

STPs As a key to : Unlock, Innovation and Entrepreneurial potentials for Economic Development

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Abstract

Entrepreneurship and Innovation are essential elements for the success of knowledge based economy development. In its commercialization phase, new technology based product, faces difficulties and uncertainties, because either the product or the market is unknown and undefined.

SMEs have increasingly important role in the global economy and it is suggested that firm's size and its growth rate are negatively correlated, because :

- 1- SMEs can significantly enhance their competitiveness and can respond faster to market change by establishing an adaptable manufacturing control system.
- 2- SMEs have an innovation rate larger than in other sector, especially in high-technology.

At the same time, some problems might put the SMEs at risk of being unable to take advances of any business opportunities, and maintaining right balance between creativity and commercialization of innovation. Attempts were made to create the entrepreneurial and innovation environment through a variety of means, among them, Science and Technology Parks (STPs) are most important and significance.

STPs may be seen as a supportive area to influence the entrepreneurial environment by access to capital, flexible and low cost space sharing of overhead expence, and management and technical assistance. In fact STPs are essential drivers for the success of business and assumed to act as a key to unlock innovation and entrepreneurial potential for knowledge based development.

This study was conducted to address how Incubator boosts economic performanc and what elements are needed to support and maintain an entrepreneurial environment for SMEs.

Ke words : Innovation – Economic development - Incubator

Introduction

With knowledge being increasingly realized as an important contributor to the competitiveness of both countries and firms through the late 20th century (Cole, 1998; OECD, 1999), both developed and developing countries have been encouraging the development of knowledge-intensive industries either directly or indirectly (Goldstein and Luger, 1993).

In the new knowledge-based economy, over two-third of economic growth stems from technological innovation and any competitive success stems from capacity to innovate. Innovation based on new scientific and technological knowledge have always led to productivity and competitiveness enhancements, imperilment infinity standard and long-term economic growth (Bizri and farah, 2002)

Defining the knowledge economy is not easy, and what works in one country will not necessarily provide the solution for another. In fact having knowledge will not automatically lead to economic benefits (McNicoll *etal.*, 2002). Knowledge economy may defined as “an economy that create, acquires, adapts and uses knowledge effectively for its economic and social development”. Thus it includes social, economic, environmental and political underpinnings that impact on society (World Bank, 1999). It is a fact that there is a correlation between the innovation rate and the shareholder value of a company (Jonahs and Sommerlatte, 1999). Hence it is necessary to keep in mind the aspect of innovation when the business strategy is developed. Innovation should be understood as a ‘value creator’ for the future shareholder value of the enterprise.

What is successful innovation ?

Innovation is the effort to create purposeful focused change in an enterprise's economic or social potential (Drucker, 2002). Innovation is successful when there is a match between the technological breakthrough and the customer's needs; each of which can be catalyst for the innovation. Tidde, *etal*, (2005), describe a successful innovation as “ a process of turning opportunities into new ideas and of putting these into widely used practice”. According to the types of changes, innovation could be categorized into 4 types (the '4Ps' innovation), as shown in Fig. 1.

