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# Architecting gloCal (global–local), real-virtual incubator networks (G-RVINS) as catalysts and accelerators of entrepreneurship in transitioning and developing economies: lessons learned and best practices from current development and business incubation practices

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## Abstract

Entrepreneurship is at the heart of sustainable, organic growth for most developed, as well as transitioning and developing economies and incubators have often served as catalysts and even accelerators of entrepreneurial clusters formation and growth.

Our premise is that this may be more so in less developed economies where incubators can help bridge knowledge, digital, socio-political and even cultural divides and help increase the availability, awareness, accessibility and affordability of financial, human, intellectual, and even social capital, the key ingredients of entrepreneurial success.

Incubation has recently experienced increased attention as a model of start-up facilitation. Venture capitalists see incubators as a means to diversify risky investment portfolios, while would-be entrepreneurs approach incubators for start-up support. Incubators are faced with the challenge and the opportunity of managing both investment risks, as well as entrepreneurial risks. As an indication of their usefulness, more than a thousand incubators have been established in the last few years based on a number of different incubation business models (not-for-profit, for-profit, public/private entity, etc.), which we categorize in five incubator archetypes: the university incubator, the independent commercial incubator, the regional business incubator, the company-internal incubator, and the virtual incubator.

In this paper, we propose an overarching incubator model that synthesizes elements and best practices emanating from the five archetypes empirically identified and also incorporates substantially higher economies of scale and scope, as well as global and local (gloCal) knowledge arbitrage potential. This paper presents an architectural blueprint for designing a gloCal, real and virtual network of incubators (G-RVIN) as a knowledge and innovation infra-structure and infra-technology which would link entrepreneurs and micro-entrepreneurs with local, regional, and global networks of customers, suppliers and complementors and thus help not only bridge, but also leverage, the diverse divides (digital, knowledge, cultural, socio-political, etc.).

The implications of this archetype of new ventures incubation for facilitating both venture business activity and broad-based economic development are discussed and early findings from pilot projects in central and eastern Europe are discussed.

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## 1. The divides between developed and developing economies: digital, economic and knowledge divides

There is ample and growing evidence that intangible resources such as knowledge, know-how and social capital will prove to be the coal, oil, and diamonds of the

21st century for developed, developing, and emerging economies alike (*Global Competitiveness Report, 2001–2002*). Moreover, there are strong indications and emerging trends that there are qualitative and quantitative differences between the 20th and the 21st century drivers of economic growth.<sup>1</sup>

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<sup>1</sup> Toward e-Development in Asia and the Pacific: A Strategic Approach for Information and Communication Technology, ADB, June 2001.

The world economy is in the midst of a profound transformation, spurred by globalization and supported by the rapid development of ICT [Information and Communication Technologies] that accelerates the transmission and use of information and knowledge. This powerful combination of forces is changing the way we live, and redefining the way companies do business in every economic sector.

We are currently going through a dynamic era for the economies of the world where a country can transition fast both upwards (see the case of Ireland) or downwards (see the case of Japan) and this trend has become increasingly more pronounced and in an accelerating fashion during the last decade. This new era is punctuated by (Dahlman and Aubert, 2001):

- Development of a service-based economy, with activities demanding intellectual content becoming more pervasive and decisive;
- Increased emphasis on higher education and life-long learning to make effective use of the rapidly expanding knowledge base;
- Massive investments in research and development, training, education, software, branding, marketing, logistics and similar services;
- Intensification of competition between enterprises and nations based on new product design, marketing methods and organizational forms;
- Continual restructuring of economies to cope with constant change.

The challenge and the opportunity in particular for advanced developing and transitioning economies is to evolve and possibly leap-frog from lower to middle income, knowledge-, technology- and know-how-importing and using countries to high and sustainable income, knowledge-, technology- and know-how-generating and exporting ones. For such a transition to be effective and sustainable, key success factors are innovation and knowledge clusters and networks linking public and private, domestic, regional, and global sector research and technological development entities (OECD, 2001):

Innovation through the creation, diffusion and use of knowledge has become a key driver of economic growth and provides part of the response to many new social challenges. However, the determinants of innovation performance have changed in a globalizing knowledge-based economy, partly as a result of information and communication technologies. Innovation results from increasingly complex interactions at the local, national and world levels among individuals, firms, and other knowledge institutions. Governments exert a strong influence on the innovation process through the financing and steering of public organizations that are directly

involved in knowledge generation and diffusion (universities, public labs), and through the provision of financial and regulatory incentives.

The global entrepreneurship monitor (GEM, 2001: 13) demonstrated a statistically significant association between entrepreneurial activity and national economic growth. Countries with the highest level of necessity of entrepreneurship are also the most underdeveloped. Unfortunately, the installation and maintenance of an effective innovation infrastructure is a very expensive undertaking and therefore not a priority in countries facing high mortality rates, poverty, and social unrest. Incubators have found more fertile grounds in economically advanced countries like the US and Europe—regions that are already home to strong industrial economies.

The intellectual, economic and social elites are usually the most mobile and hence the first to leave when their country of residence offers suboptimal conditions of existence. The US and Europe have been net immigration regions mostly from countries of a less economically developed level. On the other hand, the US, Europe, and Japan are the principal providers of foreign direct investment in most of these economically underdeveloped regions. Enhancing the economic conditions through entrepreneurial initiatives could therefore be beneficial to advanced economies with regards to the control of immigration and the effectiveness of direct investments in these countries.

In this paper, we propose such an entrepreneurial initiative that combines the technological and organizational power of advanced economies with the emigrated talent from developing countries to the direct benefit of the developing host countries, and the indirect benefit of stabilizing economic and social conditions in the sponsoring countries. In particular, we aim to make the following contributions:

- An assessment of different types of start-up incubation and their fitness for developing economies;
- The description of a global–local incubator network acting as a catalyst of entrepreneurship in host countries;
- Key elements of best practices of incubation that would have to be put in place to implement the proposed incubator network.

This paper is intellectually based on research conducted in two fields. The first field is the theory and practice of international economic integration and industrialization. The second field of research is associated with the relatively recent emergence of incubation as a means of economic and industrial development. The literature on incubation is still quite sparse (groundbreaking work as been done by the NBIA, e.g. Molnar et al., 2001 and Nash-Hoff, 1998; or Hansen et al., 2000), although more recently publications with a managerial focus have appeared (e.g. Barrow, 2001).

One of the present authors has conducted more than XX research interviews with incubators in the US, UK, Italy, Switzerland, India and China. This research focused on success measures of incubators, as well as sustainable business models of incubation in different countries, and is reported in [Ruping and von Zedtwitz \(2001\)](#) and [von Zedtwitz \(2002\)](#).

## 2. e-Development towards the knowledge economy and the role of entrepreneurship in knowledge-based economies

Adam Smith defined land, labor and capital as the key input factors of the economy in the 18th century. Joseph Schumpeter added technology and entrepreneurship as two more key input factors in the early 20th century, recognizing the role and dynamic nature of technological change and innovation, as well as path dependencies in shaping the health and future of the economy and moving away from the static approach of neoclassical economics.

