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Sustainable Development of Technology in Iran: The Role of Pardis Technology Park (PTP)

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Sustainable Development of Technology in Iran: The Role of Pardis Technology Park (PTP)

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Abstract

Sustainable development of Technology is creating a better life for all people based on principles of equity in the way those resources are used. The concept of Sustainable Development has evolved from a mere definition (1987) to a plan of action (UN Conference on Environment and Development, Rio, 1992), and then to a roadmap for implementation (World Summit on Sustainable Development, Johannesburg, 2002). The three 'pillars' of sustainable development, commonly known as the three bottom line, are namely Economic, Socio-Culture and Environment are now accepted worldwide and is hailed as an important aspect of the Millennium Development Goals (MDGs) set forth by the United Nations .

In this article, I presented a descriptive analysis of the status of sustainable Development and the role of Pardis Technology Park to enhance Sustainable Technology Development were also analyzed based on published data, reports and journals. Also summarized the major findings and synthesized the learning of the study from across different methods used, followed by the recommendations and implications of this research for its Variables.

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1. Introduction

Sustainable Development is often an over-used word, but involves a number of inter-related global issues such as poverty, inequality, hunger and environmental degradation etc.,(Kumari, 1987:1) To achieve sustainable development the three pillars economic, social (culture) and environmental must be integrated in a balanced way(Butler, 1993) . Conserving land and water resources, protecting biodiversity and managing agricultural heritage systems are very important for sustainable development (Mamhoori, 2015). There is no inherent contradiction between environment and development, and that these two concerns should be mutually supportive. Protection of the environment should not be seen as a sectorial interest but as an integrated component in all economic and social development. A sound management of natural resources, energy saving and a population size in harmony with the productive potential of the ecosystems will automatically result in sustainable development (UNCED, 1992).

Table 1: List of Macro and Micro Variables used in the Research

S. No	Macro Variables	Micro Variables	References
1	**Economic Factors(EC)** **(3 micro variables)**	Benefits to Local Community(BLC)	GSTCI (2009), Butler (1993), UNCED (1992), World Economic Forum-WEF (2015), WTTC (2014) - World Economic Forum-WEF. (2014) (2015), UNCTAD(2016), UNEP(2016), UNESCO(2015), UNIDO(2016),
		Employment Opportunities (EOP)	United Nations –UNCTD. (2016), Global Sustainable Tourism Criteria and Indicators-GSTCI (2009), WEF (2014), United Nations-UNCED (1992).
		Sustainable Infrastructure(SI)	Butler (1993), World Economic Forum-WEF(2014),World Tourism Organization -UNWTO (1997),World Travel & Tourism Council- WTTC (2014), (GSTC, 2011; STCI; 2012; 2014).

2	**Environmental Factors (EV)** **(2 micro variables)**	Conserving Recourses/ Diversity (CR)	GSTCI (2009), World Commission on Environment and Development-UNCED (1992; 1987).
		Reducing Pollution (RP)	Butler (1993), UNCED (1992), WTTC (2014), GSTC (2011), World Commission on Environment and Development (1987), STCI (2012; 2014), World Economic Forum-WEF. (2014).
3	**Socio-Cultural Factors (SC)** **(2 micro variables)**	Community Participation and development (CPD)	GSTCI (2009), WEF (2014), Global Sustainable Tourism Criteria and Indicators-GSTCI (2009), WTTC (2014), World Commission on Environment and Development-WCED (1987).
4	**Sustainable Technology Development (STD)** **(2 micro variables)**	Sustainable Management Practices (SMP)	World Commission on Environment and Development (1987), GSTCI (2009), Global Sustainable Tourism Criteria and Indicators-GSTCI (2009), WTTC (2014), World Commission on Environment and Development-UNCED (1987).
		Extent of Sustainable Development (ESD)	Global Sustainable Tourism Criteria and Indicators-GSTCI (2009),Butler (1993), GSTCI (2009), World Economic Forum-WEF (2014), WTTC, (2014), GSTC (2011), STCI (2012; 2014).