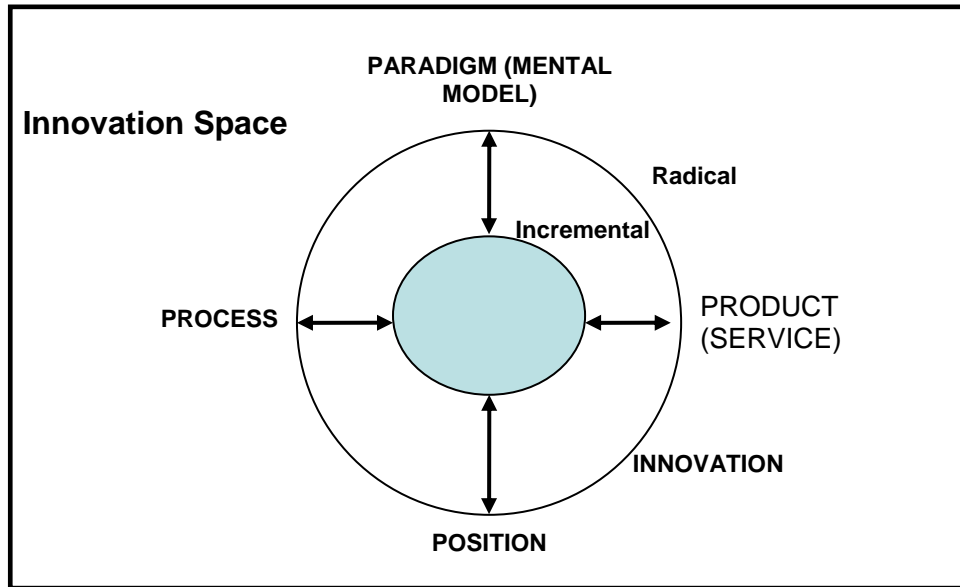


Fig. 1 :Innovation 'life Cycle' from radical to incremental change
(Adapted from Tidde *etal*, 2005)

Each of the 4Ps of innovation can take place along an axis running from incremental to radical change; the area limited by the inner circle is the potential innovation space within which an organization can operate. Whether it actually explores all the space is a question for innovation strategy/management. The capacity of countries and firms to develop and manage capacity to innovate has become a major determinant of economic growth and competitiveness.

What makes an enterprise innovative? Certainly it is not easy to answer this question, but it is possible to identify and evaluate the characteristics of an effective and purposeful innovation management. One option is to start with the following formula : (see also Fig. 2).

Innovations are the result of innovation competence and their realization in an innovation process

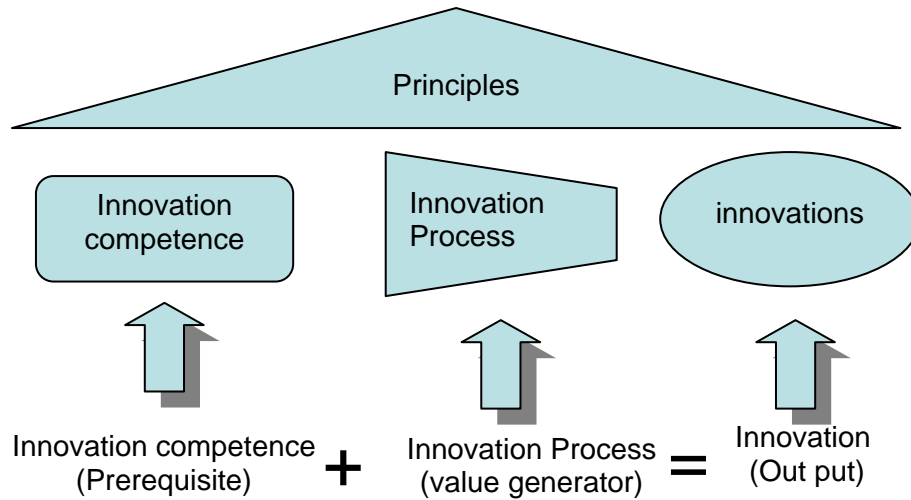


Fig. 2 : Conditions for successful innovations
(Adapted from Luggen, 2005)

In this contexts the “ **linear model of Innovation** ” is believed to be over simplistic. Successful innovation management relies on two key ingredients, i.e., technical resources (people, equipment, knowledge, money) and the capabilities in the organization to manage them(See Fig.3). There are still another models known as system or network and parallel/integrated(Tidde, *et al.*, 2005). In such models, innovation is not only about linkages with other firms but also about linkages with other public organisations and institutions (regulations or government policies), in fact, these other sources of knowledge (universities, research institutes) are increasingly important. One feature which stands out in the this model is that although the relevance of informal and tacit network relationships is acknowledge it is extremely hard classify and measure.