In the late 20th and the beginning of the 21st century, numerous scholars and practitioners, such as Peter Drucker, have identified knowledge as perhaps the sixth and most important key input and output factor of economic activity. We would like to also emphasize the role and significance of technological and economic learning as a driver of productivity gains and an accelerator of economic growth and prosperity ([Carayannis, 1993, 1994a, 1994b, 2000](#); [Carayannis and Jeffrey, 1998a,b](#); [Carayannis and Egorov, 1999](#); [Carayannis and Jeffrey, 1999](#); [Carayannis and Jorge, 1998](#); [Carayannis et al., 1998](#); [Carayannis and Roy, 2000](#); [Carayannis et al., 2000](#); [Carayannis and Jeffrey, 2001](#); [Carayannis et al., 2001](#); [Carayannis et al., 2002](#)).

We feel that there is a clear role, opportunity and challenge for entrepreneurs around the world to catalyze and accelerate economic development and convergence and leverage the digital divide through bottom-up, entrepreneurial initiatives in the private sector. As J.B. Say stated, innovation is about changing the yield of resources and in this context, knowledge-based and knowledge-supported entrepreneurship via real and virtual, global and local (glocal) infra-structures, such as the incubator networks we discuss later on, will be the pre-eminent driver of innovation in the 21st century. This vision becomes particularly promising and enticing in the context of e-Development initiatives towards the knowledge economy that we discuss next.

There are no well-articulated or established definitions for e-Development or the knowledge economy and that has been often a source of confusion:

- We define knowledge-based economies as those which are directly based on the production, distribution and use of knowledge and information.
- What is the knowledge economy? A knowledge-driven economy is one in which the generation and exploitation

of knowledge play the predominant part in the creation of wealth (UK DTI, 1998).

- For countries in the vanguard of the world economy, the balance between knowledge and resources has shifted so far towards the former that knowledge has become perhaps the most important factor determining the standard of living—more than land, than tools, than labor. Today’s most technologically advanced economies are truly knowledge-based.

Our working definition for the knowledge economy is as follows:

- The knowledge economy is a state of economic being and a process of economic becoming that leverages intensively and extensively knowledge assets and competences, as well as economic learning to catalyze and accelerate sustainable and robust economic growth.

Our working definition of e-Development is as follows:

- e-Development is a set of tools, methodologies, and practices that leverage ICT to catalyze and accelerate social, political and economic development or in other words, e-Development is ICT-enabled and KE-inspired development that may enable the economies of developing and especially transitioning countries to become knowledge economies (see [Fig. 1](#)).

e-Development allows us to perceive the challenges and opportunities of development in a new light in terms of the scope and speed, as well as the quality of technological and economic change. The role of ICT in the creation, diffusion, absorption and use of knowledge for development has been

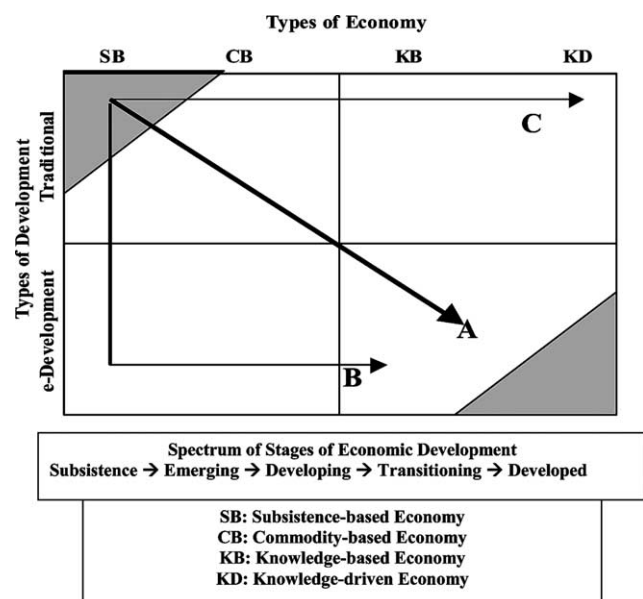


Fig. 1. E-development pathways towards the knowledge economy destination.

shown to be instrumental and with increasingly substantial and emerging potential.

We review the economies of nations within a spectrum of possible states of development as follows and we related those to development pathways (see Fig. 1):

- (a) Subsistence-focused: Where survival is the issue—i.e. Afghanistan today.
- (b) Commodity-based: Where commodities are the dominant means and goal of economic production and exchange and within that category there are barter-based economies up to some transitioning economies.
- (c) Knowledge-based: Where knowledge is one of the key means and goals of economic production and exchange and one of the key economic resources with high degree of utilization and sharing.
- (d) Knowledge-driven (UK DTI, 1998): Where knowledge is the major means and goal of economic production and exchange and the most valuable economic resource under continual renewal, sharing, and utilization. Technological innovation and economic learning are key modalities of economic development and growth.

e-Development brings about new ways of old interventions...	
Privatization	e-Privatization
Deregulation	e-Legislation
Education and human capital	e-Learning
Government reform	e-Government and e-Procurement
Finance	e-Finance
Business climate	e-Government, e-Procurement, e-Taxation, e-Registration
R&D and innovation	Technology parks and incubators

...and creates room for innovative applications

e-Society for increased participation of the civil society  
 Electronic flows of documents in the public administration to increase efficiency and transparency  
 Access to rural finance  
 Increase speed and flexibility  
 Improve general quality of services across industries and sectors of the economy  
 Opportunities for cross-country and cross-sectorial development

The set of tools, competencies and applications of e-Development in the knowledge economy may be distributed among four main pillars of general development:

- Institution-building;
- Capacity-building;
- Policy-making;
- Investment-making.

The innovative profile of e-Development is two-fold.

- First, in general terms, e-Development is the means to reach the final end of knowledge economy.
- Second, and more related to the World Bank Group, e-Development is innovative since it provides for internal cross-sectorial strategies and capabilities, and externally it provides for a regional approach to better serve the needs of client countries.

The dimension of a more effective and efficient development resulting from e-Development interventions may be highlighted by the role of:

KE The knowledge economy framework provides the foundation for the recognition of the potential of transitional and even developing economies to catalyze and accelerate their development by leveraging ICT and e-Development practices.

e-Dev

e-Development may provide the ways and means to accelerate and catalyze the transition to the knowledge-driven economy including the potential for transitioning economies to leapfrog developed economies with less focus on e-Development in special and specific sectors or in niche markets.

ICT ICT may allow commodity-based economies to evolve into knowledge-based and possibly knowledge-driven economy (see the cases of Ireland, South Korea, and Singapore among others).

- The need for e-Development interventions is also stressed by the development of the e-Economy and the increased competitiveness and openness that it brings about. The knowledge economy is fostering market transparency, integrating separate geographical markets and facilitating integration into innovative global markets.
- Without appropriate actions and interventions, as the proposed e-Development ones, the transitional countries of the ECA region may exacerbate the risk of being left behind and become victims of the digital divide and even abyss rather than reaping digital dividends.
- Moreover, the need for standardization, of both processes and policies, calls for action of an overarching organization that can provide appropriate guidance and advisory services to transitional economies willing and able to take advantage of knowledge economy. The benefits for EU-accession candidate countries from engaging in the knowledge economy development framework are those generally predicted for the intra-industry integration

Table 1  
B2B estimated cost savings by sector

Sector	Estimated savings (%)
Aerospace machining	11
Chemicals	10
Coal	2
Communications	5–15
Computing	11–20
Electronic components	29–39
Food ingredients	3–5
Forest products	15–25
Freight transport	15–20
Health care	5
Life science	12–19
Machining (metals)	22
Media and advertising	10–15
Oil and gas	5–15
Paper	10
Steel	11

Source: Goodman Sachs (2000).

and commerce, with general greater efficiency and cheaper and faster way to conduct business (see Table 1).