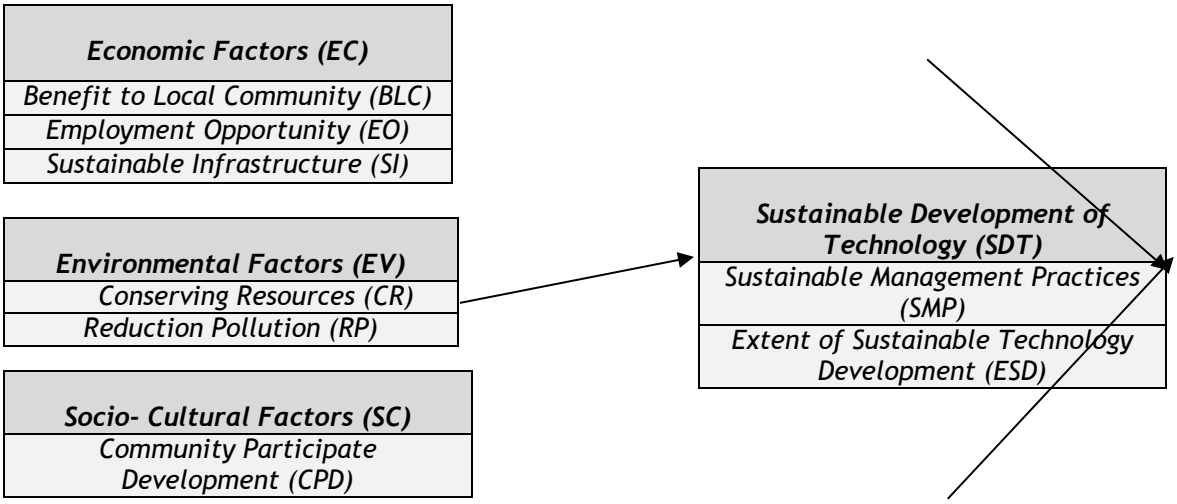
Source: Adapted from Ph.D. Thesis of STD, Ali Mamhoori, 2015

2. Conceptual Framework of Research

As drawn from sustainability and Technology Development, the basic premise of this research is sustainable technology in Iran can be leveraged by managing its triple bottom line - Economic, Environmental, and Socio-Cultural dimensions. Four broad sets of macro research constructs namely - Economic Factors, Environmental Factors, Socio-Cultural Factors, and Sustainable Technology Development Factors have been used, as explained in advance. The basic framework of this research attempts to delineate relationships between dimensions of sustainable technology on one hand and the extent of Sustainable Technology Development on the other.

Thus, the broad conceptual framework for the research hypothesizing possible linkage of the independent variables – Economic Factors, Environmental Factors, Socio-Cultural Factors with the dependent variables - Sustainable Technology Development Factors (Sustainable Management Practices and Extent of Sustainable Development) in the context of Iran, is depicted in Figure 1.

Figure 1: Conceptual Research Framework



3. Macro and Micro Variables of Sustainable Development of Technology

3.1 Macro Constructs

3.1.1Economic Factors

Economic Factors refer to all the economic benefits envisaged with the implementation of Sustainable Development. Direct economic benefits include creation of employment opportunities and income generation (foreign exchange) especially in case of international Income. This further leads to improved living standards of the local community and overall national and regional economic development as well (Allen, 1980; Elliott, 1994, Schmidt, 2011). Increased government revenues, through various types of taxation on Incomes, can be used to develop infrastructural facilities and services etc. especially in the economically backward areas, thus, adding to the overall economic development. Economic benefits are usually the primary reasons for developing sustainable development of Technology.

Thus, for the purpose of the study under consideration, Economic Factors is defined to comprise of three micro variables: Benefits to Local Community, creation of Employment Opportunities and Sustainable Infrastructure.

3.1.2Environmental Factors

Emphasizing self- perpetuating limits of its environment (Coomer, 1979 & Turner,1988), maintaining their long –term viability (Brundtland Report, 1987& Eber, 1992) and highlighting the significance of policy prescriptions and management methods for development such that environmental resource base is protected for future development (Lane, 1994, Hunter, 1997, Wackernagel & Rees, 1996) have been the core of Sustainable development agenda. Environmental dimension of sustainable ensures that its development is compatible with the preservation of essential ecology, biological diversity; protect the environment and biological resources.

Thus, for the purpose of the study under consideration, Environmental Factors is defined to comprise of two micro variables: Conserving Resources (CR) and Reduction Pollution (RP), because it has direct influence to Sustainable Development of Technology in Iran.

3.1.2 Socio-Cultural Factors

Focus on Social and cultural sustainability has been an inherent part of the triple bottom line of sustainable development (Brundtland Report, 1987 & Brundtland Committee, 1990). The output of the program includes imparting of education, both community education (sometimes called public

awareness programs) and education about the local society and cultural traditions. Thus, Socio-Cultural Factors ensure that development and well-suited with the culture and values of the people affected by it.

Thus, for the purpose of the study under consideration, Socio-Cultural Factors is defined to comprise of one micro variables: Community Participation and Development (GSTC, 2011; STCI, 2012, 2014).

3.2Micro Variables

Each of the four macro variables described above are constituted by micro variables which are explained below:

3.2.1Micro Variables Related to Economic Factors

Three micro variables related to Economic Factors have been identified from the literature and the criteria and indicators established .They are defined in the context of the research as follows*:*

3.2.2Benefits to Local Community (BLC)

If Technology is to be sustainable, it must improve the lives and health of local people; and offer them a better future. In many instances, technology can be seen as a vehicle to empower local communities and protect the environment by creating renewable energy and keep the people comfortable, developing and sustaining of local economies, preserving indigenous knowledge and practices, creating public awareness and education. Sustainable technology can help create positive opportunities for community development in remote areas.

This micro variable captures the benefits to local community such as health residents, purchasing local services and goods, encouraging the means for local small entrepreneurs to develop and sell sustainable products that are based on the renewable and clean energy (GSTC, 2011; STCI, 2012, 2014).