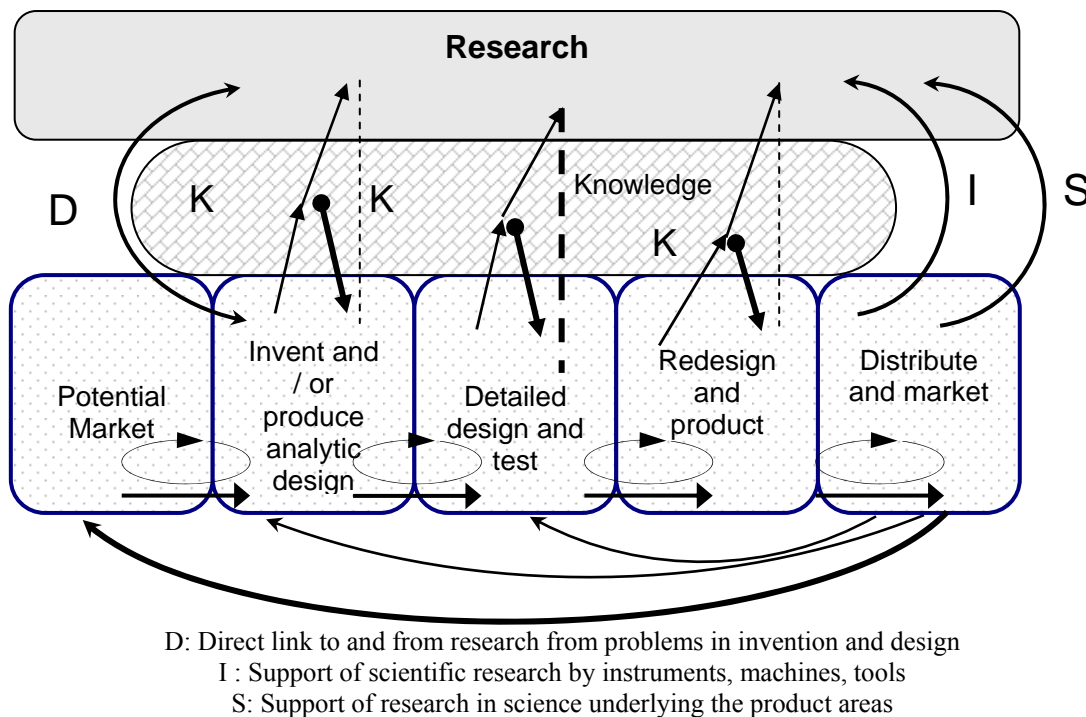


Fig. 3: interactive model of Innovation and connection between the organization and key elements in its external environment (Adapted from Kline and Rosenberg, 1986)

Entrepreneurial Environment

Bruno and Tyebjee (1982) suggest that clusters of entrepreneurs occur at certain times and places because the social and economic environment at those times and in those places encourages entrepreneurship. Porter (1998) has noted that clusters of entrepreneurship can be identified globally and that they revolve around specific industries. Much early research in small business focused on the personality characteristics of the entrepreneur rather than the environment in which the entrepreneur was created.

Entrepreneurial event is triggered by displacement, both positive and negative but more often negative. The displacement is filtered through "Perceptions of Desirability" which are influenced by culture, family, peers, colleagues, and mentors. And, filtered again by "Perceptions of Feasibility."

Bruno and Tyebjee (1982) build a model (See Fig. 4) of the entrepreneurial environment based on their review of the dozen or so authors, who have dealt with it. It is based on a list of most frequently cited factors.

