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Overview of the Hsinchu SIP in the First Half of 2001

ue to the global economic downturn, computer and semiconductor firms in the Hsinchu Science-based Industrial Park (SIP) have recently suffered from stagnant demand. Total turnover of SIP firms during the first half of this year (2001) was NT\$364.2 billion, or negative growth of 13% over the same period last year. A look at the aggregate turnover of the six major industries in the SIP reveals that only the communications, precision machinery, and biotechnology industries enjoyed significant growth compared with the previous year (respectively 25%, 21%, and 47% growth). In contrast, the integrated circuit, computer, and electro-optical industries saw their turnover shrink by 15%, 22%, and 5% respectively.

In operation for two decades, the SIP has fostered the growth of a cluster of high-tech industries, earning a reputation as Taiwan's technology capital. Currently occupying 605 hectares, the SIP was home to firms generating NT\$929.3 billion in turnover last year (2000), and accounting for a respective 10.7% and 32.5% of the country's total manufacturing and information/electronics output value. This year, however, total SIP turnover has fallen as the world economy has cooled. Nevertheless, domestic and foreign high-tech firms are still upbeat about investing in new plants, and 24 new firms with capital investment of NT\$10.642 billion were approved during the first half of the year. In terms of both number of firms and investment, this represented four-fold growth over the same period of last year. Roughly 30 firms currently have investment projects pending; the new facilities they plan to establish in the SIP will account for investment of NT\$13.64 billion.

A total of 305 high-tech firms employing 101,510 persons were operating within the SIP as of the end of June 2001, and these figures were up by 4.5% and 9.6% respectively over the previous year. The continuing R&D investment made by high-tech firms looking forward to the next economic upturn is driving steady investment growth. A total of 59 firms applied to increase their capital during the first half of the year, and NT\$211.3 billion in new capital was approved. When this figure is added to investment in new firms, total firsthalf investment came to NT\$221.942 billion-an increase of 2.1% relative to the same period last year and a setting a new record. Paid-in capital of SIP firms totaled NT\$754.3 billion as of the end of June-reaching a new high and representing robust growth of 15% in comparison with last year.

The following is an in-depth look at SIP turnover, import/export trade, investment acquisition, and future prospects:

I. Turnover

With respect to the turnover of the

SIP's six major industries during the first half, the following is an overview of industry structure and turnover trends:

- A. The integrated circuit industry enjoyed turnover of NT\$210.4 billion during the first half of 2001. While down by 15%, this figure still accounted for 57.8% of overall SIP output. This year's negative growth is chiefly due to the drops in chip manufacturing and circuit design output value by a respective 12% and 7%. For their part, wafer products, chip packaging, and testing services fell by 4%, 4%, and 6% respectively. In contrast, equipment suppliers and mask fabricators enjoyed growth of 3% and 45% respectively.
- B. After suffering negative growth of 22% relative to the previous year, the NT\$86.0 billion turnover of the computer/peripheral industry accounted for 23.6% of overall SIP output. While output value fell by 36% and 26% in the microcomputer system and input equipment categories, software, storage equipment, and network equipment firms enjoyed growth of 93%, 44%, and 42% respectively. This industry segment thus exhibited strongly polarized growth.
- C. The electro-optical industry's turnover of NT\$36.5 billion, which accounted for 10% of total SIP output, was down by 5% over the

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year before. This weak performance can be largely attributed to respective drops of 44%, 32%, and 26% in the output value of image tube, optical information, and battery firms. In contrast, flat panel display turnover grew by 6%, while the optical element/system and photovoltaic battery categories grew by 407% and 85% respectively.

- D. Accounting for 7.7% of SIP output, the communications industry's turnover of NT\$28.2 billion was up by 25%. While the value of local exchange equipment grew by a robust 112%, wireless communications equipment and local transmission equipment likewise grew by 24% and 32% respectively.
- E. Accounting for 0.7% of SIP output, the precision machinery industry generated turnover of NT\$2.5 billion and grew by 21% over the previous year. The categories of automation systems and precision molds turned in growth figures of 32% and 45% respectively.
- F. Accounting for 0.2% of SIP output, the biotechnology industry had turnover of NT\$600 million and grew by 47%. The categories of testing reagents and medical equipment grew by 140% and 27% respectively.

II. Import/Export Trade

The Hsinchu accounted for import/ export trade worth NT\$296.0 billion during the first half of 2001-a drop of 29.7% from the same period last year. The NT\$163.7 billion in exports and NT\$132.3 billion in imports were down over the previous year by 21% and 38% respectively. The SIP's cumulative trade surplus for the first half of the year was NT\$31.4 billion, which was equivalent to roughly 15% of the country's overall trade surplus of NT\$210.5 billion for the same period.

III. Investment Acquisition

The 24 new companies established during the first half of the year were distributed by industry as follows: (1) Of the 10 new integrated circuit firms, 6 perform IC design services; 2 produce design automation tools, semiconductor IP elements, and RF elements and modules; 1 produces ion implantation equipment; and 1 is a merger with improved technological capability. (2) Of the 4 communications firms, 2 produce 3G mobile communications base stations and satellite communications products; 1 produces wireless multimedia and wireless appliance products; and 1 develops and produces optical filters. (3) The 3 new electro-optical firms respectively produce surface-emission laser diode chips, silicon substrate reflection-type liquid crystal microimage displays, and lithium niobate laser chips. (4) The 2 new precision machinery firms respectively develop and manufacture automated semiconductor equipment and chemical deposition equipment/organic vapor-phase deposition equipment. (5) The 5 new biotech firms include 2 producers of transgenic mice and high-quality laboratory animals with no specific pathogens, and 3 firms respectively producing human vaccines and genetic preparations, non-invasive blood sugar testing instruments and biological test plates, and polymer materials and products such as biologically absorbable bone pins.