We now provide a list of e-Development initiatives from around the world to illustrate some key dimensions of e-Development and provide the conceptual framework for business incubation and in particular the G-RVIN model. These e-Development and knowledge economy projects can be divided into the following categories: policy-making, institution-building, capacity-building and investment-making and human capital.

## 2.1. Policy-making

### 2.1.1. Ireland: public–private partnership

The Government's approach to regulation of electronic commerce activities was flexible and supportive of business. In keeping with this, a public consultation process was initiated inviting submissions from business, organizations and individuals in relation to outline legislative proposals. An on-line discussion forum was also created for the first time to encourage public debate on the proposals.

### 2.1.2. Hungary: regulating IP telephony

To attract foreign investors in the domestic telecom market, through the privatization of the incumbent state owned operator Matav, monopoly rights on basic telephony has been granted for several years.

### 2.1.3. Romania: promoting competition in the ISP market

The incumbent operator RomTelecom has been prevented from directly participating in ISP market. This made the data/Internet market open for competition and allowed for the use of cable, VSATs, private networks, leased lines, etc., to be used to provide connectivity to the customers.

## 2.2. Institution-building

### 2.2.1. Ireland: information society commission

Most successful countries have overarching, umbrella agencies that coordinate e-development activities of different government agencies and other ICT actors in the country. Ireland's ISC has the task of shaping and managing the strategic framework for the Irish information society. It is based in the Department of An Taoiseach (prime minister) and broadly representative of the private and public sectors, relevant government departments and the social partners throughout the country. The functions of the commission include:

- Monitor the implementation of the major activities by relevant government departments and other key actors;
- Drive awareness campaigns targeted at the enterprise sector and the general public;
- Establish and monitor the key benchmarks for the development of an information society in Ireland;
- Encourage and support local and regional information society initiatives;
- Identify and oversee the establishment of flagship projects to demonstrate the benefits of the information society and win support for an Irish information society.
- Establish advisory groups to further study potential information society benefits and actions required in individual sectors of the economy.

### 2.2.2. Ireland: national competitiveness council

Ireland's government was one of the first to understand that countries increasingly compete in the global economy. NCC was established in 1997 to report on the main challenges facing the enterprise sector in Ireland and to make recommendations to the government for the improvement of country's international competitive position. NCC coordinates its work with the information society commission on issues of mutual concern, such as developing ICT skills and telecom infrastructure.

### 2.2.3. Finland: national fund for research and development

SITRA, the Finnish national fund for research and development is an independent public foundation that was created in the 1970s to address the lack of venture capital in the country. Because it was created and supervised by Parliament, it acts as a private venture capital fund with 'social conscience'. Lately, when more private venture capital funds appeared in Finland, SITRA added think-tank-like activities to its portfolio.

The list of SITRA's information society projects contains altogether 142 information society projects in several categories:

- Culture and information products and services (nine projects)
- Electronic transaction services (15 projects)

- Personal navigation (one project)
- Electronic learning (35 projects)
- Knowledge-intensive work (two projects)
- Business networking and teleworking (39 projects)
- The local information society (27 projects)
- Projects of social and health care (27 projects).

#### 2.2.4. Finland: national technology agency

TEKES, the national technology agency, is the main financing organization for R&D in Finland. Tekes provides funding and expert services for R&D projects and promotes national and international networking. Foreign companies conducting R&D activities in Finland are also Tekes' customers. More on Tekes activities in the 'R&D promotion' section below.

### 2.3. Capacity-building

#### 2.3.1. Finland: early market liberalization

Finland has long had one of the world's least-regulated telecom markets, fostering a tradition of competition and innovation. Liberalization of telecommunications networks began in 1985 and was completed in 1994, far ahead of most other European countries. Today, Finland has one of the most competitive telecommunications markets in the world, which, according to OECD figures, has made Finland the cheapest country in the world to go online.

#### 2.3.2. Finland: an innovative approach to the universal service provision

In Finland, the provision of the universal service is not tied to fixed networks only. A telecommunications company may provide these services also through its mobile networks. More and more Finns even prefer mobile phone to a fixed line.

All citizens have free access to the internet at local public libraries. Public libraries are connected into a common network called MANDA, and research libraries into LINNEA. After they have been connected into the ATM network, they will become providers of multimedia services.

#### 2.3.3. Malaysia: creating an infrastructure center of excellence

The Malaysian government attempted to replicate the Silicon Valley model to attract domestic and foreign private investment to the technology sector. The US\$40 billion initiative multimedia super corridor will serve as the backbone for the country's information superhighway. MSC embodies a 50-by-15-km area adjacent to the capital, Kuala Lumpur, which will contain new cities served by a state-of-the-art multimedia infrastructure, as well as providing the base for national and international companies in the multimedia industry. The superhighway should provide quality access to global information as quickly and easily as possible. The network is supported by a high-speed link network, which connects the MSC to

Japan, ASEAN, the US and Europe. The intent behind MSC is to create a high-tech environment and infrastructure in a certain geographic area of the country that can attract national and international investors and create spillover effects in the rest of the Malaysian economy. The ultimate goal of the project is to help the country to leapfrog its neighbors to become southeast Asia's leader in information technology.

#### 2.3.4. Argentina: 'Call Internet' project

Argentina has rather high call tariffs that would prevent widespread use of the Internet in the country. To address the problem, a dedicated number (0610) named 'Call Internet' for calls between the end user and ISPs was established. It seriously decreased the rates for dial-up Internet access without reducing the high regular call tariffs necessary for self-sustainable growth of the telecom sector.

#### 2.3.5. Singapore: heavy investment in infrastructure

The government of Singapore has heavily invested in physical infrastructure to secure the ICT development of the island. The major project of the government was S\$3 billion Singapore ONE broadband, which was launched in 1992 as part of the IT2000 Masterplan. The network enabled the government to guarantee that almost 90% of households, business and government is connected. The eCitizen initiative ([www.ecitizen.gov.sg](http://www.ecitizen.gov.sg)) launched in 1999, eCitizen is the one-stop integrated portal for government services designed according to the citizens' needs.

The portal is a window to a wide range of services (more than 200) to guide the citizen through the host of services provided by the government and other governmental agencies. From business to transportation, the citizens can access governmental services throughout the web at any time and without location constraints.

#### 2.3.6. Hungary: telecottages project

Hungary also built probably the most impressive net of telecottages (public telecenters) in eastern Europe. Since the first telecottage appeared in 1994, more than 200 new ones were established. Hungary's telecenters offer various services such as computer training, acting as centers for information gathering and social projects, sponsoring cultural events, and assisting residents with finding jobs. Some of these telecenters are also moving to provide e-commerce and distance-learning services. Telecenters serve almost a million people and cover most of the country, with at least one telecottage for every 50 km. Telecottages are funded from local resources and with the help of various international donors, such as USAID.

