# Coversheet Information for Submission

## Full Paper for the XXVII IASP World Conference on Science and Technology Parks, 2011

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☑️ I confirm my ability to present my paper in English

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Keeping and managing the Human Capital in STPs; the challenge of STPs and their programs to overcome this problem

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Introduction

Today we are in the age of human capital -- and of tight labor markets. Most companies and organizations have finally realized that competitive advantage resides mostly in people, and that finding and keeping good managers and employees is a strategic necessity. As the economy slowly begins to awaken from the recent recession, human capital leadership and challenges, such as keeping employees engaged, managing human capital risk and developing future leaders remain at the forefront of both the marketing and public consciousness.

But how do you attract and retain the best and the brightest when the competition for people is so brutal? How to recruit the best people to work for you and how to keep them stay longer, the changing environment of executive compensation, developing and maintaining future leaders, keeping employees engaged, etc have become big issues today. Finding and keeping good people will be even tougher in the future and according to a research over 20 years by the Saratoga Institute, 85% of individuals leave their organizations for reasons other than pay, including:

- Poor supervisor skills and attitudes
- No perceived growth opportunity
- Inability to speak freely about one’s concerns
- the job itself

Nearly all businesses are looking to do more with fewer resources, and do it better, cheaper and faster. For example in the third item above -- driving out fear and building trust is one way to create an environment where innovation and creativity can flourish. And that is where supervisor and manager performance significantly impacts the culture of the organization.

In science & technology parks and technology business incubators, there are supportive structures for supporting the ideas of those who enter these organizations and there are also supportive packages for commercialization of those ideas. In this way the ideas could lead to innovation that is of most important importance today in economic development and flourishing the social development. So the origin of a successful society is its residents and people. It is the people who make things happen in the first place and "it is the people that matter" \(^1\).

Where ever there is a successful organization and a successful society, there are the right people behind it, both in managerial and leadership position and those in the context of that environment.

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\(^1\) - Prof. Stephen Hill, IASP-ASPA Conference 2010, Perth, Western Australia
Therefore, there should be a change in the current trend of most societies in their approach and behaviour toward people. There should be a change from adopting and recruiting seniority and connection based people toward recruiting people based on their merits and performances. It is not easy specially for a science park to recruit the right people and to replace the existing and experienced ones with new comers and other people. It is important to have the right people at the right time for doing and succeeding your business.

Different countries have adopted different strategies in this regard. The cases of Iran and Taiwan will be discussed in this paper.

**In IRAN**

Like many developing countries, since 70's, Iran has suffered from brain drain. The most talented people in the country got scholarships from foreign universities specially US and Canada or migrated to these countries for advanced studies or working. After graduation or success in their work, only a few of them returned to Iran and those stayed in those countries made great scientific and economic contributions to those countries.

The Iranian government has taken several measures to solve the problem and to use the great potentials and capabilities of these people abroad. Formation of the High Council of Iranian Expatriates, formation of Elites National Foundation in 2004, establishment of science and technology parks, formation of the Scientific and Educational Workgroup Secretariat, brain circulation program and management are some of the programs and measures taken by Iranian government to attract the talent Iranians abroad and also satisfying the needs of the talents inside the country.

**Managing Brain Circulation and Human Capital in Iran**

Along with global changes and the advent of knowledge-based economy, the traditional trend of losing talents or brain drain has been replaced by brain circulation and managing talents. In every society there are scientists and talents that go to other countries and decide to live there. However, this could be an opportunity or a threat for that society depending on the government's and society's approach toward it. The Iranian government in recent years has taken this as an important opportunity for the country to use the potentials and knowledge of the Iranian scientists living abroad.

The International and Scientific Cooperation Office of the Ministry of Science, Research and Technology has embarked on new programs to manage the talents. Formation of the High Council of Iranian Expatriates with a scientific and educational workgroup is one of them. A data bank of all Iranian scientists has been prepared through which more than 11,000 Iranian scientists and researchers are connected to their peers in universities inside the country.