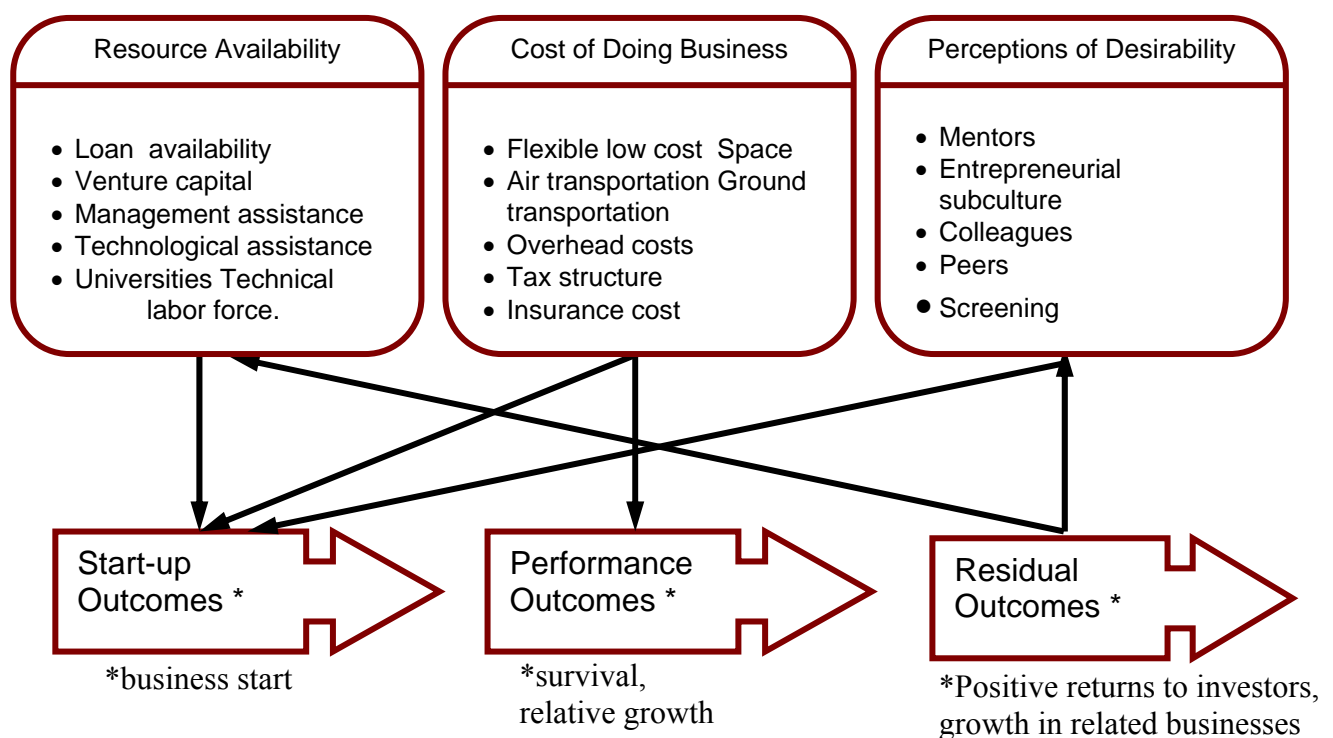


Fig. 4: Entrepreneurial environment model based on most effective factors

Bridging entrepreneurship and economic growth through innovation

A number of elements are critical for a successful entrepreneurial economy. Surely a unique entrepreneurial spirit is a part of the mix, but a supportive environment is crucial.

In this way innovation is the critical link between entrepreneurship and economic growth as well as to boosts productivity which leads to higher growth rates for economy and a rising standard of living. Thus entrepreneurship and Innovation are essential elements for the success of knowledge oriented economy development.

Thus promoting technology-oriented activities requires a new way to think about smart infrastructures. Such an infrastructure requires the linking of:

1- Talent 2-Technology 3- Capital 4- Know-how

SMEs as seedbed of innovation and entrepreneurship development

An SME can be defined as an organization which: (Small Business Service, 2003)

Has no more than 250 employees;

Has either an annual turnover of less than Euro 40 million, or an annual balance sheet total less than Euro 27 million;

Is less than 25% owned by one, or several enterprise(s) not satisfying the same criteria.

Small and medium enterprises (SMEs) are playing an ever increasing role in the transition economies of different countries. Finding of research launched in different countries confirm the idea that: (Raynard and Forstater, 2002, OECD,2004)

“SMEs are considered a Seedbed of entrepreneurship development, innovation and risk taking behavior that provides the foundation for long term growth dynamics and the transition towards larger enterprises”

However, many thousand of start-ups or beginner entrepreneurs are facing difficulties in developing their business. The uncertain legal and economic environment in which they operate, the lack of entrepreneurial skills-specially in strategic planning, and marketing-the unreliable business behavior of the partners-specially their insolvency or their grasping characteristic to get rich - , the fluctuating market needs and the aggressive competition of the strong foreign medium and large scale enterprises accompany and taint the entrepreneurs with risk, a concomitant for the market economy, but an unknown phenomenon for the former centrally planned economies.

