water are below average, while exchange rate fluctuation, exchange rate subsidies, monetary market openness, ease of access to loan, attracting foreign capital, the ease of foreign direct investment, international telephone cost and industrial electricity are higher than average.

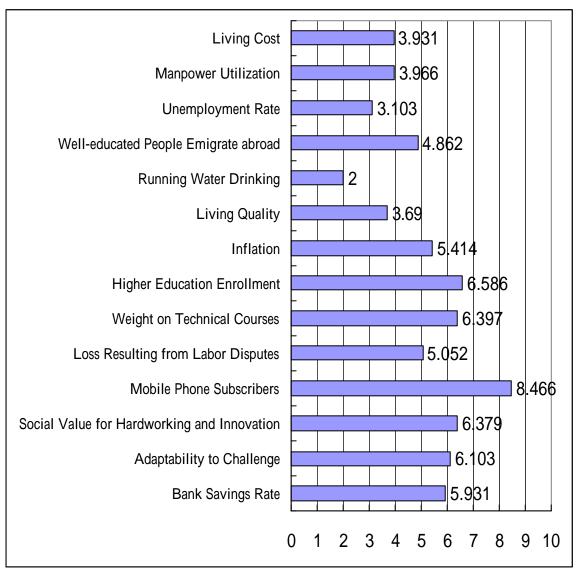


Fig.15 Component Indices Statistics under Society Subindex

The average of society subindices is 5.1342, which suggests Ordinary competitiveness. Of them, living cost, manpower utilization, unemployment rate, well-educated people emigrate abroad, running water drinking, life quality and loss resulting from labor disputes are below average, while inflation, higher education enrollment, weight on scientific courses, mobile telephone subscribers, social value by hardworking and innovation and savings rate are higher than average.

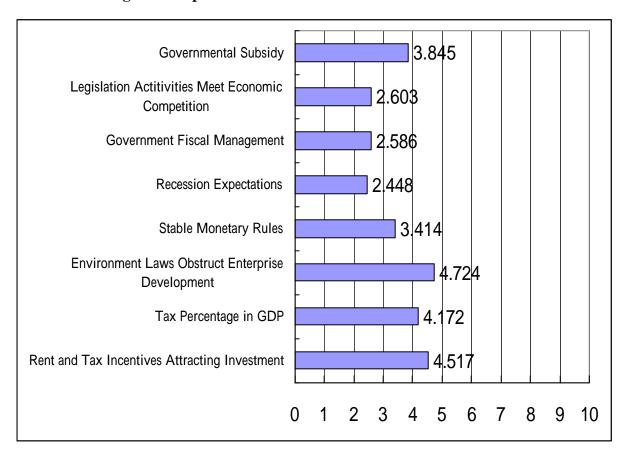


Fig.16 Component Indices Statistics under Government Subindex

The average of government subindexes is 3.5388, which suggests lower competitiveness. Of the subindex, the legislative activities meet economic competitive needs, government fiscal management, government ability in economic challenge and stable financial laws are below average, while government subsidies, environmental protection regulations obstruct enterprise development, tax percentage in GDP and rent and tax incentives attracting investment are higher than average.

. Enterprise Competitiveness Index Assessment

1. Quantitative Analysis Results of Enterprise Competitiveness Index The enterprise competitiveness index is divided into 6 subindices, namely, human resource, marketing, R&D, finance, information and operation strategy. Of them, human resource contains 2 component indices; R&D, 4 component indices; finance 1 component index; information, 1 component index; operation strategy, 3 component indices and marketing, 3 component indices. There are altogether 14 component indices.

The value of the enterprise competitiveness index and all its subindices are based on their component indices statistics. The analysis results show that the evaluation value of the enterprise competitiveness index is 6.0456. This indicates that in **Taiwan's growth and current competitiveness. the enterprise is rated as higher**. For its statistics, please see Table 26.

| Number | Valid cases | 30 |
|------------|---------------|--------|
| | Missing cases | 0 |
| Mean | | 6.0456 |
| Median | | 6.0625 |
| Mode | | 4.11a |
| Standard 1 | .70920 | |
| Minimum | 4.11 | |
| Maximum | 8.04 | |
| Percentile | 25 | 5.6215 |
| | 50 | 6.0625 |
| | 75 | 6.5069 |

Table 26 Enterprise Competitiveness Index Statistics

a. contains several modes, and the value shown here is the min.

2. Subindex Quantitative Analysis Results under Enterprise Competitiveness Index

The human resource subindex in the enterprise competitiveness index is evaluated at 6.1167, which suggests higher competitiveness. The marketing is evaluated at 6.8889, which rates its competitiveness as higher toward very high. R&D is evaluated at 6.1292, which suggests R&D competitiveness higher. Finance is evaluated at 4.8500, which suggests Ordinary competitiveness. Information is evaluated at 6.1167, which suggests higher competitiveness. Operation strategy is evaluated at 6.1722, which suggests higher competitiveness. For statistics, please refer to Table 27, Table 28, Table 29, Table 30, Table 31, Table 32 and Fig. 17.