#### 2.3.7. Finland: promoting R&D in the educational sector

Finland's system of higher education plays very important role in advancing R&D activities. The underlying principle in higher education is the freedom of research and university autonomy, which gives them extensive latitude

for independent decisions. Plus, even though all Finnish universities are state-run, the government provides only about 70% of their funding. Thus, universities are encouraged to involve in R&D for the private sector.

### 2.3.8. Finland: supporting innovative SMEs

The government-run Tekes Foundation gives grants and loans to small and medium-sized businesses seeking to develop specific ICT applications. Its funding is targeted at projects which produce new know-how or bear high technological and commercial risks. The projects to be funded promote sustainable competitiveness, commercialization of research results and emergence of new business activities.

Besides providing financial support for R&D projects of particular enterprises, Tekes also has so-called 'technology programs'. They are used to promote development in specific sectors of technology or industry, and to commercialize the results of the research work. The technology programs are planned in cooperation by Tekes, enterprises and research institutes. Tekes usually finances about half of the costs of programs. Below are some interesting examples of the technology programs.

### 2.3.9. Finland: digital media content program 1996–1999

The primary aim of the program was to support the creation of profitable business in the new media industry. It supported new multimedia businesses, particularly SMEs, not by financing the development of individual products, but by helping them to access, develop and acquire fast and efficient content production processes, enhanced business skills, and improved distribution networks.

### 2.3.10. Finland: information networking in the construction process program, VERA 1997–2002

The VERA program is an excellent example of building synergy between ICT and traditional sectors. The VERA program aims to develop information networking solutions to compile and record information flows in a building during its entire life cycle. The projects undertaken in the program deal simultaneously with the construction process and information technology solutions. Participants have included construction companies, property owners, architects and designers, and software houses. Data can be transferred between different software suites as the building is designed, built and subsequently used.

### 2.3.11. Czech Republic: SME and R&D policies for innovation

The Czech government launched the Technos Program to increase the technical level of SMEs. It focuses on research and development of new technologies, products, materials and information systems.

SMEs must apply for the subsidy and show that they are able to cover at least 50% of the project costs from their own

financial sources. The document describing the programme indicated that there is a competition for these funds, but neither the document nor the ministry in charge of this scheme defined the nature of the competition.

A survey evaluation in 2000 showed that for the sample size of 90 SMEs Kc 339 m had been granted in subsidies. Their production increased to Kc 817 m and a profit of Kc 106 m was made. Moreover, their exports were valued at Kc 278 m and the companies created 162 new jobs.

### 2.3.12. e-Government: Slovenia and Estonia

In Slovenia, the e-government portal e-uprava.gov.si provides e-applications to citizens. Currently, citizens can apply, via the internet, for copies from the registry of births, marriages, or the deceased. In the near future, more civic services will be available for citizens, and other services will be included for the business community. Data from the land register will soon be available, and through e-taxation services it will be possible to submit one's personal income statement, or data concerning the VAT calculation.

In Estonia, the government is pushing the state institutions to develop their electronic services. The e-government system developed in Estonia is an Internet-based environment for government everyday business, such as preparing cabinet meetings, harmonizing drafts, etc. Estonian government sessions are already almost paperless, and all the ministers (even if they are not in the meeting room or in Estonia at all) are available through the Internet during government sessions, and ministers can contact their assistants and other officials during these sessions. Minutes of government sessions are publicly available on the Internet. Moreover, all the sessions of the Parliament are also transmitted online, and drafts and other working documents are also available on the web. The whole e-government system for the sessions of the executive has been implemented with a budget of €159,800. A nationwide e-citizen project was launched this year which focuses on developing cooperation between people and the public sector through the internet. As of today most of governmental institutions have their websites that are integrated through one common window, the state web center ([www.riik.ee](http://www.riik.ee)). For example, almost all official forms have been available on the Internet for the past 2 years. All taxpayers in Estonia are able to file their tax reports electronically without leaving their computers. This year 37,000 private annual income tax declarations (about 10% of individual taxpayers) have already been submitted. Moreover, Estonians can file their tax forms electronically. Companies are able to submit all kind of returns via the Internet from 18 October 2000. The number of users is growing every month and now approximately 30% of companies submit their returns electronically. The first e-procurement initiative was launched in July 2001 as a pilot, and the whole project is still underway and will be completed by the end of 2002.

### 2.3.13. India: ICT as a sector of the economy

India's information technology (IT) industry has grown at an average annual rate of over 50% a year since 1991 to reach US\$8.3 bn in 2000 (Source: EIU, India, country profile, 2001). This growth has had a huge impact on India's balance of trade, where ICT-related products account for almost 15% of the country's total exports.

However, falling demand from the US—which accounts for 60% of India's exports—will make this hard to attain. In a reflection of developments in the US, larger Indian IT firms, such as TCS, INFOSYS and WIPRO, plan to cut costs by outsourcing work to China, where IT professionals are 15–20% cheaper.

India has established a world-wide tradition for software development, and has become the location of choice for many foreign investors attracted by the availability of skilled labor force and infrastructure, cheaper costs and in general the innovation culture that India has built in the new generations. Moreover, hardware and software are not the only drivers for such inflow of foreign capitals and firms: companies are choosing India as location to set up ICT-related services that can be easily outsourced despite the distance and the time difference, such as call centers and back-office work. Customer interaction services—call centers and other ICT-related services—are now becoming extremely popular in India and can be easily replicated in other transitional economies.

### 2.3.14. Ireland: Schools IT 2000 program

Schools IT 2000 was launched in 1997 and brought about a national partnership involving schools, colleges, local communities, public and private sector organizations. The program had three main initiatives:

- Technology integration initiative aimed to drastically increase the number of multimedia computers in Irish schools;
- Teaching skills initiative provided ICT skills training for teachers nationwide;
- Schools support initiative created a support telecom infrastructure.

The program was generously financed from both public and private funds.

### 2.3.15. Finland: building the educational network

In Finland's first strategy to develop informational society (1995), one of the main points was to invest massively into the technological infrastructure of Finnish educational sector. The unique thing about the Finnish plan was probably that it covered the entire school system, as well as libraries, research institutions, archives, etc. This has generated major synergy effects and some of the best projects have been those that ignore sectoral demarcation lines and involve institutions that otherwise would not have had much to do with each other.

### 2.3.16. Malaysia: teaching company scheme

Malaysian SMEs experience difficulties in their research and training activities due to a lack of skilled labor in the country. To address the problem, a concept first introduced in the UK called the teaching company scheme (TCS) was employed. The program creates partnerships in which academics and students join with companies to contribute to the implementation of their strategies on technical or management side. The TCS not only supplements the SMEs' financial and human capital, but also improves the links between public and private sector in the country.

### 2.3.17. Hungary: academic and research network

About a half of internet users in the country get free or almost free connection through the Hungarian academic and research network, HungarNet. It has 900–1000 institutional members—educational and research institutions, libraries and museums. Institutional members contribute about 10% to the HungarNet's budget, the rest is provided by the Ministry of Culture and Education. However, availability of subsidized access lead to relatively slow growth of the commercial ISP market in Hungary.