3.2.3 Employment Opportunities (EOP)

One of the direct economic benefits envisaged from sustainable technology is the creation of employment opportunities and generation of income especially in case of modern products. This further leads to improved living standards of the local community and overall national and regional economic development as well (Allen, 1980; Elliott, 1994, Schmidt, 2011).

The micro variable- *Employment Opportunities (EOP)* - captures the extent of equal opportunities in recruitment and career growth to all segments of society irrespective of caste creed religion ethnicity and gender by the organizations involved in talent and that all employees including contractual labor are treated in accordance with national legislation and are paid a fair wage (GSTC, 2011; STCI, 2012, 2014).

3.2.4 Sustainable Infrastructure (SI)

Economic benefits, especially developing sustainable infrastructure are usually the primary reasons for developing sustainable technology. Increased government revenues, through various types of export high tech products, can be used to develop infrastructural facilities and services etc. Especially in the economically backward areas, thus, adding to the overall economic development.

The micro economic variable- *Sustainable Infrastructure (SI)*- measures the perception whether the design and construction of buildings and infrastructure comply with land usage and protected or heritage area requirements and respect the natural, cultural, social, built and heritage surroundings in siting, design, impact assessment, land rights and acquisition.

3.2.5 Micro Variables Related to Environmental Factors

Two micro variables related to Environmental Factors have been identified and the criteria and indicators established as follows*:*

3.2.6 Conserving Recourses (CR)

Environment, especially Conserving Recourses (CR) is usually the primary reasons for developing sustainable technology development. Encouraging the use of renewable energy, management plan is implemented with quantitative goals to minimize waste, can be used to develop sustainable technology and other services etc. especially in the environmentally backward areas, thus, adding to the overall technology development.

This micro environment variable captures whether the organizations in technology strive for energy and water consumption by measuring it and attempt to decrease overall consumption, while encouraging the use of renewable energy and encouraging rainwater harvesting wherever water tables have been receding (GSTC, 2011; STCI, 2012, 2014).

3.2.7 Reducing Pollution (RP)

Reducing Pollution (RP) is usually the main reason for developing sustainable technology development. Encouraging the use of encouraging the use of renewable energy and rainwater harvesting can be used to develop environment, adding to the overall technology development.

This micro environment variable captures whether the organizations in technology implements plans to identify greenhouse gas emission under its control and activate measures to offset it, whether wastewater including gray water is treated effectively and reused where possible and that a solid waste management plan is implemented with quantitative goals to minimize waste that is non-biodegradable, not reused or recycled (GSTC, 2011; STCI, 2012, 2014).

3.2.8 Micro Variables Related to Socio-Cultural Factors

Two micro variables related to Socio-Cultural Factors have been identified and the criteria and indicators established. (STCI, 2012, 2014) They are defined in the context of the research as follows*:*

3.2.9 Community Participation and development

Community Participation (CP) and development is an important imperative for developing sustainable technology development. Sustainable technology should result in community development including among others, infrastructure, education, health, and sanitation which strengthens the socio-cultural environment, adding to the overall technology development.

This micro socio-cultural variable captures whether the organizations actively supports initiatives for social and community participation and development including among others, infrastructure, education, health, and sanitation and ensures that a code of behavior for activities in local communities has been developed with the consent of and in collaboration with the community (GSTC, 2011; STCI, 2012, 2014).

This micro socio-cultural variable captures whether the organizations ensure that historical and archaeological artifacts are not sold traded or displayed, except as permitted by law and that the intellectual property rights of local communities is/will be respected whenever the organization uses elements of local art and tradition architecture or cultural heritage in its operations design, decoration, food or shops (GSTC, 2011; STCI, 2012, 2014).

3.2.10 Micro Variables Related to Sustainable Technology Development

Two micro variables related to Sustainable Technology Development Factors have been identified from the literature and the criteria and indicators established (STCI, 2012, 2014) they are defined in the context of the research as follows*:*

3.2.11Sustainable Management Practices (SMP)

Sustainable Management Practices (SMP) is one of the indicators of technology sustainable. This micro dependent variable captures whether the organizations has implemented a long – term Sustainability Management System that considers environmental, socio-cultural, quality, health and safety issues, is in compliance with all relevant national legislation and regulations and ensures that people satisfaction is measured and corrective action is taken, where appropriate (STCI, 2012, 2014).

3.2.12 Extent of Sustainable Development (ESD)

Extent of Sustainable Development (ESD) is the actual extent to which sustainable technology development has taken place in Iran's context as per the perception of the surveyed stakeholders in the technology park segment. This micro dependent variable captures the extent to which economic benefits to the local community is accrued, employment opportunities for the local residents of technology parks is created, design and construction of infrastructural facilities for technology is sustainable, conservation of natural resources is undertaken by minimizing the consumption and waste and environmentally friendly practices adopted that lead to reduction in pollution. It also captures extent to which efforts are undertaken to conserve diversity and ecosystem, ensure community participation and development, and preservation of cultural heritage (STCI, 2012, 2014).

