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The Role of STPs in Strengthening ICT Contribution to SDGs Achievement

Plenary session 1:

Cities, STPs and other areas of innovation: challenges and strategies

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Executive Summary

The main idea of this paper was to develop an ICT-enabled transformation (IET) analytical framework including all key players and their positions, the levels and types of interactions between players and contextual factors to demonstrate systematically the role of STPs and AOIs in fostering ICT contribution to SDGs achievements. The main focus of IET analytical framework is on describing the levels and types of interactions between its main elements. Interactions between and within various positions of Key players, and contextual factors, all together, accomplish IET analytical framework. The five positions of key players are 1. Supply-side, 2. Facilitating, 3. Demand-side, 4. Policy-making, and 5. Supportive institutions. The four types of interactions between and within players are 1. Information flow, 2. Nurture flow, 3. Financial flow, and 4. Innovation flow. The interactions among key players by taking advantages of specific pertinent context lead to degrees of SDGs achievements through defining suitable ICT-based transformation solutions.

The Role of STPs in Strengthening ICT Contribution to SDGs Achievement

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Abstract

This paper is aiming to determine main aspects of ICT-based empowering solutions for sustainable development goals (SDGs) achievement that resulted from science and technology parks (STPs) and areas of innovation (AOIs). To do this, developing an analytical framework, by focusing on analyzing the interactions between its elements, besides grasping all contextual factors and key players in STPs and AOIs which cause ICT-based transformation regarding sustainable development targets is valuable. The elaborated framework in this paper is labeled "ICT-enabled transformation (IET) analytical framework".

1. Introduction

The SDGs of United Nations (UN) consist of 17 goals and 169 targets including social, economic and environmental dimensions that have potential to transform the quality of life in the societies. All SDGs are related to those main global challenges which should be solved by the year 2030. Therefore, all the UN Members (193 countries) have committed to attempting approach these goals. But achieving the SDGs is really a burdensome task so that one of the main challenges of policy-makers is setting out a number of pertinent policies, strategies and initiatives. Moreover, governments have to regulate some critical issues like emerging technologies namely, the Internet of Things (IOTs) and mobile applications regarding driving progress towards attaining sustainable development goals. In this regard, some public organizations and institutions have already tried to "holistically" implement and report all 17 goals. But as the reports indicate, less relevant actions have been implemented to contribute with some of the objectives. Actually pubic organizations should only focus on some SDGs. Among different organizations focusing on particular SDGs, there are some institutions such as business incubators, STPs and AOIs that can really implement and report the whole SDGs. Since in these areas, small and medium enterprises (SMEs) and entrepreneurs with different ideas and different products/services are available and also public and private sectors could have symbiotic interactions and partnership towards achieving SDGs.

Technology parks and information communication technology (ICT) incubators provide business facilities, intermediary services and commercialization assistance for nurturing entrepreneurs and promoting the activities of ICT enterprises in the private sector. Such incubation infrastructures not only increase the competitiveness and growth of knowledge-based activities, but also they can facilitate the process of inter-organizational collaboration and open innovation. As well, they encourage public-private partnership, to secure a better role for the ICT private sector in the national economy, and to boost the local economy. In fact, geographic proximity of SMEs in STPs and their interactions with other companies can create innovative collaboration. They provide access to university assets such as professors, researchers, and research equipment for SMEs. Moreover, university teams may even collaborate with SMEs to develop a university curriculum that aligns with SMEs requirements. As a result, ICT incubators, STPs and AOIs could be considered as the tools for creating new business opportunities for entrepreneurs and SMEs to develop a new technological solution for acceleration universal coverage of SDGs and transform the societies.

On the other hand, the ICT is often considered as one of the main drivers and enablers of development in both developed and developing countries. Concerning the progress and diffusion of ICT, this technology completely hyper-connected with its social and economic context as well as cultural and political circumstances. Accordingly, we live in times of great connectivity has been called "hyper-connected era". This phenomenon changes interactions among various players in the socio-economic context such as public and private sector, institutions and policy-makers, consumers and enterprises, citizens and government, clients and service providers, technical and academic communities. In fact, ICTs not only have a direct contribution in achieving the SDGs, also have an indirect contribution in driving progress toward SDGs through new benefits that resulted from the use of ICTs in other sectors. For instance, in the healthcare sector, mobile healthcare applications enable governments to provide access to quick and cost-effective healthcare services for the people in removed and underserved areas. Also, there is more evidence that in the low and medium income countries, the vulnerable population with access to mobile broadband would take advantage of more educational and healthcare opportunities and services such as mobile banking and e-government.