| Table 27 | Enterprise | Competitiveness | Index | Human | Resource | Subindex Statistics |
|----------|------------|-----------------|-------|-------|----------|----------------------------|
|----------|------------|-----------------|-------|-------|----------|----------------------------|

| Number Valid cases | 30 |
|--------------------|---------|
| Missing cases | 0 |
| Mean | 6.1167 |
| Median | 6.5000 |
| Standard Deviation | 1.14232 |
| Percentile 25 | 5.5000 |
| 50 | 6.5000 |
| 75 | 6.5000 |

| Number Valid cases | 30 |
|--------------------|--------|
| Missing cases | 0 |
| Mean | 6.8889 |
| Median | 7.0000 |
| Standard Deviation | .95926 |
| Percentile 25 | 6.3333 |
| 50 | 7.0000 |
| 75 | 7.6667 |

Table 28 Enterprise Competitiveness Index —Marketing Subindex Statistics

 Table 29 Enterprise Competitiveness Index — R&D Subindex Statistics

| Number Valid cases | 30 |
|--------------------|--------|
| Missing cases | 0 |
| Mean | 6.1296 |
| Median | 6.1875 |
| Standard Deviation | .78406 |
| Percentile 25 | 5.7500 |
| 50 | 6.1875 |
| 75 | 6.5000 |

| Table 30 | Enterprise | Competiveness | Index | Finance Subindex Statistics |
|----------|------------|---------------|-------|-----------------------------|
|----------|------------|---------------|-------|-----------------------------|

| Number | Valid cases | 30 |
|-------------|---------------|--------|
| | Missing cases | 0 |
| Mean | | 4.8500 |
| Median | | 5.0000 |
| Standard De | 1.40902 | |
| Percentile | 25 | 4.0000 |
| | 50 | 5.0000 |
| | 75 | 6.0000 |

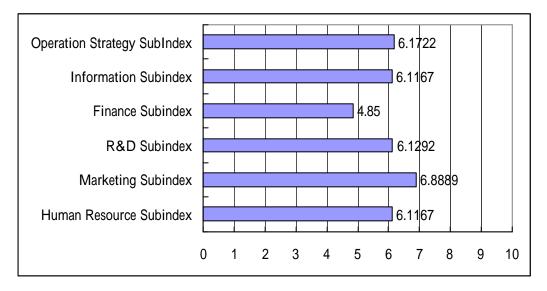
Table 31 Enterprise Competitiveness—Information Subindex Statistics

| Number | Valid cases | 30 |
|-------------|---------------|--------|
| | Missing cases | 0 |
| Mean | | 6.1167 |
| Median | | 6.0000 |
| Standard De | 1.57394 | |
| Percentile | 25 | 5.0000 |
| | 50 | 6.0000 |
| | 75 | 7.0000 |

| Table 32 | Enterprise | Competitiveness | Index O | peration S | Strategy | Subindex Statistics |
|----------|------------|-----------------|---------|------------|----------|---------------------|
| | | | | | | |

| Number Valid cases | 30 |
|--------------------|---------|
| Missing cases | 0 |
| Mean | 6.1722 |
| Median | 6.3333 |
| Standard Deviation | 1.05089 |
| Percentile 25 | 5.6667 |
| 50 | 6.3333 |
| 75 | 6.6667 |

Fig.17 Subindex Statistics under Enterprise Competitiveness Index



The average of enterprise competitiveness subindices is 6.0456. It is obvious that in enterprise competitiveness, enterprise finance subindex is below the average. That is to say, the enteprise finance performs poorly.

3. Quantitative Analysis Results of Component

Indices under Enterprise Competitiveness Index

Please refer to Table 33 and Fig.18. Competitiveness evaluation is measured by the average, with median and mode as the reference values.

| | Table 33 | Enterpris | e Compen | iveness | Subindices | Statist | ics |
|-----------|-------------------------------|-----------|-------------------------------|---------|-------------------------------|---------|----------------------------|
| Title | Index | Average | Assessment | Median | Assessment | Mode | Assessment |
| 1. Huma | an resource subind | lex | | | | | |
| 1 | Internal merit rules | 6.983 | Higher toward very high | 7 | Higher toward very high | 7 | Higher toward very high |
| 2 | Labor dispute | 5.250 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 2. Mark | eting subindex | | ž | | ž | | |
| 3 | Meeting market demands | 7.550 | Very high | 8 | Very high | 8 | Very high |
| 4 | Customer satisfaction | 7.250 | Higher toward very high | 8 | Very high | 8 | Very high |
| 5 | Market ability | 5.867 | Higher | 6 | Higher | 6 | Higher |
| 3. R&D | subindex | | | | | | |
| 6 | Innovation capability | 5.500 | Higher | 6 | Higher | 6 | Higher |
| 7 | R&D capability | 4.400 | Lower | 4 | Lower | 4 | Lower |
| 8 | Manufacturing capability | 7.517 | Very high | 8 | Very high | 8 | Very high |
| 9 | Production capacity | 7.100 | Higher toward very high | 7.25 | Higher toward very high | 8 | Very high |
| 4. Finan | ce subindex | | | | | | |
| 10 | Fiscal structure | 4.850 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 5. Inform | nation subindex | | | | | | |
| 11 | Information technology | 6.117 | Higher | 6 | Higher | 6 | Higher |
| 6. Opera | ation strategy subi | ndex | | - | | | |
| 12 | Sense of Entrepreneurship | 6.483 | Higher | 7 | Higher toward very high | 7 | Higher toward very high |
| 13 | Common value of executives | 5.733 | Higher | 6 | Higher | 6 | Higher |
| 14 | Operation strategy | 6.300 | Higher | 6 | Higher | 6 | Higher |