Table 2: Iran's Efficiency enhancers of Environment

S. No	**India's Environmental Sustainability (Sub Indicators)**	**Score 2015**	**Rank**(out of 140 countries)**2018**	**Score 2018**	**Rank**(out of 140 countries)**2018**
1	Environmental Sustainability	3.5	115	3.6	
2	Enforcement of environmental regulations	3.4	99	3.5	93
3	Natural Resources	2.48	98	2.4	100
4	Business Environment	3.9	119	4.5	79
5	Environmental Sustainability	3.5	115	2.3	119
6	Economy	4.3	76	4.27	69
7	Business Environment	3.9	119	4.5	79
8	Human Resources and Labor Market	4.0	114	4.13	105
9	Infrastructure	2.7	105	4.4	89

Source: Adapted from the Global Competitiveness Report, 2016-2018

Besides, strategies followed during the 2024 outlook Plan to take care of the challenges of human resources, there are other concerns as well that needs to be addressed in order to harness the full potential of Iran. This has been reiterated in the recent GCR Report (2015), where the global rank of Iran's ICT Readiness is 98th out of 141 Countries, with a poor score of 3.4. Also, there have been serious concerns about the attitude of local population toward foreign visitors highlighted in the report (Refer to Table 4).

Table 3: Iran's Innovation Competitiveness

S. No	**Iran's Innovation**	**Score 2018**	**Rank 2018**
1	Innovation	3.3	66
2	Capacity for Innovation	3.9	88
3	Quality of Scientific research Institutions	4.0	55
4	Company Spending on R&D	3.3	66
5	University – industry Collaboration in R&D	3.2	94
6	Gov`t Procurement of advanced technology products	3.5	50
7	Availability of Scientists and engineers	4.5	39
8	PCT Patents (applications/million pop	0.3	84

Source: Adapted from the Global Competitiveness Report, 2016-2018

Table 3. Iran's Innovation Competitiveness (IIC) Innovation is seen as the main motor of business competitiveness. Firms of countries that fail to innovate or commercialize new knowledge lag behind. According to the Financial Tribune, Iran's Competitive Index shot up 9 notches between 2014 to 2016, i.e., from 83rd position to 74th position and then stabilized on the 76th rank in 2017. The timeline of this sudden rise is not a coincidence around the JCPOA signed in 2015. The sudden rise and stability is an indicator of the interest of overseas business houses towards Iran. Iran's strongest variable "availability of scientists and engineers" (rank 39) is extremely disproportionate to its weakest variable "university-industry collaboration in R & D" (rank 94). Decreasing this major gap alone can bring up Iran's innovation competitiveness (IIC) up by leaps and bounds. Therefore, immense focus on decreasing this gap will reap great harvest with immediate effect. If applied efficiently the potency of "availability of scientists and engineers" is enough to raise the ranks of all other variables negatively affecting the IIC.

Table 4: Iran's ICT Competitiveness

S. No	Iran's Competitiveness Index of ICT	Score 2015	Rank 2015	Score 2017	Rank 2017
1	ICT Readiness	98	3.4	94	3.79
2	Global Competitiveness Index	74	4.09	76	4.12
3	ICT use for B2B transactions†	131	3.6	116	4.0
4	Internet use for B2C transactions†	115	3.6	106	3.8
5	Mobile broadband subs. per 100 pop.*	123	1.2	109	20.0
6	Mobile network coverage (% pop.)*	94	96.0	112	94.2

Source: Adapted from the Global Competitiveness Report, 2016-2018

Table 4. Iran's ICT Competitiveness (ICTC) The improvement of ICTC is around the same timeline as the improvement of the ICC, even though the advancement of the latter is relatively low and slow. The rank of Iran by the indicator "mobile broadband subs. per 100 pop." fell drastically from 1.2 in 2015 to 20.0 in 2017. Similarly "mobile network coverage" fell from 96 in 2015 to 94.2 in 2017. The IIC or overall "Global Competitive Index" rank was almost unaffected by these shortfalls holding stable at 76. The rest of the variable indicators "ICT readiness", the "ICT use for B2B transactions" and the "internet use for B2C transactions" also fell around the insecurities of the implementation of the JCPOA between 2015 to 2017, but maintained better positions than the previous year. Thus showing optimism in national and foreign trade communities.

4. Sustainable Development of Technology

The roots of 'Sustainable Technology' are based on the concept of 'Sustainable development' which means: "meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development –WCED, 1987).

Sustainable Development of Technology is, creating a better life for all people based on principles of equity in the way those resources are used and in the way in which the benefits obtained from them are distributed. The concept has evolved from a mere definition (1987) to a plan of action (UN Conference on Environment and Development, Rio, 1992), and then to a roadmap for implementation (World Summit on Sustainable Development, Johannesburg- WSSDJ, 2002). The three 'pillars' of sustainable development, commonly known as the three bottom line, are namely Economic, Social and Environmental are now accepted worldwide and is hailed as an important aspect of the Millennium Development Goals (MDGs) set forth by the United Nations (UN annually report,2015).