So, applying ICT-based services and applications in other sectors has, potentially, the capacity to transform societies, improve individuals' quality of life and offer solutions for many challenges of sustainable development like poverty alleviation (Goal 1), health (Goal 3), clean energy (Goal 7), infrastructure (Goal 9), education (Goal 4), and environmental sustainability (Goal 11).

Hence, the main objective of this paper is developing an integrated and comprehensive analytical framework that would explain the role of STPs and AOIs in strengthening ICT contribution to SDGs achievement. In Sum, applying "ICT-enabled transformation (IET) analytical framework" helps us to demonstrate systematically the role of STPs and AOIs in fostering ICT contribution to SDGs and unveils different aspects of ICT-based transformation solutions that resulted from redefining policies and strategies of STPs and AOIs according to accelerating attaining sustainable development goals.

2. Research questions

This research is highly exploratory and inductive. The research questions that we investigate to answer through this paper are as follows:

1. What are the main elements of ICT-enabled transformation (IET) analytical framework?
   - What are the key players of IET analytical framework?
   - What are the main interrelations and interactions among key players?
   - What are the main contextual factors of IET analytical framework?
2. What are the main ICT-based empowering solutions as the outcomes of IET framework for SDGs achievement that resulted from science and technology parks (STPs) and areas of innovation (AOIs)?

The degree to which ICT-based empowering solutions are effective and efficient for SDGs achievement depend on interactions among elements of IET analytical framework. Moreover, these elements play a key role in determining particular development path and work as the potential to make desired ICT-based empowering solutions for SDGs achievements.

ICT key players and contextual factors, besides interactions among them form an ICT-enabled transformation framework (hereafter IET analytical framework). The consequences of the reciprocal interactions within this framework, can be converted into CT-based empowering solutions for SDGs achievement.
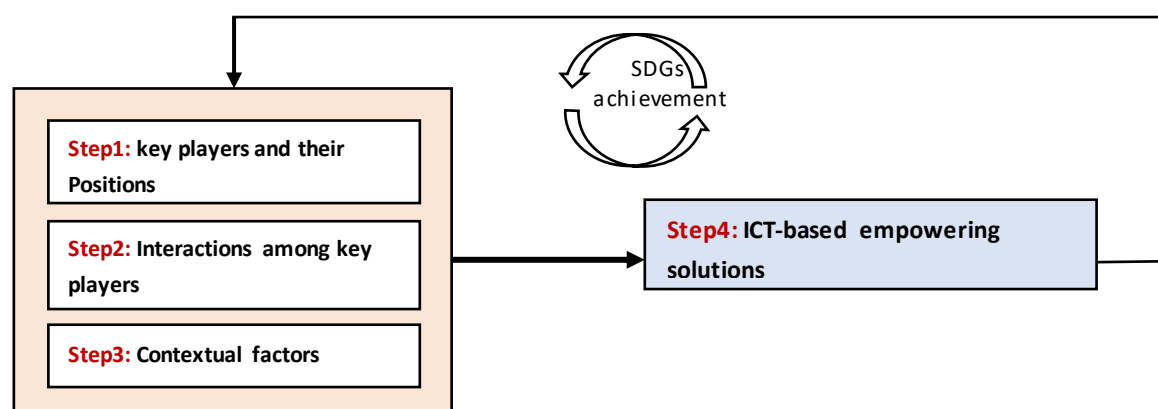

Figure 1: steps of designing framework

Based upon the interactions among key players of framework, by taking advantages of suitable contextual factors the direct and indirect impacts of ICT development could be stimulated in the form of ICT-based empowering solutions for SDGs achievement. (Outcome of IET analytical framework)

3. Main elements of ICT-enabled transformation (IET) analytical framework

Main elements of IET analytical framework are key players and their positions, dimensions of interactions and finally contextual factors. Each player has particular position in the framework. It means that players place at least in one of these positions with respect to their roles and interactions. The interactions among various players of IET framework are multi-dimensional. These interactions as continually advancing processes initiate knowledge flow all over this framework and generate dynamic changes. All players and interactions are defined in a broader context with specific economic and social conditions as well as cultural and political circumstances that are formed particular contextual factors. If the overall condition of contextual factors be suitable for ICT-enabled solutions for SDGs achievement, this system settling into dynamically movement.

3.1. Step1: key players and their Positions

In this step, first key players are identified and a brief explanation is given about each one. Then their positions will be defined and categorized.

Key players consist of:

* Research and development institutions (R&D)
  R&D plays a very important role in the success of a business. In fact R&D contributes to sustainability of business.

* Enterprises
  In IET analytical framework, enterprise refers to large businesses and organizations that their main idea is related to SDGs by benefit of ICT.

* SMEs
  Small and medium enterprises play an important role in the development of economy, by creating jobs, supporting competitiveness and innovation. Also they play an important role in supporting economic growth and overcoming the crisis, because they have the largest share in all enterprises.