 Table 33
 Enterprise Competitiveness Subindices Statistics

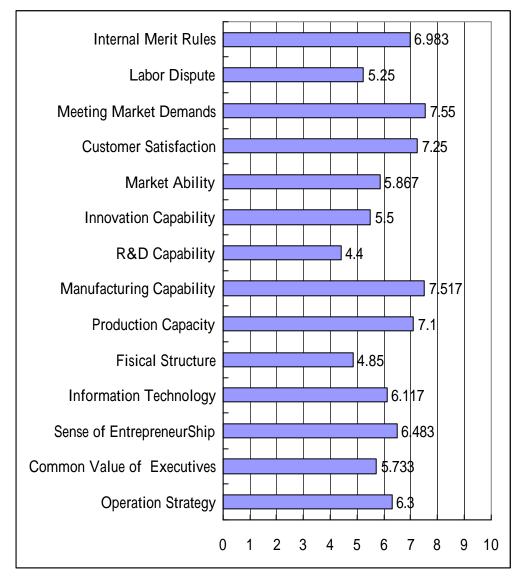


Fig.18 Component Indices Statistics under Enterprise Competitiveness Index

The average of the enterprise competitiveness indexes is 6.0456, which suggests higher competitiveness. Of them, labor dispute, enterprise marketability, enterprise innovation capability, enterprise R&D capability, fiscal structure and the common value of enterprise executives are below the average, while internal merit rules, meeting market demands, customer satisfaction, manufacturing technology, production capability, information technology, the sense of entrepreneurship and operation strategy are higher than average.

. Infrastructure Construction Index Assessment

1. Infrastructure Construction Index Analysis Results

Infrastructure construction index is divided into 3 subindices, namely, environmental safety, quality and fairness. Of the subindices, environmental safety

subindex lists 5 component indices, 20 component indices for quality, and 3 component indices for fairness. The component indices total 28.

The values for infrastructure construction index and all of its subindices are based on the component indices statistics. Its analysis results show that infrastructure construction index is evaluated at 5.0028. This indicates that in **Taiwan's growth and current competitiveness**, **infrastructure construction competitiveness is rated as Ordinary**. For statistics, please see Table 34.

| Number Valid cases | 20 |
|--------------------|--------|
| Missing cases | 6 |
| Mean | 5.0028 |
| Median | 5.1028 |
| Mode | 4.07 |
| Standard Deviation | .49627 |
| Minimum Value | 4.07 |
| Maximum Value | 5.83 |
| Percentile 25 | 4.6569 |
| 50 | 5.1028 |
| 75 | 5.4139 |

Table 34 Infrastructure Construction Index Statistics

2. Subindices Analysis Results under Infrastructure Index

Under the Infrastructure construction index, environmental safety subindex is evaluated at 4.0320, which shows its competitiveness is lower. Quality subindex is evaluated at 5.1548, which shows its competitiveness Ordinary. Fairness subindex is 5.7273, which shows that its competitiveness is higher. For statistics, please see Table 35, Table 36, Table 37 as well as Fig.19.

Table 35 Infrastructure Construction Index – Environmental Safety Subindex Statistics

| Number Valid cases | 25 |
|--------------------|--------|
| Missing cases | 1 |
| Mean | 4.0320 |
| Median | 4.0000 |
| Standard Deviation | .91775 |
| Percentile 25 | 3.5000 |
| 50 | 4.0000 |
| 75 | 4.6000 |

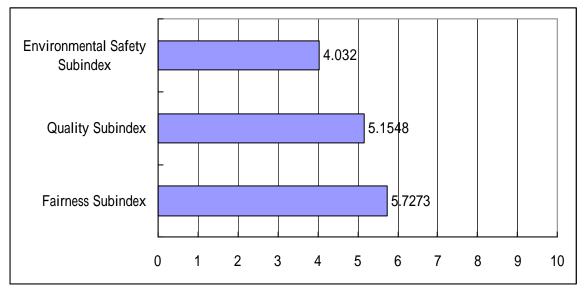
| Number | Valid cases | 21 |
|------------|---------------|--------|
| I | Missing cases | 5 |
| Mean | | 5.1548 |
| Median | | 5.2000 |
| Standard D | eviation | .42659 |
| Percentile | 25 | 4.8250 |
| | 50 | 5.2000 |
| | 75 | 5.4250 |

Table 36 Infrastructure Construction Index – Quality Subindex Statistics

| Table 37 | Infrastructure | Construction | Index – | Fairness | Subindex | Statistics |
|----------|----------------|--------------|---------|----------|----------|------------|
|----------|----------------|--------------|---------|----------|----------|------------|

| Number | Valid cases | 22 |
|------------|---------------|--------|
| | Missing cases | 4 |
| Mean | | 5.7273 |
| Median | | 5.8333 |
| Standard D | 1.24992 | |
| Percentile | 25 | 5.1667 |
| | 50 | 5.8333 |
| | 75 | 6.1667 |





The average of infrastructure construction subindices is 5.0028. It is obvious that in the infrastructure construction index, environmental safety subindex is below the average, that is to say, the environmental safety performs poorly.