Sustainable Technology Development is the dependent variable for the study under consideration and captures the perception regarding the status of sustainable technology in Iran by the key players surveyed. Though technology is essentially an economic activity, sustainable technology has become subsumed by the broader notion of Sustainable Development, conceived as technology “"is built not merely through the accumulation of physical capital and human skill, but on a foundation of information, learning and adaptation…” (World Bank, 1999).

"Sustainable technology": Technologies focusing on sustainability principles: resource conservation, reuse and recycling, energy efficiency, minimizing environmental impact and pollution reduction” (NAL Glossary, 2015) and is framed by the domains of environmental integrity, social equity and economic prosperity (Bansal, 2005). Hence, assessing the status of sustainable technology has been defined for the study as a composite measure of sustainable management systems and practices in place and the extent of sustainability initiatives implemented with respect to the economy, environment and socio-cultural dimensions.

Sustainable Technology we take into consideration the environmental impact of the entire life cycle of all the products we design, from raw material extraction to end of life. We also identify and promote innovative products that provide society with environmental and social benefits, such as reducing the energy consumption of end-applications, saving resources, protecting the environment, and providing solutions that improve the end-user’s quality of life. (http://www.st.com)

5. Sustainable Development of technology in Iran

The purpose of the study under consideration, Sustainable Technology Development in Iran is defined to comprise of two micro variables: Sustainable Management Practices and Extent of Sustainable Technology Development perceived by the stakeholder such as: Supreme Council of Cultural Revolution, Vice – presidency for Science and Technology, Ministry of Science, Research and Technology , Iran High-Tech Laboratory Network, Center for Innovation and Technology Cooperation of I.R.I Presidency, Innovation and Prosperity Fund, Iran National Science Foundation, National Elites Foundation, Innovation Acceleration Center, Iranian Venture Association, and Pardis Technology Park.

5.1Science and Technology Parks

Science and Technology (S&T) Parks: At the moment there are 33 science and technology parks throughout the country 87.1% of which are affiliated to the Ministry of Science, Research and Technology. In 2014 there were 174 established science and technology incubators in Iran. Compared to 2005, science and technology incubators increased by more than 27% in 2014.

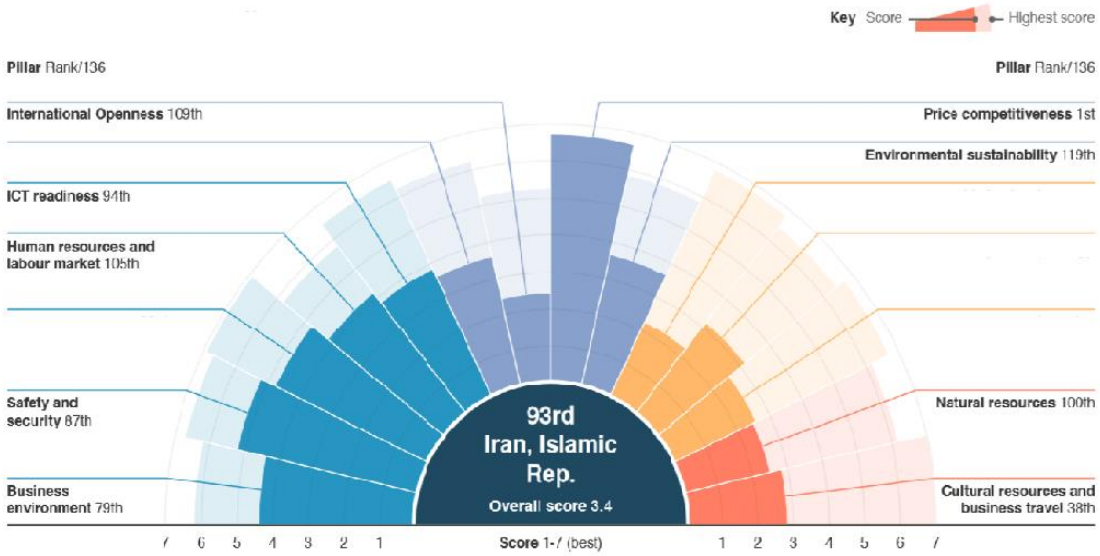
Table 5: List of Technological Achievements in Science and Technology of Islamic Republic of Iran

Technology Field	**Rank in the World**
Biotechnology	14
Agriculture and Biological Sciences	12
Nanotechnology	6
Energy Engineering and Power Technology	6
Fuel Technology	4
Renewable Engines, Sustainability and Environment	16
Ceramics and Composites	12
Electronics, Optical and Magnetic Materials	12
Aerospace Engineering	19

Source: A Brief Representation of Technological Achievements in Islamic Republic of Iran published in Center for Innovation and Technology Cooperation (2016)

The best scale to measure success is to assess things that a country has not achieved. There is no test for strength in the absence of weakness like there would be no test for health with the absence of sickness. Iran ranks 4th in Fuel Technology and 6th in Energy Engineering and Power Technology along with Nanotechnology. However what pulls down the overall performance of technological entrepreneurship is the banking system. Iran has one of the weakest banking systems in the world with a rank of 96 in Logistics Performance Index (LPI) of the World Bank, which was previously 114 in 2014 before the JCPOA. The achievements of Iran in higher education and scientific research is a sign of steady advancement.