### 2.3.18. Ireland: ICT awareness strategy

The Irish government launched an extensive ICT awareness campaign that included:

- Specific programs targeted at the 'enablers' of the information society, i.e. those who play the most important roles in the emergence of an information society in the country. One of the campaign's interesting elements is the e-commerce business awareness campaign, predominantly designed for small and medium enterprises. (The government believed that big companies are quicker to adopt ICTs and thus do not need assistance.) The Irish Business and Employers Confederation and the Information Society Commission jointly organized a nationwide series of seminars on the e-commerce. The seminars featured e-commerce case studies and presentations by the leading service providers on how to develop and implement a successful e-commerce strategy.
- Programs targeted at late ICT adopters: non-office workers, unemployed, people working in traditional sectors.
- E-business best practice case studies were collected and widely disseminated in the business community by the Information Society Commission.

This campaign is also a good example of private–public partnership approach to e-development adopted by the Irish government.

### 2.3.19. Estonia: public–private partnership for connectivity and awareness

The Village Road project in Estonia has also attracted investment from private firms. Some firms have launched



a campaign to provide farmers, teachers and young families with cheap computers and Internet connection. For example up to 2200 farmers have already got a new PC and an Internet connection within the framework of the project. A special Internet portal for farmers is under preparation too. For Estonian schools the ‘Tiger Leap’ program is also helping in creating favorable conditions for IT-driven learning environment. The program is financed mainly from the state budget, but also involves private investors. Tiger Leap has acquired a more general meaning for Estonians and has been often used as a synonym for Information Society development.

### 3. What are business incubators?

#### 3.1. Competitive scope and strategic objectives of incubators

Incubators are in the business of facilitating entrepreneurs and early-stage start-up companies and compete with consulting firms, real-estate agents, and other companies for the most interesting and valuable start-ups. Incubators differentiate themselves through their particular competitive scope, strategic objective, and service package.

Following Porter (1986), we discern four different elements of competitive scope: *Vertical scope*: Along with venture capitalists, business angels, consulting companies and institutional investors, incubators are in the business of providing financial and managerial support to start-up companies. Incubators target early-stage start-ups, but they try to differentiate themselves from business angels in their institutionalization of coaching and other start-up services, and hence are less likely to concentrate on the first-day entrepreneur. At the downstream end, venture capitalists are often exit partners or customers of start-ups successfully graduating from incubators. In this respect, incubators serve as start-up clearing houses for venture capitalists and institutional investors. *Segment scope*: The source of start-ups can provide another competitive factor for incubators. For instance, university incubators typically give preference to faculty and student entrepreneurs from their host university. Corporate-internal incubators prefer employees to external entrepreneurs. For example, BT’s Brightstar incubator offers its service to BT employees only. Some independent incubators have relied on key people being responsible for generating ideas for new start-ups (e.g. IdeaLab), but this model is extremely dependent on the creative minds behind the incubator. Other incubators tend to keep their doors open to a variety of sources. *Geographical scope*: Geographical focus is a natural competitive factor for regional business incubators, since their mission is to support new business locally. Network access is a crucial element of successful incubation, and since networks are usually limited to certain regions, many incubators strive to establish a good local presence.

The exceptions here are some company-internal incubators—where the company-internal network is more important than the regional network—and many virtual incubators, which base their business models on the variety of start-ups rather than a particular geographical focus. *Industry focus*: The focus on a particular industry—mostly because of the professional preferences or competencies of incubator managers, but also to create synergy among incubating entrepreneurs—can be another competitive scope of incubation. Typical industries are information technology, Internet services, software and biotech. Some university incubators also concentrate on a given technology, but their focus is driven by the size of the infrastructure investment or the reputation of certain academic departments. The incubator at Boston University, for instance, focuses on photonics and opto-electronics, and has invested approximately US\$100 million installing state-of-the-art research and experimentation infrastructure.

These four dimensions of competitive scope help to explain not only how incubators differ from other start-up facilitators, but also how they differentiate among themselves. Incubators also differ in their strategic objective for supporting start-ups: whether they are offering their services for profit or not for profit. This differentiation is more than just a superficial academic distinction. It fundamentally affects the design of the incubator’s business model and the execution of the incubator’s business plan. The opening spectrum of competitive focus and strategic objectives has led to the archotyping of incubator forms, offering different benefits to different clientele. The most common archetypes of incubation are:

1. Regional business incubators;
2. University incubators;
3. Independent commercial incubators;
4. Company-internal incubators;
5. Virtual incubators.

A discussion of these archetypes can be found in von Zedtwitz (2002). The first two types are generally not-for-profit oriented, while the latter three forms have strong for-profit objectives. All types differ strongly in their choice of—or opportunity for—competitive focus. Fig. 2 illustrates how competitive focus and strategic objective differentiate between incubator archetypes. The competitive focus axis distinguishes between three competitive scopes: industry, geography and segment. The strategic objective axis differentiates incubators according to their profit orientation: For-profit incubators have profitability as their primary strategic objective; not-for-profit incubators usually fulfill a public mission first, such as regional employment and growth, or they serve goals only indirectly related to operational profits, such as employee retention, innovation capacity building or stock market valuations. Although the strategic objectives of a not-for-profit incubator are also economic in the long term, the benefits are often reaped

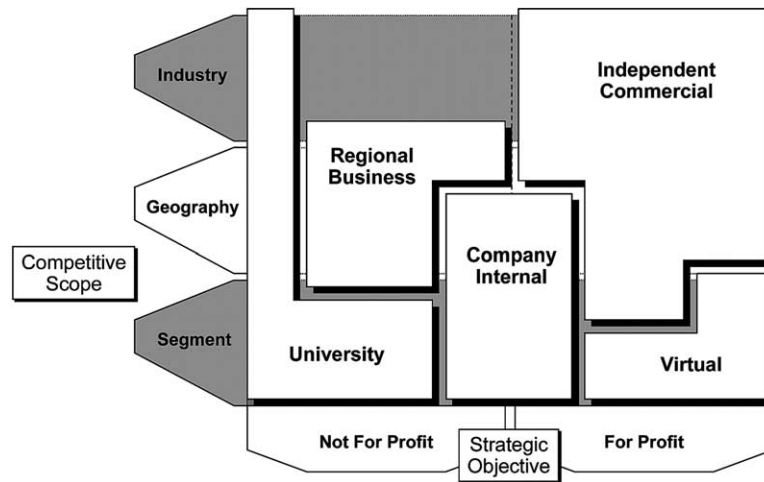


Fig. 2. Different strategic objectives and competitive scopes define five archetypes of incubation.

outside the incubator by a parent or sponsoring organization, and the incubator's contributions are difficult or impossible to measure. Internal sustainability objectives are relatively recent trends for most not-for-profit incubators.