3. Component Indices Analysis Results under Infrastructure Construction Index

Please refer to Table 38, and Fig.20 to Fig.21. The competitiveness evaluation is measured by the average, with median and mode as its reference values.

| Title | Index | Average | Assessment | Median | Assessment | Mode | Assessment |
|---------|--|---------|-------------------------------|--------|-------------------------------|------|------------|
| 1. Envi | ironmental safety subi | indexes | | | | | |
| 1 | Environmental pollution | 3.692 | Lower | 4 | Lower | 4 | Lower |
| 2 | Medical level difference from region to region | 3.885 | Lower | 4 | Lower | 4 | Lower |
| 3 | Disaster relief system | 3.846 | Lower | 4 | Lower | 5 | Ordinary |
| 4 | Infrastructure aging | 4.154 | Lower | 4 | Lower | 4 | Lower |
| 5 | Disaster protection regulations | 4.520 | Ordinary | 4 | Lower | 4 | Lower |
| 2. Qua | lity subindices | | | | | | |
| 6 | Road infrastructure quality | 4.960 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 7 | Railroad infrastructure quality | 4.885 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 8 | Railroad network | 6.500 | Higher | 6.500 | Higher toward very high | 6 | Higher |
| 9 | Port infrastructure quality | 5.885 | Higher | 6 | Higher | 6 | Higher |
| 10 | Airport infrastructure quality | 5.731 | Higher | 5.5 | Higher | 5 | Ordinary |
| 11 | Public transportation convenience | 6 | Higher | 6 | Higher | 6 | Higher |
| 12 | Network transmission speed | 6.538 | Higher toward very high | 6 | Higher | 6 | Higher |

Table 38 Component Indices Statistics under Infrastructure Construction Index

| 13 | Communication network transmission cost | 4.923 | Ordinary | 5 | Ordinary | 5 | Ordinary |
|---------|--|-------|-------------------------------|-----|-------------------------------|---|------------------------------|
| 14 | Sewerage quality | 2.923 | Lower toward very low | 2.5 | Lower toward very low | 2 | Very low |
| 15 | Sewage disposal sites | 3.692 | Lower | 4 | Lower | 4 | Lower |
| 16 | Running water supply | 6.920 | Higher toward very high | 7 | Higher toward very high | 8 | Higher toward very high |
| 17 | Energy adequacy | 6.280 | Higher | 6 | Higher | 6 | Higher |
| 18 | Educational recreational facilities | 3.875 | Lower | 4 | Lower | 4 | Lower |
| 19 | Mechanism of infrastructure construction quality | 4.480 | Lower | 4 | Lower | 4 | Lower |
| 20 | Living environment | 6.240 | Higher | 6 | Higher | 6 | Higher |
| 21 | Infrastructure quality for production environment | 6.080 | Higher | 6 | Higher | 6 | Higher |
| 22 | Infrastructure quality for ecological environment | 4.040 | Lower | 4 | Lower | 3 | Lower towards very low |
| 23 | Reasonable allocation of construction resources | 4.682 | Ordinary | 5 | Ordinary | 5 | Ordinary |
| 24 | Mastery of construction progress as scheduled | 3.840 | Lower | 4 | Lower | 4 | Lower |
| 25 | BOT level | 4.375 | Lower | 4 | Lower | 4 | Llower |
| 3. Fair | ness subindices | | | | - | | |
| 26 | E-commerce tender management | 5.909 | Higher | 6 | Higher | 6 | Higher |
| 27 | Tender fairness | 5.542 | Higher | 6 | Higher | 6 | Higher |
| 28 | Contracting fairness | 5.417 | Higher | б | Higher | 6 | Higher |

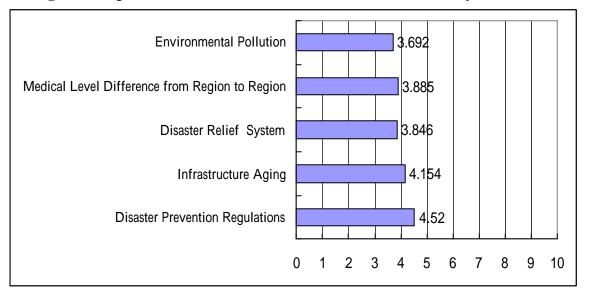


Fig.20 Component Indices Statistics under Environmental Safety Subindexes

The average of environmental safety subindices is 4.0320, which suggests lower competitiveness. Of them, environmental pollution, medical level difference from

region to region and disaster relief system are below average, while infrastructure aging and disaster relief stipulations are higher than average.