Figure2: Performance Overview of Islamic Republic of Iran



Source: Adapted from WEF-TTCR Report, 2017

5.2Pardis Technology Park (PTP)

Pardis Technology Park (PTP) as the region's technology paradise, under supervision of the Vice-Presidency for Science and Technology is located in a 38 hectares area (expandable to 1000 hectares) at 20 km east of Tehran.
PTP is located in Iran's commercial and academic intersection point. Being on the 97 km neighborhood of Imam Khomeini Int'l Airport (IKIA), it is located alongside of main north-south and east-west passages to Europe, central Asia, ECO countries, Persian Gulf, and CIS countries.

PTP is placed alongside of north-south fiber optics network and close to internationally reputable research and academic institutions. Thus, it provides an exclusive opportunity for commercialization of research and innovation in the Middle East, CIS and ECO countries. PTP can therefore contrive the proper grounds for growth of science and innovation-based companies through provision of high-end services, competitive strengthening, incubators, spin-off processes and productive and expert labors.

PTP enjoys more comparative and legal advantages and better potential to become a major center for economic environment and Socio-Culture possesses the requirements for linking to actual and potential global markets and expansion through Iran's international markets. As far as wide group of advantages and privileges are concerned, PTP has provided opportunities to absorb new know-how and proper investment and, concerning its location at the heart of reputable scientific, research and academic centers, it provides a proper environment for small and medium enterprises, R&D units of industrial companies and research institutions to locate and professionally appear in the region.

5.2.1Missions and Objectives

Along with the establishedd goals and tasks assigned by the Vice-Presidency for science and technology, and concerning Park's charter, general objectives and programs of PTP are as the following:

- Commercializing the result of the researches and constructing connections between research, production and service sectors to achieve Sustainable Development of Technology, professional employment capacity increase, technology absorption and upgrading, idea creation, enhancement of management skills, quality gentrification of domestic products and promotion of country's export capacities in high-tech services, and products;
- To accelerate the transfer process of know-how and high technologies (both inside and outside the country);
- To support small and medium size high-tech companies in order to help them expand and to achieve modern industrial development and entrepreneurship;
- To support international collaboration and to exploit global experiences to contrive effective appearance of companies, in global markets;
- To provide special privileges to reduce R&D costs and thereby accelerating the entry process of emerging technologies to global competitive markets;
- To create new research opportunities along with development prospective toward strategic technologies such as Nanotechnology, Biotechnology and Information Technology;
- To attract FDI and to equip domestic capital in order to absorb and to produce modern technology.
- To create a proper context to identify country's technological capabilities and promoting for them through Tech-mart;
- To contrive for idea and technology generators to meet investors in order to facilitate the commercialization of research results through Tech-mart;
- To expand the connections between industry and university in order to upgrade technology and to exploit existing potentials in the universities;
- To execute technical and economic feasibility studies for selected projects using technical and foreign research centers and recommending economic projects to executive projects applicants;
- To collaborate and to cooperate in outsourcing and in-sourcing the projects through the loans from domestic and foreign banks, funds and other possible credit sources;
- To create further added value in technology based production processes;
- Ideal exploitation of all existing potentials in governmental, public and private organizations and utilizing means to help technologic companies to develop and expand into global markets;
- To execute required planning and scheduling for meetings and conferences with academic and research centers and various industrial and productive organizations;
- To establish direct and to close relations with other technology Parks around the world in order to mobilize information flow;

- To create necessary channels for technology exchange including formulation of technology evolution systems, standardization, presenting consulting services on intellectual property, technical knowledge formulation, financing and similar services;
- To gentrify innovation and creative competition culture between member companies in PTP and knowledge-based institutions;
- To contrive grounds for innovation-based start-ups to grow and expand through incubators and spin-off processes;

