Project Reports: Industry and Services

APO Symposium on Entrepreneurship in Knowledge-Based Industry

23–26 July 2002, Taipei, Republic of China

BACKGROUND

The advances in telecommunications, information technology, and the Internet have transformed the global business environment. The bases of economic life and business have been extended to the realm of knowledge. Knowledge assets, knowledge workers, and knowledge ventures have become the foci of attention. This new environment brings new challenges to entrepreneurship both at the individual (new start-up) and corporate (internal corporate venture) levels. The e-business environment, as it is referred to, creates opportunities for new business models, new ways to create value, and access to new markets on a global stage. Knowledge has become one of the most important forms of intellectual capital in starting and running a business today. R&D and innovation will naturally become the primary focus of an enterprise in the process of value creation.

These developments have generated vibrancy in most economies, although there are accompanying challenges. An entrepreneur will need to know how to utilize the technological elite responsible for such efforts and tap the financial resources available to meet the challenges of knowledge-based business. To survive in the knowledge age, entrepreneurs must rethink how they operate, foster a new innovative culture within their organizations, and at the same time form knowledge networks or strategic alliances with others for mutual gain and competitive advantage. All of the following issues emerged as the main themes in the symposium:

1. e-business trends and new venture initiation in the knowledge-based industry;
2. entrepreneurs' role in knowledge-based industry;
3. appropriate business models, management strategy, and tactics including value creation methods, marketing, and branding that harness the possibilities that abound in knowledge-based business;
4. the role of venture capital in knowledge-based industry;
5. entrepreneurship and innovation; and
6. initiating ventures within corporations by motivating and retaining knowledge assets.

PROCEEDINGS OF THE SYMPOSIUM

1. PRESENTATIONS BY RESOURCE PERSONS

1-1. Corporate Entrepreneurship and Innovation: Key Thrusts in the Knowledge-Based Economy

The main part of the symposium began with Professor Tan Wee Liang, APO resource person, leading the participants in a period of discussion on the theme "corporate entrepreneurship and innovation" by examining the following questions:

a. What are the participants' expectations of the program?

b. What characterizes knowledge-based industry? What does that term mean?

c. What is entrepreneurship?

The first question, he said, was important for the symposium to address the expectations of the participants so that it would be meaningful to them. The next two questions were posed to establish a common understanding of the terms as reflected in the symposium's title before dwelling more deeply on the issues of entrepreneurship.

The participants agreed that there are two possible groups of expectations: to learn and to contribute. Under learning, they hoped to understand more about each of the aspects of the symposium, which are outlined under the discussion of the next two questions. Under the expectations for contributing, they agreed to contribute to mutual learning and to the APO by identifying issues and making recommendations for future work.

The host of observations about knowledge-based industry was characterized by a lack of common agreement. However, the observations had the common element of the key role of knowledge. Some observations are reproduced below.

- We have moved from capital-based industry to industry that is based on knowledge in the new globalized arena.
- The question is how to identify the knowledge in companies and to utilize the knowledge in new ways.
- This knowledge may have already been in existence. It may not have been called knowledge before, but it should be identified as assets.
- There is a need to understand how to harness knowledge as intellectual property rights.
- We need mechanisms to enable us to share and exchange knowledge within organizations. It is pointless to have knowledge if it is not widely distributed.
- Knowledge management is no different from the some of traditional elements.
- Innovations will be important in this knowledge-based industry.

Professor Tan highlighted two other elements that the participants had not raised. First, he pointed out that there were uncertainty and fear concerning knowledge-based industry and the knowledge-based economy (KBE). The fear arises from a lack of understanding of what knowledge is, where to find it, and how to use it. Second, there is a need to remember that knowledge resides in people. It is for this reason that entrepreneurship is important as it is through entrepreneurs in the marketplace and internal corporate entrepreneurs in organizations that knowledge can be transformed into business models, innovations, inventions, and new products and services that can create value.

Professor Tan then shared Raymond Kao's definition of entrepreneurship: Entrepreneurship is the process of doing something new or different so as to create wealth for oneself and to add value to society (Kao, 1993; 1995). He elaborated on how a mindset change is involved if one employs this definition. The advantage of this definition over others is the reliance on the new mindset and the identification

of entrepreneurship as a process rather than as characteristics. What organizations and societies need is individuals who are willing to take the step of doing something new or different. In the case of corporations, they need to have more ideas. He introduced the symposium to the various forms of corporate entrepreneurship.