* Entrepreneurs
  An entrepreneur with various features (starters, driver, accountable and responsible) have central position in a market economy. The economic success of nations worldwide is the result of encouraging and rewarding the entrepreneurial instinct. 7 Roles of Entrepreneurship in Economic Development of a Country consist of: Wealth Creation and Sharing, Create Jobs, Balanced Regional Development, GDP and Per Capita Income, Standard of Living, Exports, Community Development.

* Startups
  Since startups are often started with a low budget-base and low experience, STPs should be support them and link them to financial institutions.

* Anchor companies

Anchor companies are global or international organization where goods or services are produced. They can transfer knowledge and experience to startups and small companies.

- STPs
  The main aim of Science and Technology Park is to increase the wealth of its community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions.

- AOIs
  An area of innovation helps individuals or teams to develop their ideas and produce Minimum viable product by providing services such as management training or office space.

- BIs
  Key role of business incubators is providing services for startups and link them to financial institutions and large companies.

- Businesses
  Businesses are organization or economic system where goods and services are exchanged for one another or for money. They have important role in market and economic situation. In IET analytical framework, not only they supply products and services, but also they are as big user.

- Government
  In IET analytical framework, not only government as a big user, but also has a policy making position. The main role of government in this position is to design plans, policies and strategies and also develop enabling legislation and regulatory framework for market formation and beneficiary of ICT private sector potential in market.

- Vulnerable individuals
  Regarding one of the SDGs is End poverty in all its forms everywhere, vulnerable individuals in IET analytical framework are in important position. These individuals
  Who are or may be in need of community care services due to mental or other disability, age or illness; and who are or may be unable to take care of himself or herself or unable to protect him or herself against significant harm or exploitation. In fact achievement to SDGs changes their life and has significant impact on their life style.

- Consumers
  A consumer is an end user, and not necessarily a purchaser, in the distribution chain of a good or service.

- Citizens
  a person who is a member of a particular country and who has rights because of being born there. Citizen in IET analytical framework is in demand side position.

- Regulatory authority
  The regulatory institution not only determines what ICT enterprises or STPs/AOIs can or cannot, but also manages and controls affordability and quality of suppliers to the end users.

- Legal institutions
  Intellectual property rights and patenting have a critical role in enhancing the ICT companies' ability to produce their products/services. To sum up, these institutions improve the innovative capabilities of entrepreneurs and enterprises.

- Financial institutions & Capital firms
  Regarding startups and companies need capital to commercialize their products/services, financial institutions and capital firms have important role in IET analytical framework.

- Standard setting institutions:

Standards yield a pivotal collaborative method that helps to develop knowledge. Generally, standards are set within standard setting organizations (SSOs), which can be both purely private or involve varying degrees of government oversight. The development of standards results in many benefits, which vary depending on the purpose of the standard and the product or service they cover.

- Chamber of Commerce
  Chamber of Commerce is one of the organizations that can help businesses to advance their ideas, extend their network, and help promote their products and services.

- Universities
  The main role of universities in IET analytical framework is providing skilled-person power and promoting high quality human resources. Also, Universities can provide some facilities and services for businesses to develop their products and services.

Each of these players has particular position in the framework. These positions have been depicted in table1.

Table 1: position of key players

Position	Code
Supply-side	S
Facilitating	F
Demand-side	D
Policy making	P
Supportive institution	I

At the supply-side position (code "S"), there are the businesses and entrepreneurs that their main idea is related to SDGs by benefit of ICT. Also the players in supply-side position are considered as inputs and residents of STPs, AOIs and BIs.

In Facilitators position (code "F"), there are business incubators (BIs), STPs and AOIs that provide various types of support services such as mentor-based support, connecting, business model assistance, pitch practice, open events as catalytic activities and incubation to implement and report the whole SDGs. Since in these areas, small and medium enterprises (SMEs) and entrepreneurs with different ideas and different products/services are available and also public and private sectors could have symbiotic interactions and partnership towards achieving SDGs.

On the other hand, in demand-side position (code "D"), there are entities such as government, individuals, businesses and citizens which use and benefit from commercialized innovative-based technologies that meet SDGs achievements. The achievement to SDGs have significant impact on the quality of life of vulnerable individuals.

In policy making position (code "P"), there are entities such as government and Regulatory authority that manage and design policies and regulate supply and demand sectors. In supportive position (code "I"), there are some institutions that have key roles in suporting and Collaborating to STPs and AOIs.

As already mentioned, each of these players has particular position in the framework. It's possible that a player could place in more than one position.