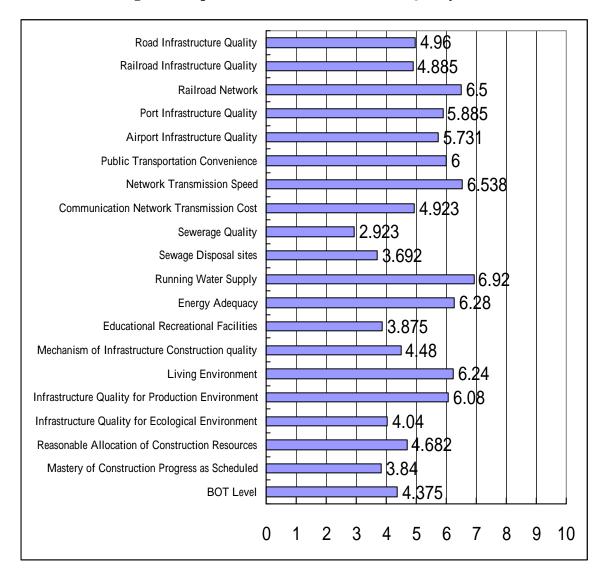


Fig. 21 Component Indices Statistics under Quality Subindex

The average of quality subindices is 5.1548, which suggests Ordinary competitiveness. Of them, road infrastructure quality, railway infrastructure quality, communication network transmission cost, sewerage system quality, sewage disposal sites, educational recreational facilities, the mechanism for the infrastructure construction quality, infrastructure construction quality for the ecological environment, reasonable allocation of construction resources, mastery of construction progress as scheduled and BOT level are below average, while railroad network, port infrastructure quality, airport infrastructure quality, public transportation convenience, network transmission speed, running water supply, energy adequacy, infrastructure construction quality for living environment and infrastructure construction quality for production environment are higher than average.

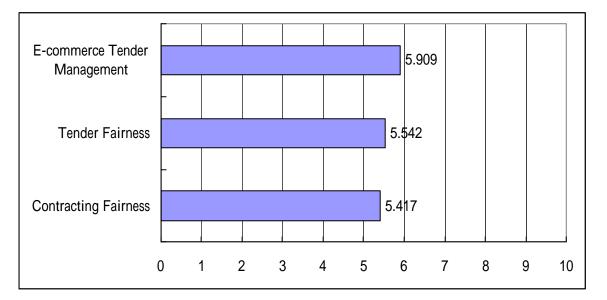


Fig. 22 Component Indices Under Fairness Subindex

The average of fairness subindex is 5.7273, which suggests higher competitiveness. Of them, the tender fairness and contracting fairness are below average, while ecommerce tender management is higher than average.

. Comparison Assessment of Five Indexes

In Taiwan's growth and current competitiveness, technology, public institutions and system, enterprise

competitiveness, infrastructure construction, and macroeconomic environment are evaluated at 5.2023, 4.3500, 6.0456, 5.0028 and 4.2738, respectively, shown as the figure below. This suggests their competitiveness as ordinary, lower, higher, ordinary and lower, respectively. The average of the aggregate five evaluation values is 4.9747, which indicates that the performance of **Taiwan's growth and current competitiveness is Ordinary**.

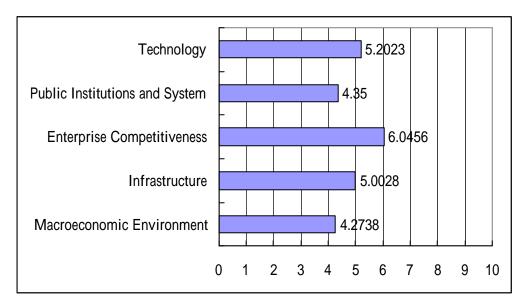


Fig.23 Five Major Indexes Statistics

The average of five evaluation values in Taiwan's growth and current competitiveness is 4.9747, which suggests Ordinary competitiveness. Of them, public institutions and system and macroeconomic environment are below average, while technology, enterprise competitiveness and infrastructure construction are higher than average.

. Comparison among Six Nations (Regions) in East Asia

Since the growth competitiveness index by WEF consists of three major factor indexes, namely, Science and technology index, public institution and system index and macroeconomic environment index, this project adopts the same evaluation index for the comparison of competitiveness among 6 nations in East Asia (Japan, South Korea, Taiwan, Hong Kong, Singapore, and China) in terms of technology index, public institution and system index, macroeconomic environment index. The analysis results are shown as follows:

1. Technology Index

In terms of mode, the competitiveness ranking of the six countries in Eastern Asia is Japan, South Korea, Taiwan, Singapore, Hong Kong and China. For statistics, please refer to Table 39.

| | 50. Do you |
|----------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | think in |
| | technology | technology | technology | technology | technology | technology |
| | index scores, |
| | Japan : | S. Korea: | Taiwan: | Hong Kong: | Singapore: | China: |
| Unit | 29 | 29 | 29 | 29 | 29 | 29 |
| Effective | 0 | 0 | 0 | 0 | 0 | 0 |
| | 5.8966 | 4.2759 | 4.1034 | 1.7586 | 3.3448 | 1.7586 |
| Omission Value | 6.0000 | 4.0000 | 4.0000 | 2.0000 | 3.0000 | 1.0000 |
| Average | 6.00 | 5.00 | 4.00 | 2.00 | 3.00 | 1.00 |
| Median | .55709 | .84077 | .81700 | .68947 | 1.11085 | 1.15434 |
| Mode | | | | | | |
| Normal Error | | | | | | |

Table 39 Statistics for Technology Index for Six Countries (Regions) in East Asia

From the above technology index, we can see Taiwan is in the third position.