Meanwhile, through a recent program by the government, the talent Iranians are invited to Iran to establish their links and relations with their peers in the country. The meeting was named "The Great Meeting of Iranians". The invitation was also welcomed by Iranian and quite a large number of them participated in the first two meetings. It was more than 30 years that some of them had not visited their homeland. These visits made it possible for both sides to exchange views, knowledge and experiences. It was interesting and beneficial to both groups

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2 - Jong-In Choi, Daedeok Innopolis Venture Association
and made the brain circulation project more operational in the country. Some of them were really interested to work in their county and help its development and they soon established scientific collaboration with universities.

The government is developing new rules on methods of this scientific cooperation between Iranian scientists abroad and the domestic universities. These relations and brain circulation has many advantages for the country among them we can refer to the followings:

- Through this collaboration they will cause their country to enter and share in science and technology global network and enjoy its outcomes specially in knowledge-based economy,
- They strengthen the flow of knowledge and investment from around the globe toward their country,
- They expand the scientific and development cooperation of their society and promote it to the international level, etc.

Meanwhile, the National Elites Foundation was formed to do necessary planning and policy making for identifying and directing talents as well as financial and intellectual support of talents, attracting them and collaborating with them for promoting the production of science and technology and scientific development of the country. It is on the agenda that this Foundation establish branches in all Iranian provinces to support them and provide necessary services to them.

**Establishing Science & Technology Parks, ISTT as the first one**

Science & technology parks and incubators have an age of about one decade in Iran and they are still new phenomena in this country. However, they have had significant growth during this time. The following diagrams show the trend of growth in the number of incubators and science parks in Iran.

![Trend of growth in the number of incubators in Iran](Source: ISTT Budget & Planning Dept)
The aim of science parks in Iran is to help development of knowledge-based businesses and increasing the scientific-economic capabilities of the country as well as creating incentives and managing the flow of knowledge and technology. As it is observed, they are all to improve the economic environment of the country so as to attract more people to move back to country and to promote the economic development of the country. Isfahan Science & Technology Town (ISTT) was the first science town established in Iran with the vision to be the key organization for development of Isfahan Region by attracting human resources and creating a knowledge-based society through establishing a special technology zone within the next years. Therefore, attracting human capital has been of the utmost importance in science parks and in ISTT in particular. Today, ISTT is the home of more than 230 knowledge-based companies with more than 4000 part time and full time employees. This prepares the ground for attracting talents to the country which has been recently embarked on new programs in this regard.

We are witnessing the effectiveness of these programs through the increasing the number of expatriates applying for cooperation with their peers in the country in the year 2010. The Iranian STPs and ISTT are also going to create more incentives to help the brain gain. Defining joint projects between ISTT tenants and staff and the expatriates, inviting the expatriates to conduct training workshops and seminars on different fields of their specializations for knowledge-based companies and other STPs and incubators, offering them spaces in science park and providing necessary services to them, offering them the companies' stock bonus, sufficient supply of qualified employers from the neighboring universities including Isfahan University of Technology, the Provincial Research Network, ISTT to the companies established by expatriates and possibilities for performing joint research projects, etc are some of these programs and incentives which are on the agenda today.

Of course, like any other new action, this endeavor has also its own challenges which are investigated and addressed by the authorities and those responsible in that area. For example, since science and technology parks are still new entities in Iran, they are still at the initial stages of defining new rules and regulations for supporting the expatriates and other foreign companies. On the other hand, it takes some more time to convince the expatriates to return to their country and define method of collaboration with them. There are of course more challenges which are not addressed here and they could be referenced as topics for further
research and investigation in the field. Meanwhile, the future challenges will be appeared when the project become more operational.

**In Taiwan**

Starting from the 60’s, Taiwan like many developing countries suffered from brain drain. The most talented students in the country got scholarships from the universities in the United States, and went abroad for advanced studies. The popular saying 「Come, come, come, come to the Taiwan University; go, go, go, go the United States」 vividly portrayed the unique phenomena at that time. The superior living environment and better career opportunities attracted these students to settle down in the USA after graduation, only 8% of them returned to Taiwan upon completing their studies. Those who stayed has made great contribution to American economy and society. For example, people said Silicon Valley is built on ICs, not Integrated Circuits, but Indian and Chinese (Before 1980, most of the Chinese in Silicon Valley were form Taiwan).