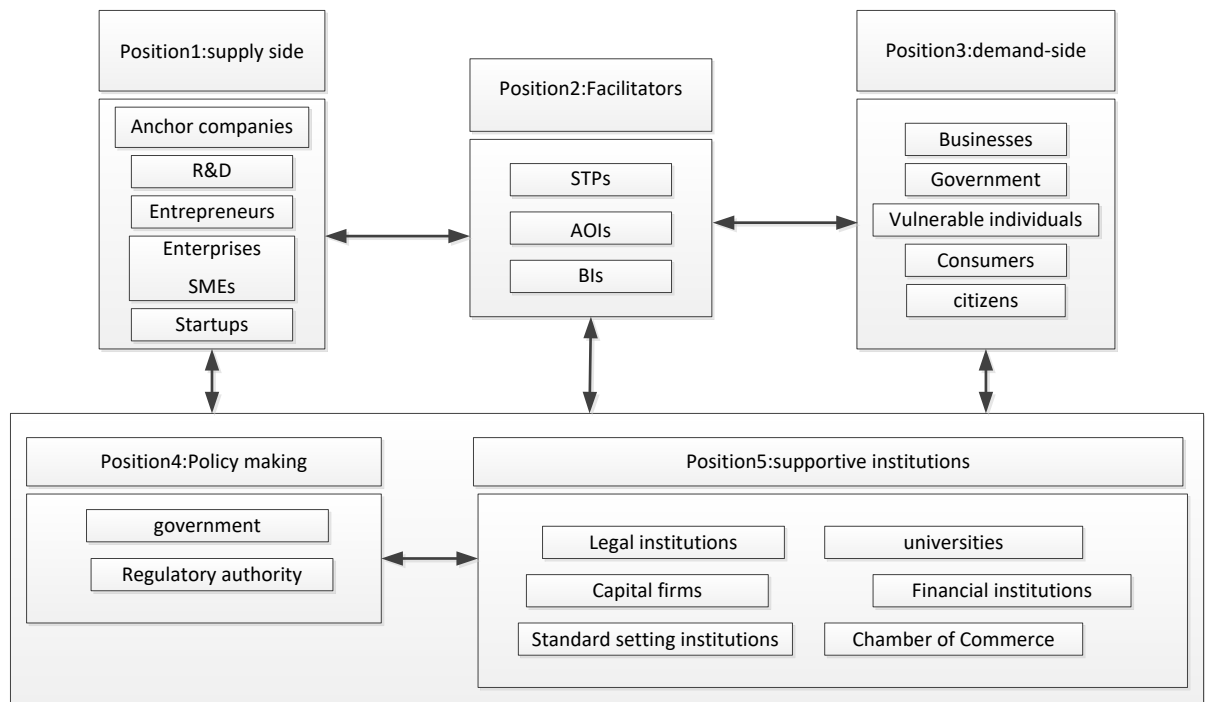Figure 2 shows key players and their positions.

Figure2: key players and their positions

3.2. Step2: Interactions among key players

In this step, first level of key connections within IET analytical framework will be investigated . then, types of interactions can be defined. Interaction is an action between specific actors.

interactions can be divided to two levels:

level 1: interactions between key players within same position:
interactions among key players in same position are very critical. Since these players learned the most from other and can transfer their knowlege and experience easily.
For instance, connections among player in Supply-side position that have been located in STPs/AOIs/BIs are extremely valuable because of observing each other's businesses both novice and experienced. since anchor companies are global/international organizations, can transfer experience to other businesses such as startups, SMEs and entrepreneurs. Figure 3, shows the connections between these players. In this figure, anchor companies are in the middle and the other players in supply-side position are around that. The two-way arrows show each player can interact with other one and sufficiently benefit from proximity to share their knowledge and experience. Also, they can provide feedback about each other's businesses.
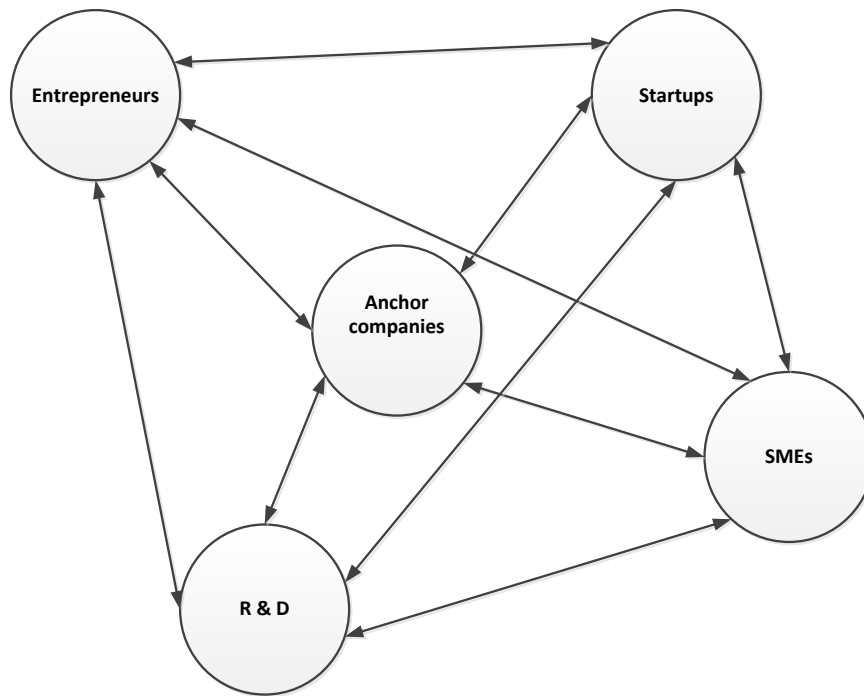
Figure 3: interactions in position1