Smart infrastructure, can unlock innovation potentials for SMEs

Development cycle time and risk are interrelated and explicit risk reduction makes innovative projects more manageable(Ellis, 1997). In its commercialization phase, innovative enterprise and entrepreneurship, faces challenges, barriers and uncertainties, because either the product or the market is unknown and undefined. The greater the innovation- the greater the challenges, the complications, and the risk involved.

Results obtained from studies indicate that state and local governments have attempted to create the entrepreneurial environment through a variety of means. Among the approaches the most effective institutional forms designed to support innovation capacity, in a specific physical location with both public and private sector institutions co-operating through actions essentially aimed at building bridges between academia and industry, promoting innovation and encouraging investment in technology-based start-up firms, known as park and incubator (Eisinger,1988, OECD, 2004).

Functions and key performance criteria set out in Park and Incubator framework.

The term, ‘science park’, has been used to refer to schemes under various similar names such as, Techno-pole, Technology park, Science/Research park and science city, Center of excellence, Technology/Business incubator, and Innovation center (AURRP, 1998; IASP, 1998; McQueen,1998). The International Association of Science Parks (IASP) (2001) defines “A science/technology park and incubator as:

“A property-based initiative which has operational links with universities, research centers and other institutions of higher education”.

Although using different names, definitions provided by IASP and AURRP share similar opinion in the following key aspects about science parks as demonstrated in Fig.5

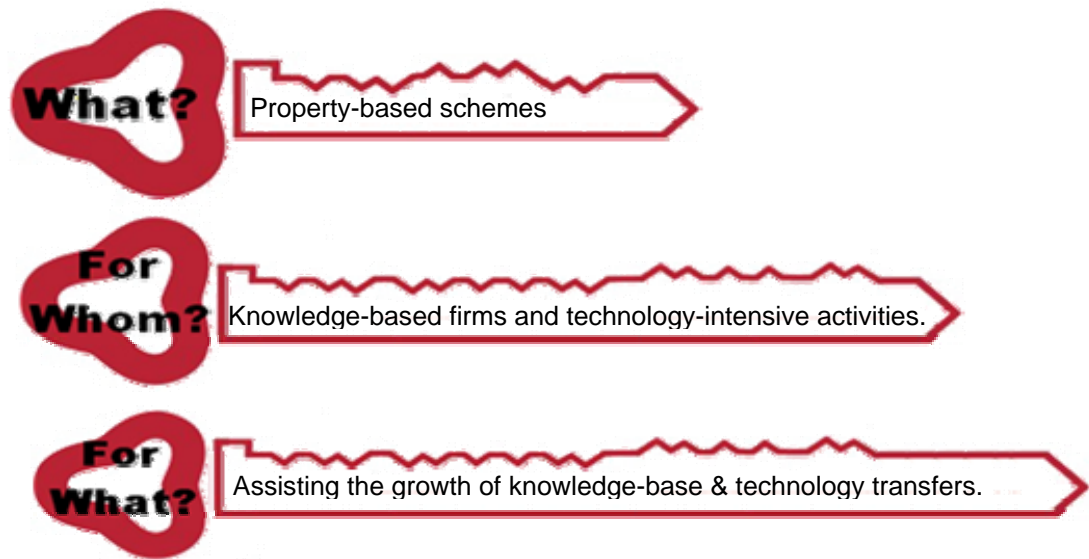


Fig.5: key aspects about STPs

Such a definition revealed that a park or incubator, as an economic development tool must be judged on its ability to: (AURRP, 2000)

- Alter the entrepreneurial environment sufficiently to create more small businesses and more jobs than would have been created without an incubator.
- Encourage the formation and growth of knowledge-based industries or high value- added tertiary firms, normally resident on site.
- Engaged in fostering the transfer of technology and business to tenant organizations.
- Promoting research and development by the university in partnership with industry.
- Assisting in the growth of new ventures, and promoting economic development.
- Aiding the transfer of technology and business skills between the university and industry tenants’.