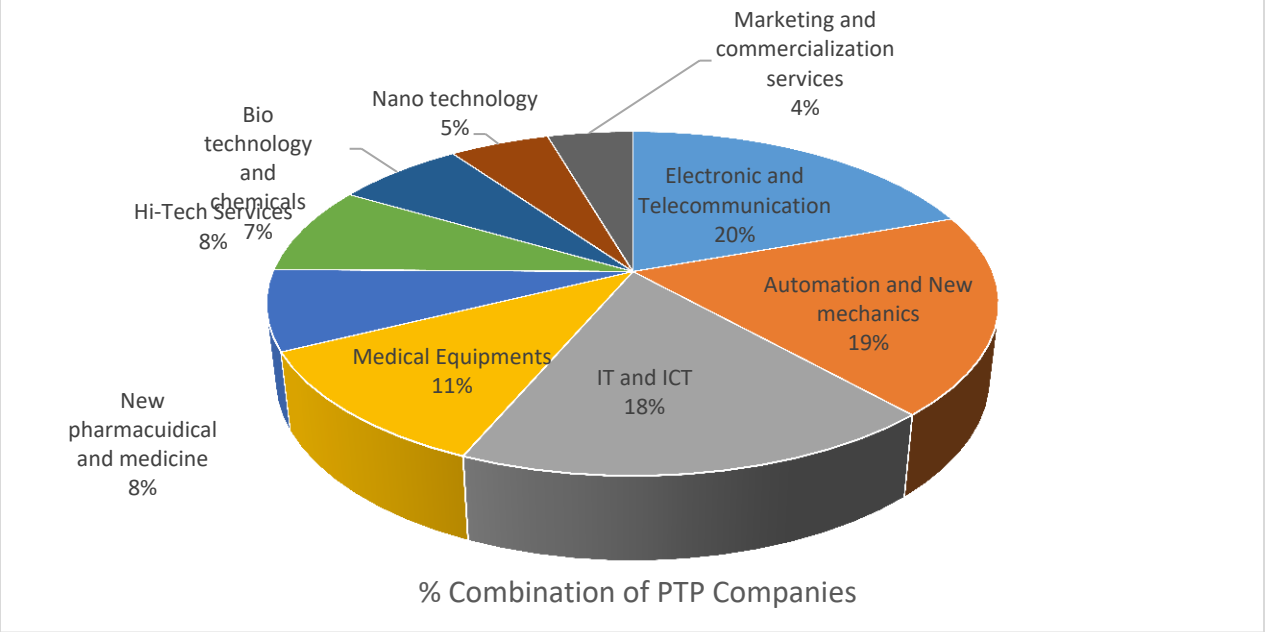
5.2.2Vision

The vision of PTP is to become the most important Technology Free-Zone in the west of Asia.

5.2.3PTP Companies

In 2016 more than 245 Hi-Tech companies are operating in PTP. These companies are rigidly selected out of more than 3000 requests for membership.

Figure3: combination of member companies in PTP



Reference: Pardis Technology Park Administration office

The difference between two extreme variables should suffice to summarize the economic situation and advancement of Iran. The PTP is ranked first in "Price Competitiveness". This single variable alone defines the incredible efficiency and optimum benefit of functions of the main triangle of all aspects of Sustainable Technology Development. Ranking 109 on "International Openness" is a major setback for any organization. However, the single variable of "Price Competitiveness" can be a very powerful incentive to attract international interests in PTP. Given the fact that Iran is a resistance economy, it has performed brilliantly to qualify as the second largest economy in the Middle East. Without the international pressure it would easily be one of the most advanced nations in the world. The example of Iran existing by resisting in the driest deserts of economic weathers is like the metaphorical trees of Imam Ali (A.S.)'s desert for which he says, "The trees of the desert are stronger and more resistant than the soft and smooth trees of the rainy forests." Iran has emerged as the strongest tree, all thanks

to the imposed desert of sanctions. And this tree will last long after the trees of the rainforest economies.

5.2.4 Goals

Fund aims to develop new technologies based on the implementing regulations of the Technology Development Plan approved by the Board is as follows:

- Establishment of private sector participation and investment in research and technology;
- Agencies to aid commercialization process;
- Eliminate the obstacles to their achievements in research and technology;
- Compensate for the gap caused by the lack of a common language between banks and researchers; innovators, especially in technical knowledge matters;
- Creation of new business in the field of advanced technologies with high added value;
- To accelerate the process of transforming ideas into wealth (innovation) and to avoid the usual bureaucracy;

5.2.5 Technology Transfer Facilities

Supports such as financial and special consultant services are being propound to those members who are willing to transfer technology in all the models to/from their member company.

5.2.6 Expert Recruitment

Having a proliferous data bank of experts, this center can help new established companies to employ technical, well-trained experts.

5.2.7 Other services

In line with previous aforementioned services, there are other uncountable services conferring to member companies such as:

- Conducting business plans and feasibility studies;
- Marketing & Market Researches;
- Clearance & customs services;
- Technology Evaluation Services;
- Joint Exhibitions;
- Technology Tours;
- Consultancy in trade & export;
- Facilitation for Producing Prototypes;

5.2.8 Synthesis of Findings and Key Conclusions

As discussed above some of the key conclusions based on the synthesis or combination of results from different types of analysis undertaken for providing recommendation for the emancipation of Pardis Technology Park are enumerated as follows:

- Sustainable development is generally and widely perceived to be associated with the sustainable practices in the economic and environmental aspects of society. Over the last few decades in Iran the economic outcomes of Sustainable Development of Technology such as expansion of Infrastructure, increase in employment generation et cetera have become the focal points of economic growth. Besides these economic aspects environmental issues also have been accorded greater importance. Amplified emphasis on conserving resources and reducing pollution are integral subjects of the descriptive analysis;
- Indicators of both economic and environmental variables of Iran do not compare well with other countries despite being acknowledged as strong predictors of Sustainable Development.