- In administrative entrepreneurship, the firm has a center that handles R&D or business development.
- In imitative entrepreneurship, the firm imitates the innovations of others by reverse engineering or with technology innovations of its own.
- Acquisitive entrepreneurship takes the form of mergers with and acquisitions of other firms that may have relevant inventions and innovations.
- Incubative entrepreneurship is encouraged by fostering teams and providing internal financing and resources for innovations and inventions within the firm.
- Holistic entrepreneurship transforms enterprises into communities of entrepreneurs.

The last type of corporate entrepreneurship requires organizational change beginning with the redefining of the enterprise, the articulation of a clear vision and philosophy for action, the identification of core values, the eradication of bad sub-cultures and the inculcation of a corporate culture supportive of entrepreneurship, and training and equipping staff, accompanied by reward systems to motivate entrepreneurial activity.

1-2. Entrepreneurship Development Program in Higher Education Institutes in the ROC

Professor Yue-Shan Chang provided an overview of the economic development of Taiwan from the 1950s through the 1990s to illustrate the setting for the Entrepreneurship Development Program. In the 1990s, structural reform of the economy took place with the government passing the main influence over the economy to the market, moving from industrial policy to competition. The government thus introduced competition, privatization, and liberalization policies. Most recently, in the 2000s, Taiwan has sought integration into the global economy by joining the World Trade Organization.

The challenges facing Asian economies were described by Professor Chang as:

- Globalization creates increasing competition from less-developed countries in manufacturing, and this is no longer a way forward.
- Cost considerations have caused traditional industries in Taiwan to relocate to cheaper locations with fewer capital and other requirements.

Thus, Taiwan had to abandon the old economic development model. The Knowledge Economy Development Program was created against this background. The program is based on a national initiative to encourage innovation and creatively utilize information technology infrastructure in the field of education. The government has a series of policy papers that the institutes of higher education must follow. The main points of the Knowledge Economy Development Program are to:

- establish mechanisms to encourage innovation and creativity;
- establish infrastructure for Internet access and applications;
- Expand IT and Internet applications in production and other practices in daily

life;

- evaluate the education system to encourage innovation and entrepreneurship; and
- restructure government to become more responsive and service oriented.

The National Sun Yat-Sen University (NSYSU) is one such institutes of higher education and it wants its students to engage in viable projects. It has set up an Entrepreneurship Development Center as an interface between academia, industry, and government. The NSYSU is establishing e-learning platforms and fostering entrepreneurship through self-financing projects.

1-3. Entrepreneurship and Innovation Toward the Application of Knowledge Management in Malaysia

Dato' Mustafa Mansur shared the National Information Technology Agenda vision of a "knowledge Malaysia" by 2020. He described the key thrusts of Malaysia's plans to become a KBE as:

- building the knowledge manpower base through the introduction of a system for lifelong learning and a brain gain program;
- intensifying science and technology and R&D initiatives to strengthening the national innovation system;
- accelerating the development of "infostructure" to facilitate the development of the KBE;
- restructuring the financial system to provide appropriate types of financing for knowledge activities, make available the tools for macroeconomic management, and withstand the challenges associated with the KBE;
- raising the knowledge content in the agriculture, manufacturing, and service sectors;
- encouraging the private sector to prepare with greater urgency for the KBE as well as identifying and exploiting the opportunities that will be generated; and
- reinventing the public sector to become more proficient in the acquisition, utilization, dissemination, and management of knowledge.

He also outlined the 14 awards that the government is using to spearhead change. These award schemes employ the criteria of benefits to the state/region, innovation, quality, recognition, local content, and potential leading edge. Another initiative is the Technopreneurship Development Program of the Multimedia Super Corridor, launched in November 2001. It seeks to achieve four objectives: 1) spawn a critical mass of SMEs and start-ups involved in information and communications technology (ICT), biotechnology, and other life sciences; 2) nurture potential world-class companies; 3) create the nuclei for the physical roll-out of the Multimedia Super Corridor nationwide; and 4) spur the growth of the venture capital industry.

1-4. Grasping a Knowledge Management Model for SMEs in the Knowledge-based Economy

Dr. Moon-Kyum Kim guided the participants through the various concepts behind knowledge management before drawing applications for SMEs. He explained the current thinking on knowledge management, the distinctions between knowledge and know-how and between knowledge and learning, and other concepts.