Most incubators can be associated with one of the five archetypal forms, although some incubators incorporate elements of two or even three incubation archetypes. University incubators usually have no financial pressure to return a profit, but they are focused on serving the scientific community at the university. Regional business incubators serve a local community first of all, and their objective is to create jobs and support local commerce and wealth. Independent commercial incubators are profit-oriented, and they often focus on a particular technology or industry to achieve this. Virtual incubators are also for-profit, but they focus on particular needs in the entrepreneurial community rather than a particular industry. Company-internal incubators are more difficult to categorize because on the one hand their parent companies have strong commercial objectives, but on the other hand the internal incubator serves (both internal and external) political interests, as well as corporate development objectives. Obviously, these different objectives and sources of competitive advantage must have specific consequences on the business models that the incubators deploy.

### 3.2. Five defining services

Entrepreneurs need business facilitation services, such as funding, office space, IT infrastructure, coaching, etc., from incubators, consulting firms, real-estate companies, and other service providers. Based on our research, we identified the following five services as central to incubation:

1. Access to physical resources: Incubators offer office space, furniture, sports facilities, a computer network, 24-h security and other amenities to do with physical

infrastructure and real estate. Poorly performing incubators have focused too much on their role as landlords, neglecting other services described further below. In this field, incubators compete with technology and science parks and, sometimes, real estate companies.

2. Office support: In addition to infrastructure, incubators also maintain efficient operation of basic office support such as secretarial and reception services, mail handling, fax and copying services, computer network support and book-keeping. These services are hardly complex or technologically advanced, but they ensure that basic organizational resources are in place and save time and effort for entrepreneurs who want to get going quickly. Although these services may be taken for granted when they are working well, the lack of, for example, proper book-keeping or timely IT support can be quite a hindrance.
3. Access to financial resources: Incubators also offer access to venture capital—usually a combination of private funds and outside capital invested by business angels, venture capitalists or local institutions and companies. Venture capital criteria apply for due diligence and in the selection of start-ups. In general, incubators target very early stage, sometimes pre-seed money, start-ups and try to bring them to the next financing round. Natural competitors are business angels as well as early-stage venture capitalist and investment firms.
4. Entrepreneurial start-up support: Entrepreneurs may be strong in technology and perhaps business vision, but usually lack organizational, management and legal skills. Incubators guide entrepreneurs through the necessary steps a newly founded company must take, sometimes even helping define the business plan, but more often providing professional services such as accounting, legal advice for incorporation and taxation issues, and formulating ownership and employee option plan structures. In addition, incubators provide valuable management

coaching support, helping entrepreneurs develop and apply leadership and management skills. Many incubator managers, however, have not been able to provide real value added in start-up coaching—competing in this space with law, accountancy and consulting firms.

5. Access to networks: Good incubators are able to identify and leverage key individuals for the success of their start-ups. Entrepreneurs usually do not have the network that an incubator has taken years to create. Incubators can bring in individuals crucially important to a start-up's business: a potential customer, a leading-edge programmer, a new CEO, an interested venture capitalist. The central tool is the incubator director's Rolodex, as well as his or her intuition for making the right calls at the right time. Access to these networks is sometimes also provided by human resource firms, consulting companies, business angels or networking organizations (e.g. FirstTuesday).

The actual service mix depends on the focus of the incubator as well as the needs and preferences of the entrepreneur (e.g., Nash-Hoff, 1998). An agreement between the entrepreneur and the incubator outlines this service mix, along with any service fees and the equity position the incubator will hold in the start-up.

Some incubators offer all five of these services: These are incubators in the strong sense of the term. Organizations that offer only four services are considered incubators in the weak sense of the term. Organizations that offer fewer than four of these services lack too many elements of incubation and should no longer be called incubators. Rather, this is the domain of accelerators, technology-transfer offices or entrepreneur-in-residence programs of consulting and accounting firms.

### 3.3. Customer value proposition of incubators

An incubator must know the unique value proposition of the services it combines in one package. If it is unable to define the value of a particular service in the context of the package, it might be better to outsource the service. For instance, some incubators have decided to outsource stock option planning to more specialized accounting firms. Most if not all of above services could be outsourced and merely aggregated by incubators.

#### 3.3.1. The question is why do they choose to integrate these services?

Early-stage entrepreneurs have the following problems: They do not know whether their business idea is ultimately successful, and they do not have much time (or money) to find out. Time lags and conflicts of interest in decentralized organizations are well discussed in the literature. Entrepreneurs are willing to pay the higher price tag of centralized incubation in order to avoid opportunity costs of late product introduction, foregone revenues, or me-too innovation.

Incubators are essentially offering to speed up business development and to reduce uncertainty fast. Competitive focus not only signals the incubator's strengths and advantages, it also provides a clear definition of the most valued customer an incubator should accept in order to leverage its competencies most effectively. Graduation policies and increasing rent schemes force the entrepreneurs to focus on a proof of concept and moving the venture into the next stage of professional funding. Turnkey office infrastructure and flexible office layout (e.g. desks on wheels) help entrepreneurs to take up space quickly and efficiently. For an entrepreneur, beating the clock means beating competition. Successful incubators have understood this principle, and shelter entrepreneurs temporarily from outside tribulations so that they can focus on critical business building. There is no guarantee that the start-up is going to be successful, but at least the entrepreneur will find out fast. As a matter of evidence, Molnar et al. (2001) showed that survival rates of graduating start-ups were as high as 90 to 95% for for-profit incubators, compared with approximately 80% for not-for-profit incubators. Both figures are far better than the overall success rates of start-ups in comparable stages of less than 20%.

## 4. Challenges and opportunities of business incubation in bridging developed and developing countries: the G-RVIN model

### 4.1. Challenges and opportunities of business incubation for e-Development towards the knowledge economy

Innovation and technology are important drivers of industrial success and hence of regional and national economic prosperity. Governments throughout the world recognize this and include the support and stimulation of innovation, research and development, and technology transfer in their economic and industrial policies. Within the European Union (EU), for example, many of the more advanced member states have significant incentive and support mechanisms in place, in particular aimed at the SME sector. Outside the EU, new entrant countries such as Poland and Hungary, have been substantially strengthening their support systems in order to prepare industry for the increased competition that will follow accession.

Supra-national bodies also recognize the significance of innovation and technology. The European Commission, for example, has paid close attention to improving innovation and technology transfer across the EU, for example through the European Innovation Monitoring System (EIMS) and the framework R&D programs. The World Bank is similarly active in central and eastern Europe and central Asia, for example through its current initiatives to support real and virtual technology incubator networks and technical assistance centers.

In the context of e-development towards the knowledge economy, business incubators can play a particularly important role as bridges and levers for the digital, economic, and knowledge divides around the world, allowing entrepreneurs to tap into markets and pools of expertise that may span the globe and also individuals that can add value from a remote location, to participate in such entrepreneurial ventures. Incubators may be much better suited to play this role in developing and even transitioning economies where the business and regulatory environment, the infra-structures, and other critical resources that are key in the formation and growth of new ventures such as human, intellectual and social capital are non-existent, scarce, or hard to access.

This is unlike the case of most developed economies, where there is often oversupply of these critical resources. In this sense, incubators and especially glocal networks of real and virtual incubators can be perceived as ways and means to enable more effective and efficient allocation of knowledge-based assets locally, regionally and globally. Moreover, they can also be perceived as tools for glocal knowledge arbitrage (GKA), namely devices that may allow entrepreneurs to unlock and capture substantial added value from pooling and leveraging human, intellectual, and social capital. In particular, GloCal, Real & Virtual Incubator Networks (G-RVINs), may prove a powerful means in the struggle and race for development.