This drawback has been attributed to poor infrastructure and other government policy that have not been properly implemented to address the needs of development (57th out of 137 and value 4.4), (WEF report, and 2017-18). Iran's rank in sustaining Technological readiness (91st out of 137 countries) as compared with other countries is also quite poor;

- Socio-cultural variables, though significantly related to Sustainable Development, are not perceived to be as important as the other two macro variables;
- This is further reflected in the descriptive analysis which indicates that Iran lags behind in the social indicators with poor global ranks in its Human Resources and Labor Market (rank 105) and Innovation and Sophistication (rank89) out of 140 countries;
- Development of sustainable infrastructure, which is identified as one of the key economic micro variables of economic growth, has emerged as the most critical variable affecting Sustainable Development. This is further reiterated in the lower ranking (67th out of 140 countries) of Iran in Technology related infrastructure;
- Among the other micro variables of environmental factors affecting growth, both reducing pollution and conserving resources exhibit strong relationship with Sustainable Development.
- Descriptive analysis, too, identify these factors as the chief cause of Iran's low global ranking especially in areas of: local availability of Specialized Training Service (rank 84 out of 137), Technological Readiness(rank 91) and Innovation (rank 66 out of 137). Therefore, Pardis Technology Park seeks to pay much greater attention and converge more energy and efforts towards conservation and sustainability of natural resources;
- While the Government has been playing the role of formulating policies and legislations for Sustainable Development in Iran, it has yet to create an environment that enables the private sector to operate with more sustainability in the area of Technology;
- Given the significance of the role played by the local community in promoting sustainable development of technology, this role-model needs to be widely replicated;

6. Major Recommendations

Based on the findings summarized and presented above, some major recommendations for Pardis Technology Park to augment Sustainable Development of Technology in Iran can be enumerated as follows:

- One of the key areas of intervention for the development of sustainability in Iran, as highlighted in the conclusions above, is the socio-cultural dimension. While Pardis Technology Park has initiated several social programs and campaigns, a lot more needs to be done to further improve the competitive ranking of the country with respect to social indicators. Some of the ways in which this can be addressed are as follows;
- Pardis Technology Park should reduce the implementation gap with respect to Capacity of Innovation, Company Spending on R&D, Availability of scientists and engineers and PCT patents that are not adequately implemented, and hence do not contribute significantly to actual Sustainable Development of Technology in the Islamic Republic of Iran;
- A stronger mechanism of compliance with sustainable practices, along with a more attractive set of incentives for complying organizations, need to be put in place. For this a greater coordination with service providers is required. Workshops should be organized in collaboration with Pardis Technology Park and other NGOs to sensitize these organizations to the need for it and encourage voluntary compliance;
- The Vice Presidency of Science and Technology should develop a roadmap to engage with the local community and incorporate it as an important criterion in Sustainable Development, in specific ministries as well as those of general concern;
- Service providers should not just plan for passing on economic benefits to the local community, but should directly involve and engage them in offering Technology services. They can collaborate with the local community for offering eco-friendly village Industries, as in other developed countries;
- Government of Iran should encourage Technology Parks directly venturing into sustainable development making businesses, and handhold them for integrating sustainable practices in their offerings;

Despite being a traditionally recognised and strong predictor of Sustainable Economic Development, requires strong policy directions and strategies to compete at the global level. Some major suggestions for enhancing economic sustainability may be listed as follows:

- To focus on developing sustainable infrastructure, in general, and technology infrastructure in particular, is an important way forward. This is expected to have a magnifying effect on not just other economic variables like employment generation and benefits to local people, it will also have positive impact on environmental factors (reduction in pollution) and socio-cultural factors like Community Participation in Development (CPD) etc. These would create in an enhanced image and improved ranking of the country on the global stage. As a result this would increase its overall competitiveness in Sustainable Development of Technology;
- The use of clean energy or renewable energy sources should be promoted. Use of solar panels, wind based or waste based energy system should be encouraged especially in the remote areas.
- The proper accounting of resource use, for both water and electricity, should be encouraged as a part of the sustainable management practices by the involved organizations such as Pardis Technology Park;
- The use of incentives and collaboration with the local community to pass on the benefits of conservation is the key to effective implementation;

7. Conclusion

In summary, improved technology will continue to play a major role in moving humanity towards sustainability. However, relying on improved technology alone is not enough. Iran still needs to reduce individual consumption and stabilize its population. It may be recalled that the key objective of this research journey was to present a viable and validated framework for Sustainable Development of Technology in Iran as a guideline for the ambitions and efforts of Pardis Technology Park. The preliminary phase of the study concentrated on the identification, validation and deeper understanding of the research variables and their relationships.

The results of the investigation strengthen the basic premise of the research that the key features of the triple bottom line of sustainability, that are, Economic, Environmental and Socio-Cultural factors are the significant predictors of Sustainable Technology Development.

Conclusively, this research work can be considered as a step forward in laying the foundations for a more tangible contribution to the analysis of the Sustainable Development of Technology in Iran.

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