To use knowledge as a competitive force, it is necessary to interpret "knowledge" from the firm's perspective. A firm is an organization that constantly makes decisions on various business activities and tries to operate efficiently to make profits. In this context, knowledge is useful for business decision making and business operation. Thus knowledge can be defined as a collection of facts, know-how, patterns, and systems that are embedded in individuals or the organization itself, which can be utilized in the process of decision making and business operation. Facts include "know-what" and "know-why" and are obtained from experience and learning. Know-how is firm-specific production technology or management skills. Patterns imply an internal process of performing jobs, while systems refer to a company's by-laws, rules, and organizational culture. Knowledge that is firm specific is difficult to transfer, imitate, and trade, and its value can be vastly reduced when it is applied outside the firm.

After identifying the knowledge that exists, its management consists of five elements: objective; strategy; knowledge assets; knowledge activities; and knowledge infrastructure. These are the knowledge management domains that an entrepreneur can effectively target. An entrepreneur moves around these domains by performing knowledge activity management and knowledge asset management in particular. Knowledge activity management seeks to improve the competitiveness of knowledge assets by efficiently managing such activities as knowledge creation, knowledge sharing, knowledge transfer, and knowledge learning through the knowledge infrastructure formed by the organization, human capital, and information technology. Knowledge asset management improves a firm's competitiveness by utilizing knowledge assets to achieve product leadership, operational excellence, and customer intimacy. The success of knowledge management depends upon how well the two activities of knowledge activity management and knowledge asset management are harmonized.

However, in Dr. Kim's assessment, SMEs have much scope for improvement in the area of knowledge management. The product leadership of SMEs is weak in terms of their brand power, design capability, and development of new products. The competitiveness of SMEs is generally based on low prices. SMEs are weak in utilizing explicit and tacit knowledge and tend to follow a simple "me too" strategy. SMEs have difficulties in achieving operational excellence because most still depend on labor and capital in their operations. Their focus is mainly on achieving economy of scale or increased productivity while they neglect value creation from the utilization of knowledge. The tasks that they should engage in for knowledge management include:

1. Determine the knowledge necessary, for example, by brainstorming sessions, the development of scenarios, or interviewing clients, suppliers, or colleagues.
2. Determine the knowledge available, for example, by sharing successful acquisitions or projects (also called best practices), maintaining a file of personnel, or organizing experience-swapping sessions.
3. Determine the knowledge gap, i.e., the difference between the necessary and available knowledge.
4. Develop knowledge via R&D, through education and training, or by conducting customer satisfaction studies.

5. Acquire knowledge by employing specifically qualified personnel, purchasing licenses or patents, or purchasing market research or strategic reconnaissance results.
6. Lock in knowledge, that is, transform the purchased or developed knowledge into a structural and systematic form whereby it is determined (codified) and available to everyone. Examples of forms of knowledge that can be locked in are requests for patents, maintenance of project files, or installing an intranet.
7. Share knowledge by making project or fact sheets available, practicing job rotation, and holding lunchtime meetings.
8. Utilize knowledge, chiefly stimulated and motivated by the management.
9. Evaluate (utilized) knowledge within the organization. The evaluation of the (utilized) knowledge should then be reused as input for the determination of available and necessary knowledge. Evaluation can be done through project evaluations, internal and external audits, conducting customer satisfaction surveys, or benchmarking.

1-5. The Internet as the Driving Force for Transition to a Knowledge-based Society

Dr. Chingteng Hsiao, Vice President of Yam Digital Technology, evaluated the impact of the Internet and offered the participants with his insight into the future of the ICT industry. He noted that "The show has just begun; big games areyet to come." Many elements are evolving rapidly with new business models, new devices and applications, and changing user behavior.

He provided numerous examples. ICT usage is different at the desk, on the road, or on the couch. Usage by enterprises and individual customers also differs. There will be a convergence between computers, TVs, and telephones. General-purpose processors, which can handle more volume and are superior to special-purpose processors, are being developed. The industry is grappling with competing directions, for example, whether PCs should be set-top boxes controlling information appliances in homes (Microsoft) or whether network servers should control information appliances in homes (Sony). The challenge is how to resolve these contradictions.