Thus it seems that technology parks straddle a broad spectrum of commercial innovation activities that overlap the interaction of research and business activities (Baker *et al.*, 2004). Figure 6, illustrates the type of activities that technology parks encompass. Technology incubators and parks may, in part be ‘virtual’, particularly for support services that are only intermittently required.

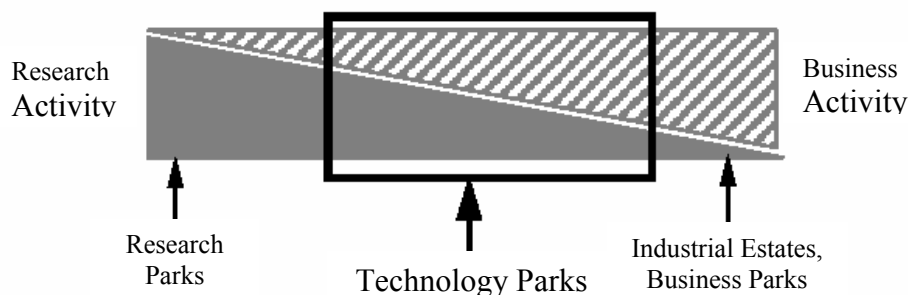


Fig.6 :Technology parks—the interaction of research and business activity (adapted from Baker *et al.*, 2004)

Existing literature suggests that STPs are important and useful supportive initiative for knowledge based development because(Zhang, 2005):

- Create value for industrial growth that would not otherwise occur;
- Assist in diversifying the local economy and making it stronger;
- Develop successful local firms, and where possible and reasonable, retain those firms in the local area;
- Assist the government to achieve their priorities for economic development;
- play a vital role in enhancing international competitiveness by:
 1. expanding and developing the commercialization skills and experience base, particularly in relation to the application of new technologies in industry and the development of new industries based on information technology and biotechnology platforms.
 2. stimulating cultural change that leads to the development of a more entrepreneurial business culture based on the application of new technologies in industry.
 3. assisting in the development of an investment environment which is receptive to technology business investments and finance, particularly in relation to the adoption of new technologies in industry.
- Technology parks will underwrite the establishment and development of sustained business growth that:
 1. promotes regional development
 2. encourages re-industrialization
 3. facilitates commercial and industrial innovation.
- Technology parks will provide the foundation for establishing and growing new innovative industries that will:
 1. increase wealth through industry growth
 2. increase business investment in new innovative, high technology industries
 3. provide high value, highly skilled employment opportunities.

However it is important that the purpose for establishing the facility to promote innovation and its role in fulfilling the vision for a region, city or state be very clearly defined (OECD 1987). These are considered essential in the development of smart infrastructure and should one be missing then regional economic development will not occur, or if it has occurred, will be slowed or stopped. STPs should not be viewed simply as property to be developed on a commercial basis. These facilities are able to provide attractive, affordable facilities in a technology, research and business environment where entrepreneurial ventures can take root, where young companies can develop their potential and where established firms can expand their opportunities.

In brief, innovation and entrepreneurship flourishes in an environment where ideas can bubble up and become productive and marketable and where business start-ups can readily grow and mature need effective tool for stimulating commercial innovation, particularly innovation driven by advances in new technologies. In this atmosphere STPs are essential drivers for the success of business and assumed to act as a key to unlock innovation and entrepreneurial potential for knowledge based development

Conclusion:

Over the past decade, the world has increasingly recognized the vital role of science and technology in driving economic growth, developing new industries, fostering job creation, and improving the quality of life. As a result, strong government efforts in establishing STPs can be observed in various parts of the world since the 1980s to fulfill two main objectives:

1. to promote technological innovation and entrepreneurship as well as to encourage technology transfer by reducing the time lag between innovation and production of new products in a research and development environment.
2. to provide means of encouraging the establishment and growth of high technology industry in an area in order to generate wealth, employment, increased economic productivity and technological innovation