Moreover, interactions between players in supportive position or in facilitator position matter the most. Detailed back-stage discussions between player in these positions helped to avoid unnecessary overlaps of support and concerns of redundancies. Also, STPs can help BIs and AOIs to enhance peer-learning especially for seed and early-stage start-ups. In fact, STPs provide knowledge and experience for AOIs and BIs. Moreover, When the startups in BIs go through stages of the business life cycle, they need to learn upcoming challenges they will need to succeed. So various players in facilitating position could provide tailor-made services regarding stages of business growth.

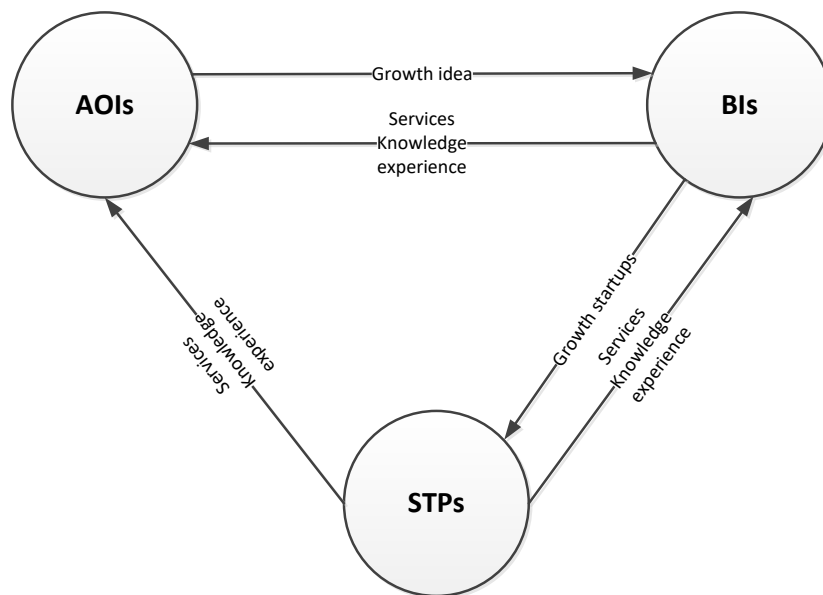Figure 4 shows the connections between players in facilitating position.

Figure 4: interactions in position2

level2: interactions among key players in different positions:
these level of connections remark the right support do not occur in isolation. These level of connections help to exchange highly detailed information about strengths, weaknesses and what have been done in the past. Arranging periodic connectins in level 2, help to provide more efficient support to achieve SDGs. For example STPs stimulate and manage the flow of knowledge and technology amongst universities, R&D institutions, companies and markets. It also facilitates the creation and growth of innovation based companies through incubation and spin-off processes and provides other value-added services.

besides the level of connections, The interactions among various key players of IET analytical framewok are divided into three typed. Not only the nature of these interactions are either co-operative or competitive, but also there are three types for these interactions.These three types of interactions have been depicted in table 2.

Table2: types of interactions in both two levels

Type of interaction	code
Information flow	T1
Nurture flow	T2
Financial flow	T3
Innovation flow	T4

The information flow type of interaction (type "T1") is a two-way flow that provides each entity in the framework with information about other entities to make an interaction. For instance, players in demand-side gets information about the ICT service or product and through using the ICT technologies obtain applicable knowledge and reflect this knowledge to the suppliers of ICT service or ICT producer in supply-side position. Moreover, The information flow between player in position "P" not only determine rules under which the other players of IET framework operate but also cause more efficient ICT service and products tailored to the SDGs priorities. So this type of interaction could be generalized to all interactions that embedded in IET framework. The Information flow type of interaction causes dynamic changes throughout the IET analytical framework by obtaining and reflecting applicable information.