According to a IDC research, by 2003, one-sixth of the world population will subscribe to mobile phones (the number in 2002 is 1 billion). By 2005, 40% of traffic over the Internet is expected to come from non-PC devices. Demand for Internet-enabled mobile phones and services will flourish. WPAN and WLAN will gain in popularity, along with multimedia messaging services. All of these will result in changes and new opportunities.

IDC is a provider of technology intelligence, industry analysis, market data, and strategic and tactical guidance to builders, providers, and users of information technology

1-6. The Role of Venture Capital in Knowledge-based Industry

Mr. Gilbert Ma of the Fortune Venture Investment Group briefed the participants on the major roles of venture capitalists, which included:

1. providing cash and value added;

2. building up a company's conventional value in financial assets (cash and equity) and physical assets (technology, land, and equipment);
3. building up a company's intangible value in organizational areas such as intellectual property, brand name, strategy, culture, suppliers, and employee teams; and
4. increasing the future value compared with the current value to meet challenges in new technology, new designs, new products, new channels, and new strategic partners.

The future direction of venture capitalists in Taiwan is moving toward knowledge-based ventures in other areas of Asia, such as China and the Pacific Rim.

2. COUNTRY PAPERS

The country papers were grouped under the selected themes as determined by the chief facilitator. The list of participants and the topics they addressed in their presentations are given in Annex 1.

SUMMARY OF ISSUES

1. ISSUES ARISING FROM THE PRESENTATIONS BY RESOURCE PERSONS

In any company, there is a need to identify the knowledge that exists, which may be tacit, i.e., not just intangible but not codified and residing in people. Knowledge then needs to be harnessed. This process of harnessing knowledge requires the development of intellectual property rights, the necessary legal systems to safeguard them, and respect for them among the public. At the firm level, Dr. Kim outlined the steps that a company should embark on to manage knowledge creation, development, and utilization. Entrepreneurship is needed in a country and in organizations because entrepreneurial leadership is the glue that brings knowledge assets and knowledge activities together to achieve desired outcomes. Dr. Kim reinforced this point in his presentation, substantiating the symposium's discussion on entrepreneurship. Countries need entrepreneurship at all levels, as do companies. Successful companies, as in the case of Taiwan, include a corporate venture capital section, as noted by Mr. Gilbert Ma.

Professor Tan highlighted the need for entrepreneurship at all levels of society with an emphasis on the need for innovation and internal corporate entrepreneurship (intrapreneurship). The discussion showed the importance of top management being supportive and driving the organizational change needed to implement innovation and entrepreneurship. When an organization is large, change may need to begin small. As success is achieved in one unit and the news spreads, other units may also embrace change.

Another issue is the need for established enterprises to continue to innovate, as the basis for competition in the KBE is knowledge. Thus, companies need to identify the areas in which they can excel by applying the knowledge they have or can develop. Innovations in processes, products, or services are needed. For innovation to take place, companies need to encourage internal corporate entrepreneurship and innovations. To encourage corporate entrepreneurship and innovations, business owners and leaders need to be prepared to change their organizations. It may be a difficult and painful process but even in a large conglomerate can be achieved by starting in one unit so that it can "infect" the whole.

Countries need to recognize and embrace the KBE and the need to develop knowledge-based industries. This may require a national plan and campaign, as in the case of Malaysia, as Dato' Mustafa Mansur described. A country needs to put infrastructure in place, both in terms of hardware and software (which include softer resources such as training and equipping). The infrastructure elements needed for innovations and knowledge-based industry identified in Malaysia led to the development of the Multimedia Super Corridor. Over and above the infrastructure, there is a need for public education through award schemes and other modes of profiling successful entrepreneurs and enterprises.

Taiwan has taken this further by introducing policy measures to encourage entrepreneurship in the knowledge-based economy through its Knowledge Economy Development Program. It has mandated that educational institutes must introduce innovation, creativity, information technology, and computer technology as a means of delivering their curricula. Professor Chang explained what the National Sun Yat-Sen University has been attempting to do through its Entrepreneurship Center.

One of the key infrastructure elements identified by the speakers was venture capital. Appropriate financing and value-added services from professionals who have the skill set and knowledge that enterprises may lack can be provided by venture capitalists to assist new high-technology enterprises in their start-ups.