References

- AURRP(The Association of University Related Research Parks). 2000. 'The association of university related research parks'. <http://www.aurrrp.org/whatis.html>.
- AURRP. 1998. Worldwide Research & Science Park Directory. 1998, The Association of University Related Research Parks, BPI Communications.
- Baker, J., G. Bullock, M. Hefferan, D. Kuchler. 2004. Development of Technology Incubators, Parks and Precincts in Queensland. A Review and Start-Up Guide for Proponents. www.sdi.qld.gov.au/dsdweb/v3
- Bizri, O., and M. Farah. 2002. New technology-based institutional forms as instruments to enhance innovation and competitiveness of small and medium enterprises. United Nation . Economic and Social Council Commission for western Asia. Manama, 10-12, 2002
- Bruno, A. V.,and T. T. Tyebjee, (1982). The environment for entrepreneurship. Encyclopedia of Entrepreneurship. Englewood Cliffs, NJ: Prentice-Hall,Inc. pp. 288-315
- Cole, R.E. 1998. 'Introduction', California Management Review, Vol. 40, No. 3, pp.15–21.
- Drucker,P.F. 2002. The discipline of innovation. Harvard Business Review. 80(8), 95-104.
- Ellis, L. 1997. Evaluation of R & D process effectiveness through measurements. Northwood: Artech House.
- Eisinger, P. K. 1988. The rise of the entrepreneurial state. Madison, WI: The University of Wisconsin Press
- Goldstein, H.A. and Luger, M.I. (1993) 'Theory and practice in high-tech economic development', in R. Bingham and R. Mier (Eds) Theories of Local Economic Development, Newbury Park, CA: Sage Publications, pp.147–174.
- IASP. 2001. International Association of Science Parks [Online]. Available:
<http://www.iaspworld.org>.
- IASP. 1998. (International Association of Science Parks) Members of IASP – World-wide Directory, Spain. <http://www.iaspworld.org>
- Kline,J., and N. Rosenberg. 1986. "An Overview of innovation" in R.Landau and N. Rosenberg (eds.) (1986), pp.275-305
- McQueen, J.D and Haxton, B.M. (1998) 'Comparison of science park planning, economic policy, and management techniques between science parks: worldwide', Proceedings of IASP World Conference on Science & Technology Parks, pp.484–512.
- Jonahs, R., and T. Sommerlatte. 1999. The innovation premium. Perseus Book. New York.

McNicoll, I., U. Kelly, R. Marsh, and D. McLay. 2002. Defining and identifying the knowledge economy in Scotland. A regional perspective on a global phenomenon. University of Strathclyde , Strathclyde.

OECD (Organization for Economic Cooperation and Development) (1987) Science Parks and Technology Complexes in Relation to Regional Development, Paris.

OECD. 1999. Managing National Innovation Systems. Paris. <http://cdnet.stic.gov.tw/ebooks/oeed>

OECD. 2004. Promoting Entrepreneurship and innovative SMEs in a global economy. 2nd OECD. Conference on ministers responsible for small and medium sized enterprises (SMEs). Istanbul, Turkey.

Portet, R. B. 1998. ' Science parks – the European dimension', in: H. Sunman (Ed.). The role of Science park in the promotion of innovation and the transfer of Technology. *Pp.* 19-24

Raynard, P., and M. Forstater. 2002. Corporate social responsibility: Implications for Small and Medium Enterprises in development countries, UNIDO, Vienna.

Small Business Service (2003) Small and Medium Enterprises (SME)-Definitions.

<http://www.sbs.gov.uk/>.

Tidde, J., Bessant, J., and Pavitt, K. 2005. Managing innovation: International technological market and organizational change. 3rd ed. Hoboken, N.J.: John Wiley & Sons, Ltd.

World Bank. 1999. World development report. 1998/99: *Knowledge for development*. Washington : World Bank

Zhang, Y. 2005. The science park phenomenon: development, evolution and typology

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