Taiwanese government took several measures hoping to reverse the trend, such as
(1) recruiting overseas talents to teach in the universities or to find jobs in public organizations with better financial offers, like allowance for travel expense, wages, housing, research expense, children’s education, etc. since 1960;
(2) making long-term investment in public infrastructure to improve the economic environment so as to attract more people to move back since 1970;
(3) establishing Hsinchu science parks in 1980.

These measures proved to be effective, and the number of returned expatriates increased, although not many, year by year. The Figure 1 below showed the increasing number of talents returned to Taiwan, and the number has increased substantially since 1990 (The number after 1995 was not available because the agency in charge no longer provided the statistics.)

![Figure 1: No. of Returned Expatriates each year](image-url)
Establishment of Hsinchu Science Park

Inspired by Silicon Valley, Taiwan Government officials consulted the father of Silicon Valley Prof. Frederick Terman, and received valuable advice to set up high-tech cluster in Taiwan. Hsinchu Science Park (HSP) was established in 1980 under the circumstances with an aim of creating a center for the development of high-tech industries in Taiwan. One of its missions was to attract hi-tech companies and expatriate professionals to the park and to facilitate them to take-roots in Taiwan. The Park was run by the Science Park Administration, an agency under ministry-level National Science Council, therefore, it got fully support from the government and was able to provide the best environment for investors, including sound infrastructure, good facilities for both working and living, tax incentives, and a professional management team. It successfully attracted Wang Laboratories, an American based company established by overseas Chinese Dr. An Wang, to be its first tenant.

Today HSP is the home of 450 high-tech companies with more than 139 thousands employees. Like talent magnet it attracts high-tech professionals both from local and abroad. In addition, one forth of the companies were founded by returned expatriates. For example, Dr. Morris Chang, MIT Ph.D. and the former Group Vice President of Texas Instruments, founded Taiwan Semiconductor Manufacturing Corporation (TSMC) in 1987, and led the TSMC to become the largest company in HSP and the world leading dedicated semiconductor foundry today.

The story of Macronix International is a legend in HSP. Stanford-educated Miin Wu, with years of working experience in Intel, VLSI, and other high-tech companies in Silicon Valley, brought back 28 Taiwanese semiconductor professionals and their family to set up the Maxcronix in Hsinchu in 1989. Ten years later the company become the world #1 Mask ROM supplier, and it was the first Taiwanese company that went public on NASDAQ.

Similar stories took place in HSP over and over. Taiwanese students got diplomas from noted Universities in USA, worked for international high-tech companies for many years and accumulated their skills, experience and contacts. When the investment environment in their homeland improved, they went back home to start their own companies. “Combinations of U.S. know-how and Taiwanese entrepreneurship, engineering and manufacturing skill are creating enormous new wealth on this island” (Andrew Tanzer). The natural born entrepreneurship spirit encouraged the trend. Unlike Japanese and Korean people who like to find jobs in large enterprises, Taiwanese like to have their personal business, therefore over 98% of the companies in Taiwan are SMEs. This entrepreneurship spirit gave them the courage to abandon the successful career and stable life in the States to pursue an unknown future – to establish a company of his own.

Main Incentives Provided by HSP

The Figure 2 shows the accumulated number of returnees in Hsinchu Science Park. But it did take a long way and many efforts to get to this far. There were only 223 persons returned from abroad to work or to found companies in the park in the first ten years since the park started, but by the end of second decades, the accumulated number skyrocketed to 5025. What were the reasons that helped the brain gain?
In addition to the improvement of economic environment, there were other incentives that helped the recruitment of entrepreneurs and professionals to the park.

1. Incentive for relocating or forming companies in the HSP

   (1) Good invest environment:
   The park offered sound infrastructures and facilities, such as land parcel or office space for lease, sufficient supply of power and water, waste water treatment plant, employees training course, bridging cooperation with academia, around the clock customs service, etc.

   (2) Financial incentives:
   Taiwanese government offered financial incentives to park companies, including 5 years tax holiday, low income tax, no import duty, R&D grants, low interest loan, and government’s venture fund.