2. ISSUES RAISED BY THE PARTICIPANTS

2.1 Entrepreneurship Development

a. **Context of individual countries:**
It was pointed out by the participant from India that some countries are still agrarian societies characterized by low literacy rates, low exposure and mobility, and rural or nomadic populations, and are also often steeped in traditional cultural, racial, and religious beliefs that may not be conducive to attempts to introduce entrepreneurship.

b. **Lack of technical knowledge and practical experience:**
Developing countries in Asia have a low penetration of technical education. Technical education is costly and often beyond the reach of deserving students. There is also a brain drain in those countries because technically proficient personnel seek employment and venture opportunities in developed countries.

c. **Lack of industrial and social infrastructure:**
Some Asian countries do not have the industrial infrastructure and R&D facilities for product selection and development. There may be cumbersome government rules and procedures that need to be amended. To groom global firms, the lack of knowledge of local and international laws needs to be addressed.

d. **Access to financing:**
SMEs find difficulty in financing their projects with exorbitant bank interest rates and low funding from venture capital funds. Financial rehabilitation schemes for SMEs are needed.

e. **Lack of industrial incubators:**
More low-cost industrial incubators should be developed in universities, R&D centers, and government-sponsored industrial parks to help entrepreneurs, especially in knowledge-based industry.

2.2 Internal Corporate Entrepreneurship

The issues identified in developing internal corporate entrepreneurship concern firms and can be summarized as follows:

1. Corporations may not be aware of knowledge management systems, which can be complex and expensive to implement in the case of larger business concerns.
2. Corporations must overcome cultural hurdles such as the reluctance of employees to share information and ideas.
3. Top management should encourage intrapreneurship.
4. Corporations need to allow employee-inventors to share in the intellectual property rights to their inventions and need to know how to protect intellectual assets.
5. Corporations should introduce transparent reward systems.
6. Corporations also require intrapreneur-leaders to drive projects with passion.

2.3 Innovation and High-technology Entrepreneurship

Creativity and innovation may be hereditary but individual capability, the availability of resources from governments, and families play an important role in the presence of high-technology entrepreneurs in a country. Therefore, the necessary environment for the development of such enterprises must be created.

RECOMMENDATIONS

1. ENTREPRENEURSHIP DEVELOPMENT

To overcome the issues highlighted, governments need to improve literacy rates and ensure that there is opportunity for the social mobility that education can engender. Educational systems also have to provide technical education. National governments should leverage ICT to spread the benefits of knowledge, education, and training.

There may be a need to select manpower for higher technical education, grooming them through exposure to world-class technology, and upgrading skills. At the same time, there is a need to motivate them to remain in the country to block the brain drain by providing world-class salary structures and social infrastructure. To this end, a strong industrial and social infrastructure needs to be created; international funding may be required to build world-class infrastructure. Focal points need to be strengthened to facilitate the transfer of technology. In addition, there is a need to disseminate market information so that the entrepreneurs and enterprises can have better access to markets.

To address access to financing, governments could make available interest-free or soft loan to first-generation entrepreneurs and assist in the financial rehabilitation of ailing SMEs. A venture capital industry should be encouraged. Incubators should be established to aid aspiring young entrepreneurs with the necessary technology and skills. Incubators should be developed in universities, R&D centers, and government-sponsored industrial parks to help entrepreneurs, especially in the knowledge-based industry.

2. INTERNAL CORPORATE ENTREPRENEURSHIP - RECOMMENDATIONS FOR FIRMS

Firms need to:

1. form venture teams comprising small groups from marketing and other functions to encourage entrepreneurship (cross-functional venture teams);
2. develop the appropriate support systems to facilitate the exchange of knowledge and sharing of knowledge;
3. promote internal innovation and entrepreneurship and provide the requisite resources such as training in business plan preparation, venture financing, etc.;
4. introduce appropriate corporate policies on employee involvement in internal corporate ventures and encourage calculated risk-taking;
5. provide incentives, e.g., 20% of net profit for patent applications, allow joint registration of patents with employees, and encourage spin-offs and co-ownership in the resulting ventures; and
6. reduce the fear factors in intrapreneurship through a process of secondment to the new corporate venture instead of a total spin-off for the first year, co-invest in the spin-offs through internal corporate venture funds, guarantee to a buy-back of shares from spin-offs if the value decreases by 50%, and undertake to re-employ the intrapreneurs in the parent corporation.