As for sources of investment, 9 firms were founded by overseas Taiwanese researchers, 5 were founded by foreign companies, and the remaining 10 were established by domestic investors. This shows that the Hsinchu SIP is still attracting advanced foreign technology and investment from overseas Taiwanese researchers and scientists. In addition, the SIP's industrial network is becoming steadily denser and more extensive.

IV. Future Outlook

The world economy has sputtered since the beginning of the year, and the research arms of the IMF and OECD have slashed their economic growth forecasts. Because demand for personal computers and mobile phones has been stagnant, such research organizations as the Semiconductor Industry Association (SIA), World Semiconductor Trade Statistics (WSTS) organization, and Dataquest have similarly cut their 2001 worldwide semiconductor production and sales forecasts sharply from the 20% growth predicted last year to negative growth of 13%~21%. While the continued weakness of the international semiconductor market has lowered the equipment utilization rate of DRAM makers and chip fabs, forcing them to reduce their prices, some firms and research organizations expect a recovery in the fourth quarter, and the actual situation remains to be seen. It is currently predicted that as the domestic semiconductor industry responds to the global economic slump, the turnover growth of high-tech firms in the Hsinchu SIP will temporary slip. Total SIP turnover for the whole year is likely to be in the range of NT\$800~850 billion. But in view of this year's strong investment and the economic recovery forecast for next year, SIP turnover may very well cross the NT\$1 trillion threshold in the coming year.

The 2001 First Wu Ta-You Science Camp



A group photo of the science camp instructors and students.



he First Wu Ta-You Sci ence Camp was held by the Wu Ta-You Academic Foundation for the purpose of training talented young scientists of Chinese descent. Several world-class scientists who had been invited to teach students from Taiwan, Hong Kong, and China gave lectures in which they introduced a number of cuttingedge research fields. Personally conveying the excitement and challenge

of research work, these senior scientists urged the younger generation to strive to be outstanding scientists and promote science education and academic interchange throughout the Chinese world.

The Wu Ta-You Foundation invited the Nobelist Chu Kang-wen, as well as such international figures as Chu Ching-wu, Y.R. Shen, Frank H. Shu, Leroy L. Chang, and Kwok-Yung Lu to participate at the science camp.



These prominent scientists conveyed to the outstanding university students from Taiwan, Hong Kong, and China the research experience, research methods, and the direction cuttingedge science is headed. In comparison with the three Wu Chine-Shiung Science Camps that have been held so far, the students invited to this camp were university upperclassmen-not high school upperclassmen. And since university students from Taiwan, Hong Kong, and China have few opportunities to meet, it was hoped that the camp would promote understanding and interaction among outstanding future scientists from both sides of the Taiwan Straits.

The theme of this science camp was physics. Thanks to the impressive qualifications of the instructors and interesting and wide-ranging subject material, many fine students from Taiwan, Hong Kong, and China applied to take part in this rare opportunity. In conclusion, the Wu Ta-You Science Camp was an extraordinary gathering of science talent from the Greater China Area.

The First Wu Ta-You Science Camp was held on August 12~17, 2001.

The 2001 Fourth Wu Chine-Shiung Science Camp

he 2001 Fourth Wu Chine-Shiung Science Camp was held June 6~11 at the Fuhua Hotel and Chih Ma Hotel at Shihmen Reservoir. More than 140 of the country's finest science students (high school juniors and seniors plus university freshmen; including ten outstanding students from the Chinese School of Malaysia and two schools in Hong Kong) were selected to participate in this top-flight feast of knowledge. Close to 40 high school science teachers, 14 heavyweight professors of physics, chemistry, and life science, four world-class scientists (including Nobelists), and NSC work personnel were also in attendance. Education Minister Tzeng Tyh-Lang and NSC Vice Chairman Wu Maw-Kuen visited the event and gave spe-eches. Liu Chung-Laung, president of National Tsinghua University, gave a keynote lecture at the opening ceremony on the topic "Computers All-powerful! Computers All-powerful?" Wu Yan-Hwa, president of National Yang Ming University and one of the country's most outstanding female scientists, gave a lecture on the topic "Enjoy

life", in which she described the achievements of Dr. Wu Chien-Shiungthe 20th century's greatest female scientist of Chinese ancestry.

The following four world-class scientists served as lecturers at the camp:

(1) Prof. Douglas Osheroff

Winner of 1996 Nobel Prize in physics. Fellow of the U.S. National Academy of Science. Professor and head of physics department, Stanford University.

(2) Prof. Yuan Cheng B. Sung

Winner of the 2000 President's National Science Medal. Fellow of the Academia Sinica Fellow of the U.S. National Academy of Science. Honorary professor of biodynamics and applied dynamics, University of California at San Diego.

(3) Prof. Eric Davidson

Fellow of the U.S. National Academy of Science.

Professor of cellular biology, California Institute of Technology.

(4) Prof. Y. C. Lee

Winner of the 2001 U.S. Chemistry Society's Claude Hudson Award.

Fellow of the Academia Sinica. Professor of biology, Johns Hopkins University.

Prof. Douglas Osheroff, a founder of the contemporary field of low-temperature physics, explained physical phenomena that occur at absolute zero. Prof. Yuan Cheng B. Sung, a founder of the field of biodynamics, introduced new biological engineering applications and talked about their future prospects. Prof. Eric Davidson, a specialist in embryonic cells, talked about the genetic control system responsible for an organism's growth. Prof. Y. C. Lee, a pioneer in the field of sugar chemistry, described the mysteries of identifying sugars in living organisms.

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