Another type of interactions is called nurture flow (type T2). This type mainly refers to those interactions between players in position "F", position "S" and position "I". For example, STPs, AOIs and BIs empower and nurture entrepreneurs to convert innovative ideas related to new ICT product and services in line with SDGs achievements.

The financial flow type of interactions (type "T3") includes fund flow between financial institutions and capital firms (position "I") with other players of IET framework.

The last but not the least type of interaction is an innovation flow (type "T4") interaction. This type of interaction mainly refers to those interactions between players of supply-side position (posotion "S") and facilitator position (position "F") and employs the results of other two types to innovate. It means that innovation to achieve SDGs emerges from this recent type of interactions. This type of interaction is the fuel of the IET analytical framework.
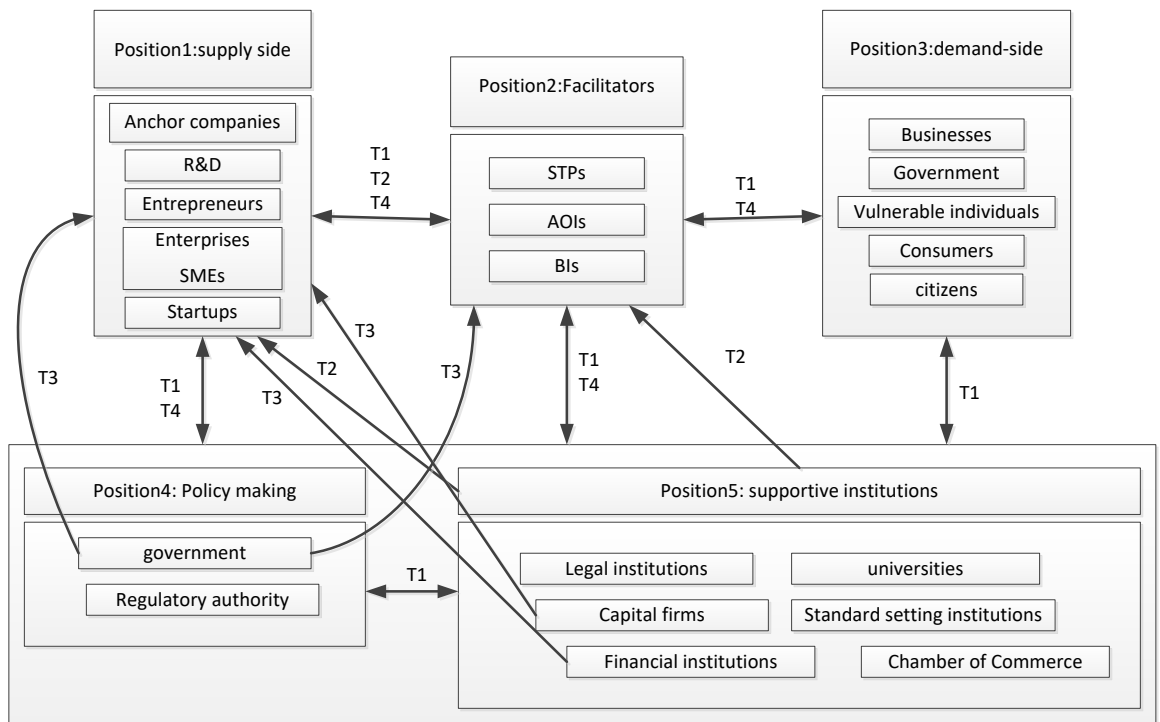
Figure 5: interactions in level 2