#### 4.2. *The G-RVIN concept: catalyst and accelerator of e-development towards the knowledge economy*

##### 4.2.1. *Motivation*

Any human endeavor, and entrepreneurship par excellence, is subject not only to technological challenges and opportunities but also to human and cultural ones. The success of entrepreneurial ventures relies on the appropriate 'brew' of tangible and intangible assets with the right timing, selection and sequencing and in this sense incubators and in particular, networks of real and virtual incubators with local presence and global reach (or GloCal Real & Virtual Incubator Networks or G-RVINs), can also serve as compensating mechanisms to deal with such human and cultural, as well as regulatory, business and political hurdles that entrepreneurs in developing and transitioning and developing economies are confronted with.

The G-RVINs will be supported by internet and wireless multimedia enabling technologies starting within a specific region first and expanding globally to connect, catalyze and leverage the creation, dissemination, absorption, and use of technical and business knowledge and know-how among and within less developed regions.

The G-RVINs would use a portfolio of telecommunication and information technology appliances and infra-structures to allow less privileged people to connect with private and public sector centers of teaching, research, and learning and through distance and local mode learning as

well as master-apprentice and mentor-protégé schemes, to empower them to acquire knowledge and skills that would then allow them to become knowledge workers in their own right and tap in the global knowledge infra-structure and markets.

The G-RVINs can help with regards to four particular determinants of entrepreneurial success:

- Awareness;
- Availability;
- Accessibility;
- Affordability.

of key knowledge assets, expertise and know-how, as well as very mundane and basic resources for new ventures.

The G-RVINs can also help as strategic communication, co-optation and coordination devices enabling local entrepreneurs to become gloCal knowledge arbitrageurs by allowing horizontal, vertical, and even diagonal integration of value adding chain activities and assets.

In other words, G-RVINs can help promote economic development, integration and convergence among developed and developing/emerging economies. The nature and dynamics of the essential drivers of local, regional and global productivity and competitiveness factors are increasingly assuming a 'gloCalizing' (global, regional and local) socio-economic and technological context. The premise of the G-RVIN concept, is that the critical success and failure factors that undergird the enduring wealth of nations and firms increasingly pivot on the formation of 'gloCal' knowledge grids, clusters and networks of innovation involving private and public entities, such as large as well as small firms, government research laboratories, universities, and government agencies, as well as NGOs.

Along with aiding the less-developed regions, this effort would help develop and make accessible knowledge workers that are becoming increasingly scarce in the developed economies thus enabling further economic growth around the world. The knowledge and training provided locally and through distant learning would encompass basic technical, business and health care in packages that would be formulated to fit the needs and context of the situation they would be targeted for.

The aim of the G-RVIN is to support and promote interaction among the four segments of the society and economy (Fig. 2):

- government (local, national and regional authorities involved in private sector development, i.e. ministries, local entities, agencies, etc.);
- firms and companies of different sectors and dimensions (i.e. manufacturing, large, small and medium, micro);
- entities of the financial sector (i.e. banks, insurance companies, venture capitalists, etc.); and

- civil society (i.e. universities, associations, trade unions and NGOs, etc).

Each of these segments are crucial to support and sustain the goals of private sector development. The G-RVIN will be the framework to create links among these segments that would otherwise rely only on traditional means of interaction, being then heavily affected by geographic and cultural distance and barriers that hinder the development of an open market economy. The four pillars of society and economy do not have sufficient and efficient means of interaction and communications to foster sustainable long-term growth plans. So far, the interaction of these actors is only guaranteed by traditional means of cooperation. The creation of the G-RVIN will improve the interaction within and among each segment. Currently, there are various factors that

- **Government:** The lack of an ICT vision in the public administration of most developing and many transitioning countries has hindered the development and implementation of proper e-government initiatives. The creation of a G-RVIN may improve the efforts in that direction. By establishing e-government solutions, public administration and governmental agencies will improve the efficacy of their services and policies. The regional connotation of the network will, moreover, foster international cooperation both within and across regions in that regard.
- **Private sector:** From a private sector point of view, the motivations for the project hinges on the fact that the profitability of small, medium and micro enterprises, but also large firms, is heavily affected by:
  - Poor business plans;
  - Lack of access to financing (micro-lending) at reasonable costs and conditions: asymmetric market;
  - Inadequate knowledge of requirements of finance providers by entrepreneurs;
  - Inadequate financial plans;
  - Lack of opportunities to explore new markets or expand opportunities in the local ones.

The network will address these major limitations for the development of the private sector, by providing a framework to:

- access appropriate information and training solutions;
- establish a forum to create and disseminate knowledge about business management, production and distribution techniques;
- enable buyers and sellers to interact in a virtual e-marketplace that will provide opportunities at local, national and regional level.
- **Financial sector:** The banking and financial sector many transition economies has dramatically improved in the transition from centrally planned economy to an open market one. Yet, across the board the reform

and development of the financial sector has not been homogeneous. There is still a wide gray area in the financial sector, for instance in many countries of central and eastern Europe, including EU accession candidate countries: corporate governance, management, links to enterprises and government financing. These weaknesses have prevented some institutions from being able to fulfill their function as financial intermediaries, leaving the overall sector affected by inefficiencies. The regional virtual network may help correcting the asymmetries in the region's financial services and markets, by spurring cooperation and consolidation. Financial institutions will gain by having a wider audience of potential customers, to whom offer modern insurance and financial solutions to meet the demand of the private sector, especially small entities.

- **Civil society:** Any action aimed to developing the private and financial sectors would be devoid of meaning without proper participation of civil society, the G-RVIN may serve as the means to extend the dialogue and include entities form civil society, such as NGOs, associations of citizens and consumers, trade unions, universities, etc. The lack of viable means of coordination hinders the ability of each of these actors to affect their decision-making. Their contributions are crucial to promote sustainable development towards the knowledge economy, for the role they play in the society: universities are vital to promote learning and training activities while NGOs and associations of consumers have the potential of guiding both the private and financial sectors in the offer of proper and adequate services and products.

#### 4.2.2. *G-RVIN particular attributes*

- **Uniqueness:** The pilot is unique in its focus on creating opportunities for the four pillars of society and economy, new room for new entrants and enabling existing micro- and small-sized enterprises to improve production and penetrate international markets through an Internet-based innovative tool.
- **Replicability/Scalability:** Pilot projects will initially be implemented in few target countries in a select region, such as Poland. In the next stage, will be implemented on a cross-regional and international scale to foster replication of successful models, thus maximizing the long-term development impact on private and financial sectors. Moreover, the knowledge creation, sharing and use model can be replicated globally for other sectors of interest for development strategies of private or public sector entities.
- **Multiplier effect:** The pilot has a positive impact on the various aspects of the private and financial sectors. It includes the participations of different entities involved in the social and economic development of the region of focus The G-RVIN is a suitable instrument to support

diverse sectors of the economy, providing a reliable and replicable framework to foster development and should trigger significant knowledge, market, and network spill-over effects within and across regions.