2. Public Institutions and System Index

In term of mode, the competitiveness ranking of 6

countries in East Asia is Singapore, Japan, Hong Kong, Taiwan, South Korea and China. For statistics, please refer to Table 40.

Table 40 Statistics for Public Institution and System Index for Six Countries (Regions) inEast Asia

| | 35. Do you think in public institution and system index scores, Japan: | 35. Do you think in public institution and system index scores, S. Korea: | 35. Do you think in public institution and system index scores, Taiwan: | 35. Do you think in public institution and system index scores, Hong Kong: | 35. Do you think in public institution and system index scores, Singapore: | 35. Do you think in public institution and system index scores, China: |
|----------------|--|--|--|---|---|--|
| Unit | 27 | 27 | 27 | 27 | 27 | 27 |
| Effective | 0 | 0 | 0 | 0 | 0 | 0 |
| | 5.0000 | 2.5556 | 2.8519 | 3.81480 | 5.7407 | 1.0370 |
| Omission Value | 5.0000 | 2.0000 | 3.0000 | 4.0000 | 6.0000 | 1.0000 |
| Average | 5.00 | 2.00 | 3.00 | 4.00 | 6.00 | 1.00 |
| Median | .73380 | .75107 | .71810 | 1.00142 | .44658 | .19245 |
| Mode | | | | | | |
| Normal Error | | | | | | |

From the above public institution and system index, we can see Taiwan is in the fourth position.

3. Macroeconomic Environment Index

In term of mode, the competitiveness ranking of

six countries(regions) in East Asia is Singapore, South Korean, China, Hong Kong, Taiwan, and Japan. For statistics, please refer to Table 41.

Table 41 Statistics of Macroeconomic Environment Index for Six Countries (Regions) in East Asia

| | 35. Do you |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | think in |
| | macroecono | macroecono | macroeconom | macroecono | macroecono | macroeconom |
| | mic | mic | ic | mic | mic | ic |
| | environment | environment | environment | environment | environment | environment |
| | index scores, |
| | Japan: | S. Korea: | Taiwan: | Hong Kong: | Singapore: | China: |
| Unit | 29 | 29 | 29 | 29 | 29 | 29 |
| Effective | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2.6207 | 4.3448 | 2.4828 | 2.8276 | 5.2414 | 3.7931 |
| Omission | 2.0000 | 5.0000 | 2.0000 | 3.0000 | 6.0000 | 4.0000 |
| Value | 1.00 | 5.00 | 2.00 | 3.00 | 6.00 | 4.00 |
| Average | 1.89763 | 1.26140 | .91107 | 1.33815 | 1.29987 | 1.52079 |
| Median | | | | | | |
| Mode | | | | | | |
| Normal Error | | | | | | |

From the above microeconomic environment index, we can see that Taiwan is in the fifth position.

4. Comparison with WEF and IMD Assessments

From our statistics on three major indexes of technology, public institution and system and macroeconomic environment, we can conclude that in the competitiveness ranking for the above 6 countries (regions), Singapore is in the first place, Japan and S. Korea in the second place, Taiwan and Hong Kong in the third and China in the fourth.

According to WEF assessment, the global growth competitiveness index ranking for the above 6 countries (region) is Singapore the 4th, Taiwan 7th, Hong Kong 13th, Japan 21st, South Korea 23rd and China 39th.

Therefore, we can conclude from the above ranking that Singapore is ranked 1^{st} , Taiwan 2^{nd} , Hong Kong 3^{rd} , Japan 4^{th} and South Korea 5^{th} and China 6^{th} .

According to IMD assessment, the global growth competitiveness index rankings for the above 6 countries (regions) is Singapore the 5th, Taiwan 24th, Hong Kong 9th, South Korea 27th, Japan 30th and China 31st. Therefore, we can conclude from the above ranking that Singapore is ranked the 1st, Hong Kong 2nd, Taiwan 3rd, South Korea 4th, Japan 5th and China 6th.

Compared with the appraisels conducted by WEF and IMD (see the table below), we can find that Taiwanese experts gave Taiwan a lower competitiveness rating than that by WEF and IMD. Their ratings, which we call Taiwan Growth and Current Competitiveness (TGCC) Assessment, are compared with those of the WEF and the IMD below.

| | TGCC Assessment | WEF Assessment | IMD Assessment |
|-----------|-----------------|----------------|----------------|
| Singapore | 1 | 1 | 1 |
| Japan | 2 | 4 | 5 |
| S. Korea | 3 | 5 | 4 |
| Taiwan | 4 | 2 | 2 |
| Hong Kong | 5 | 3 | 3 |
| China | 6 | 6 | 6 |

Table 42 TGCC, WEF and IMD Rankings

5. Comparison with WEF Major Factor Indexes

According to the statistics of this project on the six East Asian countries (regions), technology index competitiveness ranks Japan, South Korea, Taiwan, Singapore, Hong Kong and China. Public institution and system index competitiveness ranks Singapore, Japan, Hong Kong, Taiwan, South Korea and China. Macroeconomic environment index competitiveness ranks Singapore, S. Korea, China, Hong Kong, Taiwan and Japan.