Table 3. Correspondence between position of players and types of interactions

Position of players	entity	Anchor companies	R & D	entrepreneurs	SMEs	startups	STPs	AOIs	BIs	businesses	government	Vulnerable individuals	consumers	citizens	Regulatory authority	Legal institution	universities	Capital firms	Standard setting	Financial institution	Chamber of commerce
S	Anchor companies	T1	T1,T4	T1,T4	T1,T4	T1,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T3,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T2,T4	T1,T2,T4	T1,T2,T3,T4	T1,T2,T4	T1,T2,T3,T4	T1,T4
S	R & D	T1,T4	T1	T1,T4	T1,T4	T1,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T4	T1,T3,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T2,T4	T1,T2,T4	T1,T2,T3,T4	T1,T2,T4	T1,T2,T3,T4	T1,T2,T4
S	entrepreneurs	T1,T4	T1,T4	T1	T1,T4	T1,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T4	T1,T3,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T2,T4	T1,T2,T4	T1,T2,T3,T4	T1,T2,T4	T1,T2,T3,T4	T1,T2,T4
S	SMEs	T1,T4	T1,T4	T1,T4	T1	T1,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T4	T1,T3,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T2,T4	T1,T2,T4	T1,T2,T3,T4	T1,T2,T4	T1,T2,T3,T4	T1,T2,T4
S	startups	T1,T4	T1,T4	T1,T4	T1,T4	T1	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T4	T1,T3,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T2,T4	T1,T2,T4	T1,T2,T3,T4	T1,T2,T4	T1,T2,T3,T4	T1,T2,T4
F	STPs	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1	T1,T4	T1,T4	T1,T4	T1,T3,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4
F	AOIs	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T4	T1	T1,T4	T1,T4	T1,T3,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4
F	BIs	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T4	T1,T4	T1	T1,T4	T1,T3,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4
D	businesses	T1,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1	T1,T3,T4	T1	T1	T1	T1	T1	T1,T4	T1,T3	T1	T1,T3	T1
D,P	government	T1,T3,T4	T1,T3,T4	T1,T3,T4	T1,T3,T4	T1,T3,T4	T1,T3,T4	T1,T3,T4	T1,T3,T4	T1,T3,T4	T1	T1	T1	T1	T1	T1	T1,T3	T1	T1	T1	T1
D	Vulnerable individuals	T1,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1
D	consumers	T1,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1
D	citizens	T1,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1
P	Regulatory authority	T1,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1,T4	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1
I	Legal institutions	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1
I	universities	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T4	T1,T3	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1
I	Capital firms	T1,T2,T3,T4	T1,T2,T3,T4	T1,T2,T3,T4	T1,T2,T3,T4	T1,T2,T3,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T3	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1
I	Standard setting institutions	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1
I	Financial institution	T1,T2,T3,T4	T1,T2,T3,T4	T1,T2,T3,T4	T1,T2,T3,T4	T1,T2,T3,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T3	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1
I	Chamber of commerce	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1,T2,T4	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1	T1

3.3. Step3: Contextual factors

In this paper the contextual factors have been defined the capacity of a nation to fully leverage ICTs to obtain SDGs and were measured by a set of indicators. The extent to which a country benefit from the role of STPs and AOIs in fostering ICT contribution to SDGs and defining meaningful ICT-based transformation solutions related to the present set of social, economic, political, cultural and environmental Indicators that may be considered as weaknesses or strengths for running IET analytical framework. The indicators which have been introduced as the contextual factors are Global Innovation Index (GII), Global Creativity Index (GCI), Doing Business, Corruption Perception Index (CPI), Global Entrepreneurship Index (GEI), Gross National Income (GNI), Life Expectancy Index (LEI), unemployment Graduated Population Index
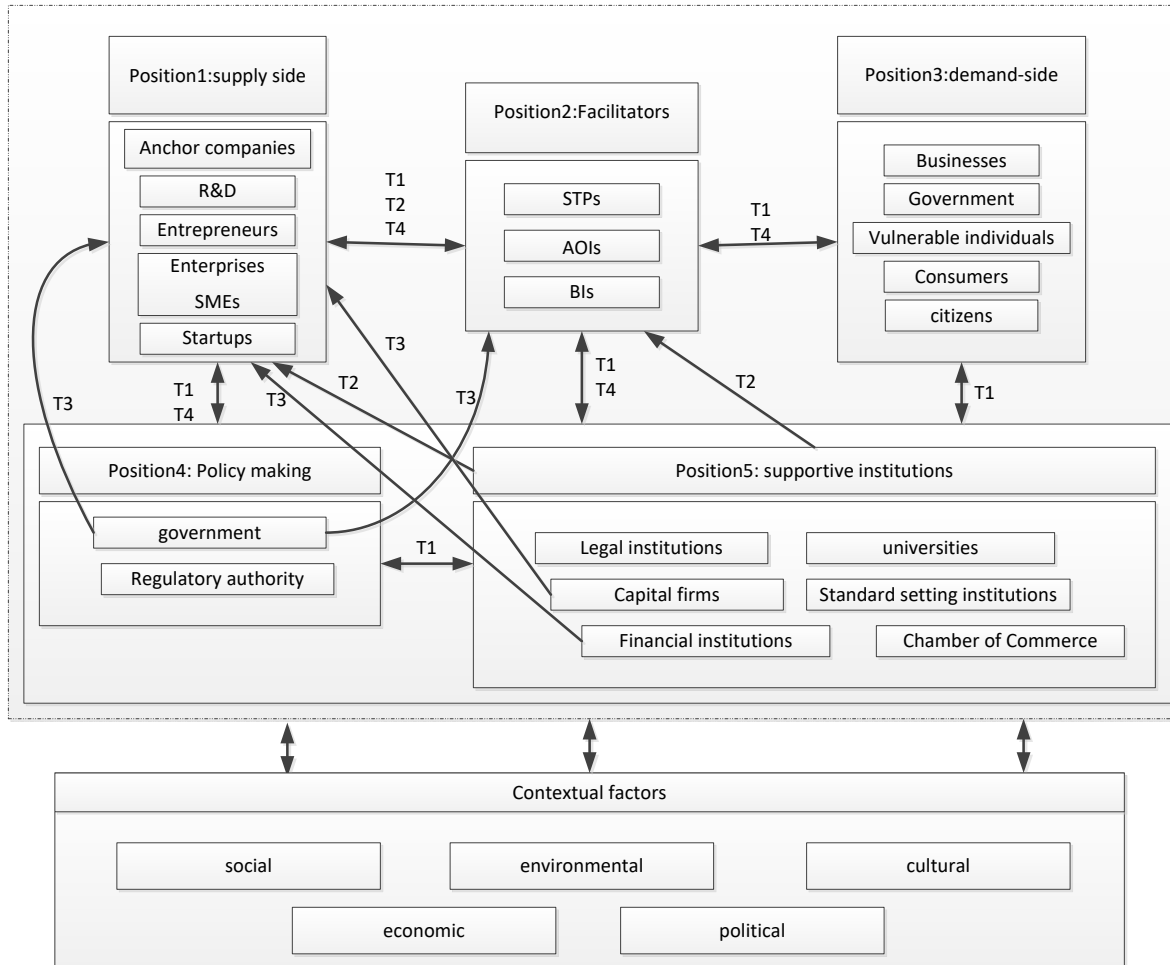
Figure 6 shows framework with Contextual factors.