National governments need to train their corporations in corporate entrepreneurship and knowledge management systems.

3. INNOVATION AND HIGH TECHNOLOGY

3-1. National Governments

Government assistance will be required in the following areas: R&D financing (future technology); tax benefits; changes in the national education system; free technical education; creation of research labs/incubators; and the search for potential (nationwide talent search). Creativity, innovation, and high-technology entrepreneurship are dependent on the education system of a society/country. Schools should produce innovative entrepreneurs for the future knowledge-based society.

3-2. Recommendations to the APO

Several recommendations for implementation by the APO were made at the symposium.

1. Continue the process of discussion and discovery begun at this symposium with subsequent symposia along similar themes, particularly best practices for corporate entrepreneurship and innovations, the design of training programs for top management in the area of corporate entrepreneurship and knowledge management, motivation, reward, and recognition systems for corporate entrepreneurship and innovation, and the design of national innovation systems and enterprise education.
2. Design and implement a top management entrepreneurship development program in APO member countries through the NPO network.

3. Promote an APO-wide award that promotes innovations in various industries to promote recognition even in agrarian societies. Similarly, an award could be promoted to recognize corporate entrepreneurship.
4. Alternatively, report achievements in innovation or corporate entrepreneurship in the APO News.

Annex 1

List of Assigned Topics for Country Paper Presentations

Bangladesh The Internet revolution and how it has led to new forms of entrepreneurship.	**Mr. Shabbir Ahmed Khan** Senior Vice President The Dhaka Chamber of Commerce & Industry
India Venture capital in India – a perspective.	**Mr. Tilak Raj Sarangal** Director & Secretary Directorate of Industries & Commerce Government of Punjab State, India
India Internet – the Indian scenario. "e-Business in India and KBEs offering solution to e-business."	**Mr. J. S. Sethi** Senior Deputy General Manager Bharat Heavy Electricals Limited
Indonesia The Internet revolution and how it has led to new forms of entrepreneurship.	**Mr. Takarianto Ari** Director PT. RTM Global Integration
Malaysia Malaysia's efforts to promote innovations and the venture capital industry.	**Mr. Kamis bin Mahawi** Coordinator Majlis Amanah Rakyat (MARA)
Mongolia Entrepreneurship in the knowledge-based economy in Mongolia.	**Mr. S. Sainbat** Deputy Director Department of Electronic Nomin Holding Company
Nepal Adoption of technology by SMEs in Nepal.	**Mr. Kunj Bihari Kayal** Deputy General Manager Nepal Industrial Development Corporation
Nepal Entrepreneurship development in Nepal.	**Mr. Dilip Thapa** Manager Human Resource Development Industrial Enterprise Development Institute

Philippines Successful efforts of the Philippines to promote innovations in the knowledge-based industry through e-business and knowledge management.	**Ms. Ma. Teresa U. Bagaman** Vice-President Philippine Society for Quality
Singapore Technopreneurship development in a KBE – Singapore's experience.	**Mr. Michael Leung Yau Chee** Managing Director SME TechVenture Pte Ltd
Thailand Technology and innovation management toward the knowledge-based industry.	**Mr. Sommit Kotarawibul** Assistant Director National Metal and Materials Technology Center (MTEC)
Vietnam Knowledge management consultancy for the Vietnam Productivity Centre – Key findings and recommendations.	**Mr. Le Sy Trung** Consultant Vietnam Productivity Centre **Mr. Hong Hai Duong** Chairman Goldsun Group

Annex 3

Symposium on Entrepreneurship in Knowledge-based Industry

(23 – 26 July 2002, Taipei, ROC)

List of Participants

Bangladesh

Mr. Shabbir Ahmed Khan
Senior Vice President
The Dhaka Chamber of Commerce & Industry
65-66, Motijheel Commercial Area
Dhaka 1000
Tel: 880-2-9552562
Fax: 880-2-9550103
e-mail: sak@bol-online.com

India

Mr. Tilak Raj Sarangal
Director & Secretary
Directorate of Industries & Commerce
Government of Punjab State, India
Udyog Bhawan, Sec.17
Chandigarh, Punjab
Tel: 91-172-701214
Fax: 91-172-712636/701363
e-mail: dic@punjabmail.gov.in / trsarangal@rediffmail.com