According to WEF assessment, technology index competitiveness ranks Taiwan the 4th, South Korea 9th, Singapore 18th, Japan 23rd, Hong Kong 33rd and China 53rd. Therefore, from the rankings of the six countries (regions), we can see that Taiwan is in the first place, S. Korea 2rd, Singapore 3rd, Japan 4th, Hong Kong 5th and China 6th.

Public institution and system index

competitiveness ranks Singapore the first, Hong Kong the 10th, Japan 19th, Taiwan the 24th, South Korea 44th and China 50th. Therefore, from the rankings of the six countries (regions), we can conclude that Singapore is in the first place, Hong Kong 2nd, Japan 3rd, Taiwan 4th, S. Korea 5th and China 6th.

Macroeconomic environment index competitiveness ranks Singapore the 1^{st} , Hong Kong 4^{th} , China 6^{th} , S. Korea 8^{th} , Taiwan 15^{th} and Japan 18^{th} . Therefore, from the rankings of the six countries (regions), we can conclude that Singapore is in the first place, Hong Kong 2^{nd} , China 3^{rd} , S. Korea 4^{th} , Taiwan 5^{th} and Japan 6^{th} .

Compared with WEF assessment (please see Table 43), we can see that in technology index, the assessment by the Taiwanese experts gives Taiwan a lower ranking than that given by WEF, ie. 3^{rd} and 1^{st} . In the public institution and system index and macroeconomic environment index, they rank Taiwan in the same position, 4^{h} and 5^{th} , respectively.

Table 43 Factor Index Rankings by TGCC and WEF

| | Technology index | | Public institution and system index | | Macroeconomic environment index | |
|-----------|------------------|-----|-------------------------------------|-----|---------------------------------|-----|
| | TGCC | WEF | TGCC | WEF | TGCC | WEF |
| Singapore | 4 | 3 | 1 | 1 | 1 | 1 |
| Japan | 1 | 4 | 2 | 3 | 6 | 6 |
| S. Korea | 2 | 2 | 5 | 5 | 2 | 4 |
| Taiwan | 3 | 1 | 4 | 4 | 5 | 5 |
| Hong Kong | 5 | 5 | 3 | 2 | 4 | 2 |
| China | 6 | 6 | 6 | 6 | 3 | 3 |

Attachment 1 Technology Index Panel Name List

| Name | University | Department | Position |
|--------------------|------------------------------------|---|---------------------|
| HSUEH, Cherng- tay | National Taiwan University | Department of Sociology | Professor |
| SUN, Yea-li | National Taiwan University | Department of Information Management | Associate Professor |
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| SOONG, Jenn- jaw | National Cheng Kung University | Department of Political Science | Professor |
| LEE, Bo-ywe | National Cheng Kung University | Department of Political Science | Professor |
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| BAI, Jan-erh | National Taiwan University | Department of Business Administration | Professor |
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Attachment 2 Public Institutions and System Index Panel Name List

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| | · · · | | |
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| | , , | Institute of Sociology | |
| CHIU, Hei-yuan | Academia Sinica | Academia Sinica | Professor |
| | | Institute of | |
| | A 1 . C | | |
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| | University | Science | |
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| | National Chengchi | Department of Public | |
| WU, Samuel | University | Administration | Professor |
| | National Taiwan | Department of Political | |
| LU, Ray-chong | University | Science | Professor |
| | Chryonaty | Science | |

| Name | University | Department | Position |
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| LIN, Cheng-hero | Soochow University | Department of Law | Professor |
| HONG, Min-Chou | National Taiwan University | Department of Business Administration | Professor |
| FU, Tsu-tan | Academia Sinica | Institute of Economics | Research Fellow |
| WANG, Yung-jang | National Chung Cheng University | Department of Finance | Professor |
| HUANG, Bwo-nung | National Chung Cheng University | Department of Economics & Graduate Institute of International Economics | Professor |
| CHEN, An-sing | National Chung Cheng University | Department of Finance | Professor |
| CHEN, Shu-heng | National Chengchi University | Department of Economics | Professor |
| LEE, Bih-hearn | National Taiwan University | Graduate Institute of National Development | Professor |
| CHEN, Show-lin | Fu Jen Catholic University | The Department of Economics | Associate Professor |
| CHEN, Kun-ming | National Chengchi University | Department of International Trade | Professor |
| LEE, Thomas | National Chengchi University | Department of Money and Banking | Professor |