Figure 6: the framework with contextual factors

In next step, ICT-based transformation solutions that resulted from redefining policies and strategies of STPs and AOIs, according to accelerating attaining SDGs will be unveiled.

4. ICT-based empowering Solutions

In previous section main elements of IET analytical framework including key players and their positions (step1), the levels and types of interaction between players (step2) and contextual factors (step 3) were introduced.

In this section main aspects of ICT-based empowering solutions (step4) for sustainable development goals (SDGs) achievement that resulted from science and technology parks (STPs) and areas of innovation (AOIs) are elaborated as a list of policy implications.

- Focus on the levels and types of interactions between elements of IET analytical framework. This can enhance learning among various players in all positions;
- players in position "F" and "I" should recruit staff with entrepreneurial experience;
- Players in position "F" are suggested to acquire a list of experienced local players in position "s" (such as entrepreneurs and ...) that their main ideas are related to SDGs by applying ICT to connect them to growing entrepreneurs;
- Players in position "F" should Diagnose and assess different development stages of players in position "S";
- Not only the presence a mixture of growing and pioneering entrepreneurs in STPs, AOIs and BIs is sessential, but also the interactions between these two groups of entrepreneurs is even more important (mentorship between experienced and growing entrepreneurs);
- Reorganize existing AOIs, STPs and Bis to connect entrepreneurs and enhance peer learning;
- Cooperation between players in position "I" to connect entrpreneurs with the same types of support they need;
- Cooperation between player in position "f" and "I" to connecting players in position "S" to local key support institutions
- Financial institutions and capital firms (players in position "I") are recommanded to distribute smaller award to multiple players in position "S" (especially startups and entrepreneurs that their main ideas are related to SDGs by applying ICT), instead of large awards;
- The Transparancy between players of framework, accountability and governance of finance are the keys for evolution of IET framework in each region;
- Different region could have different interactions and players according to contextual factors. Thus, this issue should be taken into account by players in policy making position;
- Understanding and paying attention to contextual factors especially "cultural" and environmental aspects of each region, are important issues for players in position "F" ;
- Arranging catalytic activities and periodic events by STPs and BIs for entrepreneurs that their main ideas are related to SDGs are crucial in accelerating achieving SDGs.

5. Concluding Remark

The main focus of IET analytical framework is on describing the levels and types of interactions between its main elements. Interactions between and within various positions of Key players, and contextual factors, all together, accomplish IET analytical framework. The five positions of key players are 1. Supply-side, 2. Facilitating, 3. Demand-side, 4. Policy-making, and 5. Supportive institutions. The four types of interactions between and within players are 1. Information flow, 2. Nurture flow, 3. Financial flow, and 4. Innovation flow. The interactions among key players by taking advantages of specific pertinent context lead to degrees of SDGs achievements like poverty alleviation (Goal 1), health (Goal 3), clean energy (Goal 7), infrastructure (Goal 9), education (Goal 4), and environmental sustainability (Goal 11), through defining suitable ICT-based transformation solutions. The main transformation solution that suggested in this paper is redefining and reconstructing the interactions between various players and different positions which have been introduced in IET framework.