#### 4.2.3. Role of each segment within the network:

1. Government: The e-government component of the G-RVIN will allow governmental entities to cooperate among each other at local, national and regional level to coordinate their efforts in providing a suitable e-government system in support of the private sector. Thanks to the network, local and national governmental agencies can go digital and provide information and up-dates on services and requirements for the private sector, i.e. licensing requirements, authorization requests, national and international standards, safety measures, etc. At the regional level, the G-RVIN will improve interaction among countries within a region in terms of benchmarking, wider cooperation to establish common standards and procedures and promote positive spill-over on e-governance focused on private sector development. The participation to the G-RVIN will be easier in those countries that already have e-government plans. In addition, the creation of e-government solutions will improve the interaction between public administration and private sector by enhancing e-procurement. For the countries that do not offer any e-government solution, the G-RVIN opportunity is two-fold:
  - It creates an incentive in implementing e-government solutions to participate in the network. This is a basic element of the networked economy, where there is a disadvantage by being excluded by the network.
  - It grants the opportunity to benchmark and implement already tested solutions for e-government, providing these countries with guidelines and examples of success and failure examples from solutions implemented by other countries.
2. Private sector: The G-RVIN will allow firms of various sectors of the economy and sizes to participate in the creation, sharing and use of knowledge for their own needs and priorities. The network will bring together ideas and opportunities for firms to get more integrated in the value chain of production, distribution and marketing at both national and regional level. Access for micro-enterprises and artisans will be supported by the creation of telecenters that will function as local one-stop-shops for entrepreneurs, granting them access to the integrated package of services of the network: information on requirements and regulation from governmental agencies, information on supply and demand dynamics of local, national and regional markets; training and guidance on best practice on the production and distribution cycles provided by the quality content available on the network; access to financial services and information about capital availability thanks to

the integration of the financial sector actors (banks and venture capitalists); news and updates on the development of the social dimension of the market, thanks to the link to universities, NGOs and consumers.

3. Financial sector: The G-RVIN will bridge the gap between financial institutions and end-users of financial services. The participation of banks, insurance companies and venture capitalists is crucial to sustain the development of both the financial and private sector. On the one hand, the network will create new opportunities for the financial sector, by making a wider audience accessible, hence stimulating competition among financial actors. Moreover, the regional dimension of the network can foster regional integration and consolidation of the banking and insurance sector. On the other, entrepreneurs will be able to improve their access to capital, by gaining more accurate and relevant information on financial services and different solutions and actors of the whole sector. The network will create a window of new opportunity for entrepreneurs thanks to the participation of venture capitalists that may find viable business opportunities.
4. Civil society: The rationale for the inclusion of the civil society segment in the network hinges on different factors:
  - Universities and other institutions can redefine their educational services according to the better knowledge of both the private and financial sectors, which will allow them to better understand the training and skill needs of an economy in transition.
  - There is the need to create an interface between the research carried out in universities and other institutions and the market where the results of such research will be implemented.
  - NGOs and associations of citizens and consumers can find a forum in which to express their needs and opinions on services and products. This forum will allow consumers and citizens to contribute in the shaping of the market, and companies to better understand the needs and expectations of the demand side of the market.
  - The network can function as preferential channel to link the enterprise and job-seekers at national and regional level, providing new opportunities and increasing mobility across the region.

## 5. The G-RVIN pilots experience: lessons learned and implications

### 5.1. G-RVIN pilot: *Fabrykat 2000*

To support and guide the implementation of this initiative which will focus on CEE (Poland, Hungary, and the Czech Republic) and SEE countries, we will draw upon our experience and lessons learned from a recently

completed 2-year, US AID-funded project in Poland, called Fabrykat 2000 (in which the first author participated as expert advisor).

Fabrykat 2000 aimed at building the Polish manufacturing technology transfer system as a facilitating mechanism to integrating Poland into the European Union and provided technical consulting services to 113 SMEs in Poland. In addition, the project provided specialized assistance in venture capital, lean and agile manufacturing methodologies, collaboration software and training, technology transfer models, and business planning.

The project strengthened the financial, marketing and technical capabilities of four technology transfer centers in Poland. It also demonstrated the potential of building partnerships and strategic alliances between US firms and Polish enterprises. The experience generated a number of concepts to dramatically shorten the technology transfer cycle and reduce costs through the use of internet-based tools. Fabrykat 2000 concluded with the design of a more cost-effective, high velocity web-based technical assistance service that after development may provide a scaleable model to emerging economies throughout the world.

One of the key lessons learned, was that technology can be both overestimated and underestimated at the same time, namely, there were several cases where the benefits of awareness, availability and accessibility to the global grid of knowledge encompassing US and European experts were apparent. Non-apparent, elegant and powerful solutions to challenging technical and business problems that Polish entrepreneurs were dealing with were provided very quickly and via virtual consultation in several cases, saving expert travel and time costs. At the same time, there were some cases where attempting to solve problems only on the basis of virtual interactions proved inefficient and ineffective.

The Fabrykat 2000 experience reinforced our perception that there is a need for a flexible mix of both real and virtual interactions, hence providing anecdotal empirical evidence supporting the G-RVIN model.

## 6. Conclusions

In this paper, we propose an overarching incubator model that synthesizes elements and best practices emanating from the five archetypes empirically identified and also incorporates substantially higher economies of scale and scope, as well as global and local (gloCal) knowledge arbitrage potential. This paper presents an architectural blueprint for designing a gloCal, real and virtual network of incubators (G-RVIN) as a knowledge and innovation infra-structure and infra-technology which would link entrepreneurs and micro-entrepreneurs with local, regional, and global networks of customers, suppliers and complementors and thus help not only bridge, but also leverage the diverse divides (digital, knowledge, cultural, socio-political, etc.).

This paper also discusses some basic concepts about the nature and role of business incubation and in particular, G-RVINs as catalysts and accelerators of economic development and convergence of developing and transitioning economies towards more developed economies or the e-development of developing and transitioning economies towards knowledge-based and knowledge-driven economies.

Our premise is that the G-RVIN model may be particularly helpful in less-developed economies, where incubators can help bridge knowledge, digital, socio-political and even cultural divides and help increase the availability, awareness, accessibility and affordability of financial, human, intellectual, and even social capital, the key ingredients of entrepreneurial success.

Incubation has recently experienced increased attention as a model of start-up facilitation. Venture capitalists see incubators as a means to diversify risky investment portfolios, while would-be entrepreneurs approach incubators for start-up support. Incubators are faced with the challenge and the opportunity of managing both investment risks, as well as entrepreneurial risks. As an indication of their usefulness, more than a thousand incubators have been established in the last few years based on a number of different incubation business models (not-for-profit, for-profit, public/private entity, etc.), which we categorize in five incubator archetypes: the university incubator, the independent commercial incubator, the regional business incubator, the company-internal incubator, and the virtual incubator.

Based on the experience from e-development interventions in a number of countries and also one particular pilot implementation of a G-RVIN in Poland, we feel that this concept provides a powerful way to leverage business incubation on a larger scale and scope via the support of ICT, as well as strategic balance between local and global challenges and opportunities.

Further research is under way to identify, analyze and organize the best practices of business incubation in the G-RVIN context which can serve to bridge, as well as leverage the digital, knowledge, and cultural divides among and within developed, transitioning and developing countries.

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