Attachment 3 Macroeconomic Environment Index Panel Name list

| HUANG, Chi | National Chung Cheng University | Department of Political Science | Professor |
|----------------------|------------------------------------|---|---------------------|
| LI, Kung-cheh | National Taiwan University | Graduate Institute of Environmental Engineering | Professor |
| SHEI, Shunyi | Academia Sinica | The Institute of Economics | Research Fellow |
| YAU, Ruey | Fu Jen Catholic University | The Department of Economics | Associate Professor |
| YU, The-pei | Soochow University | The Department of Economics | Professor |
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Attachment 4 Enterprise Competitiveness Index Panel Name List

| Name | University | Department | Position |
|-----------------|----------------------|---------------------------------|-------------------|
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| re, chwo ning | University | Administration | 110103501 |
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| LIN, Chu-chia | University | Department of Economics | PIOLESSOI |
| | National Chung Cheng | Department of Management | |
| ROAN, Jin-sheng | University | Information System | Associate Profess |
| VANC Lines min | National Chengchi | Department of Management | Dueferren |
| YANG, Jiann-min | University | Information System | Professor |
| DENC Chier man | National Cheng Kung | Graduate Institute of Political | Professor |
| PENG, Chien-wen | University | Economy | Professor |
| WILD: | Fu Jen Catholic | Graduate Institute of | Dueferren |
| WU, Bingeng | University | Management | Professor |
| | Fu Jen Catholic | Department of International | Associate |
| LIN, Miao-que | University | Trade and Finance | Professor |
| | Fu Jen Catholic | Graduate Institute of | Dueferren |
| LEE Tain-shyug | University | Management | Professor |
| | Fu Jen Catholic | Business of Administration | |
| KAO Jem-lung | University | Department | Professor |

| HONG, Min-chou | National Taiwan University | Department of Business Administration | Professor |
|-----------------|------------------------------------|---|-----------------|
| SAN, Gee | National Central University | Graduate Institute of Industrial Economics | Professor |
| FU, Tsu-tan | Academia Sinica | Institute of Economics | Research Fellow |
| WANG, Yung-jang | National Chung Cheng University | Department of Finance | Professor |
| HUANG, Bwo-nung | National Chung Cheng University | Department of Economics & Graduate Institute of International Economics | Professor |
| HSU, Song-ken | Academia Sinica | Institute of Economics | Research Fellow |
| WU, Jyh-lin | National Chung Cheng University | Department of Economics & Graduate Institute of International Economics | Professor |
| BAI, Jan-erh | National Taiwan University | Department of Business Administration | Professor |
| TAN, Bertram | National Cheng Kung University | Department of Business Administration | Professor |
| CHEN, Andin | National Sun Yat-sen University | Department of Business Administration | Professor |
| KUNG, Cheh-li | National Taiwan University | Graduate Institute of Environmental Engineering | Professor |
| MU, Lan-hsu | National Taiwan University | Department of Business Administration | Professor |
| CHIN, Fu-ho | National Sun Yat-sen University | Department of Management Information | Professor |
| SHUN, Yi | Academia Sinica | Institute of Economics | Research Fellow |
| SHIN, Kun-peng | Academia Sinica | Institute of Economics | Research Fellow |
| YU, Syue-ming | National Taiwan University | Department of Law | Professor |
| CHEN, An-sing | National Chung Cheng University | Department of Finance | Professor |
| CHEN, Yen-liang | National Central University | Department of Information Management | Professor |

| Name | University | Department | Position |
|-----------------|------------------------------------|--|-----------|
| YANG Shou-jung | Soochow University | Department of Sociology | Professor |
| LI, Lamp | Soochow University | Department of International Business | Professor |
| CHIANG, Hsim-li | National Sun Yat-sen University | Sun Yat-sen Institute of Interdisciplinary Studies | Professor |
| PENG, Chein-wen | National Cheng Kung University | Graduate Institute of Political Economy | Professor |
| LU, Ya-li | Chinese Culture University | Department of Political Science | Professor |
| WANG, Jenn-hwan | Tung Hai University | Department of Sociology | Professor |
| HONG, Min-chou | National Taiwan University | Department of Business Administration | Professor |
| CHEN, Yen-liang | National Central University | Department of Information Management | Professor |
| WU, Jyh-lin | National Chung Cheng University | Department of Economics & Graduate Institute of International Economics | Professor |
| LIU, Shang-jyh | National Chiao Tung University | Institute of Technology Law | Professor |
| YOW, Nie-jia | National Central University | Institute of Construction Engineering and Management | Professor |
| LO, S.L. | National Taiwan University | Graduate Institute of Environmental Engineering | Professor |
| KUO, Jan-tai | National Taiwan University | Department of Civil Engineering | Professor |
| CHO, Hsun-jung | National Chiao Tung University | Department of Transportation Technology & Management | Professor |
| WEI, Chien-hung | National Cheng Kung University | Department of Transportation & Communication Management Science | Professor |

Attachment 5 Infrastructure Construction Index Panel Name List

| CHEN An-lin | National Sun Yat-sen University | Department of Business Management | Professor |
|------------------|------------------------------------|--|-----------------|
| YU, Syue-ming | National Taiwan University | Department of Law | Professor |
| SHEI, Shunyi | Academia Sinica | Institute of Economics | Research Fellow |
| PENG, Shin-kun | Academia Sinica | Institute of Economics | Research Fellow |
| HUANG, Jong-shin | National Cheng Kung University | Department of Civil Engineering | Professor |
| FANG, I-kuang | National Cheng Kung University | Department of Civil Engineering | Professor |
| HUANG, Tai-sheng | National Chiao Tung University | Department of Transportation & Communication Management Science | Professor |
| LU, Ray-chong | National Taiwan University | Department of Political Science | Professor |
| CHEN Yung-hsiang | National Taiwan University | Department of Engineering Science and Ocean Engineering | Professor |