   (3) Sufficient supply of qualified employees:
   Neighboring prestige universities Tsing-Hua and Chiao-tung, the national leading research institute ITRI, plus the national research laboratories located in the park offered qualified engineer graduates and searchers to park companies, and possibilities for joint research projects.

2. Incentives to attract high-tech professionals

   (1) Comfortable working and living environment
   Hsinchu Science Park provided necessary facilities to returned talents and other employees, including park like residential area, villa and apartments for rent, recreation facilities, shuttle buses, bilingual school from for employees’ children, and many other.

   (2) Employee stock bonus/option
   Many researchers agree that the employee stock bonus system which began at UMC in Hsinchu Science Park was the most influential measure to lure back the high-tech professional from abroad and attract the most talented employees from local.

   Traditionally a company will distribute 5% of its profits to reward its employees by cash, while UMC began to distribute about 25% of its profit to reward its employees by
stock. It is not uncommon that the value of employee stock bonus one obtained worth much more than one’s salary. Because of this, employees worked very hard and were loyal to the company, and to retired at the age of 40 with a fortune become the dream of many park employees.

The returned expatriates together with local employees helped to build Hsinchu Science Park to be Taiwan’s most valuable asset, and made great contribution to country’s economic growth. This example showed that the outflow of talents in early year was not necessarily a loss; rather, it could be regarded as to store talents in the developed countries, and gained them back when they become stronger and more powerful, and were able to make more contribution.

New Challenges in the future

For many years Taiwan’s industries relied on the strong support from returned expatriates and overseas professionals. Although the support is still there, this advantage is losing gradually because the size of the talent pool abroad is shrinking. Less and less students want to study or work abroad, because local companies can offer good job and salary, and the idea of going abroad becomes less attractive.

Moreover, the raise of China in recent years has changed the direction of global talent flows. The United States used to attract talents from all over the world to chase the American dream – freedom, good education, the pursuit of happiness and good life, while China today attracts people because of its huge market and chance of success. As its close neighbor and of same ethnic origin and cultural background, Taiwan has been influenced greatly by the new situation. Today over one million Taiwanese work or live in China, and the number is still increasing. It is obvious that another wave of brain drain is taking place.

The low marriage rate and birth rate in Taiwan makes the population issue more complicated. Taiwan has the lowest fertility rate in the world in 2010: an average 0.91 child per woman, and the shrinking birth will threaten the country’s productivity in the near future.

Therefore new measures have been taken to improve the situation, such as

1. Encouraging more students to study abroad by student exchange for under graduate, and by offering scholarship to graduate students.
2. Offering scholarships to students from other countries.
3. Modification of immigration law in order to attract more foreign talents, such as offering working permit or permanent resident permit to skilled workers, simplified the application process, etc.
4. Loosing the constraint of hiring Chinese talents - which is not allowed because of political confront of both sides in the past.

It will take some time to know if the new measures will be effective.

Conclusion and Wrap Up

Human capital is considered as one of the most important sources of growth in the world. Countries, organizations and companies are embarking on new measures to keep their talents and their effective workforce and to use the potentials and capabilities of those who have migrated to other countries. Proper management of human assets, providing job incentives including good wages, organizational promotions, providing opportunities for development, etc are some of the measures taken to satisfy the existing human capital in organizations inside the country. As for those talents living abroad, the national authorities and organizations in the
countries have introduced different initiatives including brain circulation programs, establishing science and technology parks, establishing special foundations, defining ways of collaboration and recruiting them in universities, etc. These could be summarized below:

Incentives and measures for preserving human capital inside the country:

- Training those who want to effectively manage other people to produce superior business results
- Organizing training courses for managers on Leadership and Organizational Behaviour and organizational requirements
- Building trust in their employer
- Proper management of human assets in different aspects including providing behavioural, financial, environmental, and work incentives, providing opportunities for growth and contribution, and listening to them, then training them
- Providing special offers to knowledge workers

Incentives and measures for Attracting those outside:

- Implementing Brain circulation programs
- Establishing science and technology parks
- Establishing Talents Foundations
- Creating incentives in their homelands
- Building scientific networks of expatriates with their peers inside the country
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