Mr. J. S. Sethi
Senior Deputy General Manager
Bharat Heavy Electricals Limited
Power Sector, Management Services
Bhel House, Sirifort, New Delhi 110049
Tel: 91-11-6001202
Fax: 91-11-6493612
e-mail: asdmsx@asiad.bhel.co.in

Indonesia

Mr. Takarianto Ari
Director
PT. RTM Global Integration
Plaza DM (Mashill) 25 F
Jl. Jend Sudirman Kav. 25
Jakarta 12920
Tel: 62-21-5268008
Fax: 62-21-5268009
e-mail: ari.takarianto@rtmglobal.com

Malaysia

Mr. Kamis bin Mahawi
Coordinator
Furniture Industry Technology Center
Majlis Amanah Rakyat (MARA)
Tingkat 17, Medan MARA
Jalan Raja Lant
50609 Kuala Lumpur
Tel: 60-3-26915111
Fax: 60-3-26910377
e-mail: kamis@mara.gov.my

Mongolia

Mr. S. Sainbat
Deputy Director
Department of Electronic
Nomin Holding Company
7F, State Department Store
Peace Avenue 44
Sukhbaatar District
Ulaanbaatar
Tel: 976-11-313232
Fax: 976-11-314242
e-mail: sainbat@nomin.net

Nepal

Mr. Dilip Thapa
Manager
Human Resource Development
Industrial Enterprise Development Institute
P.O. Box 3676
Tripureshwor, Kathmandu
Tel: 977-1-266162
Fax: 977-1-261241
e-mail: iedisti@mos.com.np

Mr. Kunj Bihari Kayal
Deputy General Manager
Nepal Industrial Development Corporation
Durbar Marg
P.O. Box 10
Kathmandu
Tel: 977-1-222560
Fax: 977-1-227428
e-mail: Kayal@ccsl.com.np / kbkayal@hotmail.com

Philippines

Ms. Ma. Teresa U. Bagaman
Vice-President
Philippine Society for Quality
Suite 3-2, Sunshine Condominium
9633 Kamagong Street
Makati, Metro Manila
Tel: 632-6322424
Fax: 632-6322053
e-mail: mtbagaman@smg.sanmiguel.com.ph

Singapore

Mr. Michael Leung Yau Chee
Managing Director
SME Techventure Pte Ltd.
11 Level 2, Changi North Street 1
Changi North Industry Estate
Singapore 498823
Tel: 65-67689887
Fax: 65-65422900
e-mail: michael@smeventure.com

Thailand

Mr. Sommit Kotarawibul
Assistant Director
National Metal and
Materials Technology Center (MTEC)
114 Paholyothin Road
Klong 1, Klong Luang
Pathumthani 12120
Tel: 66-2-564-6500
Fax: 66-2-564-6501/5
e-mail: sommit@mtec.or.th

Vietnam

Mr. Le Sy Trung
Consultant
Vietnam Productivity Centre
8 Hoang Quoc Viet
Cau Giay, Nanoi
Tel: 84-4-7561501
Fax: 84-4-7561502
e-mail: vpc@fpt.vn

Mr. Hoang Hai Duong
Chairman
Goldsun Group
14F Fortuna Tower
6B Lang Ha
Ba Dinh District
Hanoi City
Tel: 84-4-7760760
Fax: 84-4-7760761

Annex 4

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APO Resource Persons

Dato Mustafa bin Mansur
Executive Chairman
Manewtech-Belle Sdn. Bhd.
c/o Soltronic Sdn Bhd
SD32, Jalan Kip 10, Taman Industrian Kepong
52200 Kuala Lumpur
Malaysia
Tel: 60-3-62751336
Fax: 60-3-62741336
e-mail: musalfa@hotmail.com / musalfa@pd.jaring.my

Prof. Tan Wee Liang
Professor
Singapore Management University
Tanglin Post Office
P.O. Box 257
Singapore 912409
Tel: 65-64650157
Fax: 65-68220101
e-mail: wltan@smu.edu.sg

Dr. Moon-Kyum Kim
Professor of Entrepreneurial Finance
School of Entrepreneurship and SME Management Soongsil University
1-1, Sangdo-Dong, Dongjak-ku
Seoul, Republic of Korea
Tel: 82-2-820-0567
Fax: 82-2-824-4384
e-mail: mgkim@saint.ssu.ac.kr