
The Role of IT-Focused Business Incubators in Managing Regional Development and Innovation

Dr. Dimitrios Lagos¹, Dr. Konstadinos Kutsikos²

Abstract:

Governments are increasingly focusing on achieving growth at regional, national and international levels. Research and practice indicates that innovation is a key driver for achieving this goal. Unfortunately, finding efficient ways to promote and manage innovation is not a straightforward task. It depends on potentially conflicting parameters that are critical for turning innovative ideas into local and national economic prosperity. To address the challenge, regional and national governments are adopting best-practice vehicles of innovation management. In this article, we focus on one such vehicle, namely business incubators. After presenting basic definitions, we provide quantitative and qualitative research findings on the positive effects that incubators may have on regional development. These findings are often constrained by lack of access of researchers in the internal structure of incubators, thus providing only an “outside-in” viewpoint. Our involvement in the development of an IT-focused incubator in the UK provided new research insights, from an “inside-out” perspective. The latter is presented in terms of an integrated incubator model and the structure of its components is described and analyzed.

Key Words: *Business Incubation, Technology-based Innovation, IT-focused incubators, Regional Development, Innovation Management*

JEL Classification: *M13, M15, O32, R11*

¹ *University of the Aegean, Business School, Chios, Greece, E-mail: d.lagos@aegean.gr*

² *University of the Aegean, Business School, Chios, Greece, E-mail: kutsikos@aegean.gr*

1. Introduction

The term ‘innovation’ can be defined as the successful exploitation of new ideas, often involving new technologies or technological applications. Its importance lies with the fact that it can deliver better products and services, new and more efficient production processes and improved business models. Indeed, innovation has driven economic progress, from the invention of the spinning jenny that transformed the textile industry during the 18th century, to the harnessing of electricity and the development of mass production. More recently, semi-conductors, the Internet and wireless technologies have revolutionized business performance and the economic potential of nations.

Today, innovation is even more urgent for companies and countries alike, due to an increasing number of macro- and micro-economic trends:

Trade liberalization and a rapid fall in communication and transport costs mean that many western countries must increasingly compete against countries with much lower labor costs and well-educated labor forces. For example, wages in China are less than 5% of those in the UK. Labor costs in Korea are just over half the UK levels, while the proportion of graduates in the working age population is almost identical.

Technology and scientific understanding are changing our world faster than ever before. Developments in information technologies, new materials, new fuels and nanotechnology are unleashing new waves of innovation, thus creating many opportunities for entrepreneurial businesses to gain competitive advantage at regional, national and international levels.

Global communications, the “24 hours, 7 days a week” phenomenon of the 21st century, means that consumer tastes are also changing faster, as new trends, ideas and products spread across the world almost instantaneously.

Unfortunately, finding efficient ways to promote and manage innovation at regional and national levels is not a straightforward issue. Research indicates that managing innovation heavily depends on certain intertwined and complex parameters that are critical for turning innovative ideas into local and national economic prosperity (Porter, 2003):

- Sources of new technological knowledge
- Capacity to absorb and exploit new knowledge
- Access to financing
- Entrepreneurship and competition
- Collaboration and networks of alliances
- A regulatory environment that promotes the above.

Managing these parameters is an even more difficult task for information technology startups – the growth workhorse for many regional and national economies across the globe. Such startups are historically characterized by growth

factors that heavily depend on endogenous needs, thus increasing the quantity and quality of innovation parameters that need to be properly managed.

To address the challenge, governments are investigating and adopting best-practice vehicles for managing regional development and innovation. In this article, we focus on one such vehicle, namely business incubators. After presenting basic definitions, we provide quantitative and qualitative research findings on the positive effects that business incubators may have on regional development. Unfortunately, these findings are often drawn independently from the incubator's internal structure, due to commercial sensitivities that often limit researchers' access to incubators. Our involvement in the development of an IT-focused incubator in the UK provided new research insights, from an "inside-out" perspective. The latter is presented in terms of an integrated incubator model and the structure of its components is described and analyzed.

2. Business Incubators: Definitions and Relevant Research

Terluin (Terluin, 2001) classified theories on regional economic development based on organizational competitiveness. The result is the grouping of these theories into: a) traditional models; b) pure agglomeration models; c) local milieux models; and d) innovation models (see Table 1).

Table 1. Classification of theories on (regional) economic growth

Models	Theories
Traditional models	Neo-classical growth theory Keynesian approach: Export base theory
Pure agglomeration models	Cumulative causation theory Growth pole theory
Local milieux models	Endogenous growth models Theories based on the changes in the organization of labor
Innovation models	Incubator theories Product life cycles Theory of innovative milieu Porter's theory on competitive advantage of nations Storper's theory - region as a nexus of untraded interdependencies

A common aspect of the above theories is the emphasis on innovation in order to explain economic development. For example, (Perroux, 1998) introduced the concept of growth poles as an innovation vehicle, i.e. a grouping of competences around a central core of support competencies whose actions act as a catalyst to growth in a region. Perroux's growth pole theory hypothesizes that growth is stimulated by cutting-edge industries, firms, or other factors that are dominant in their field. He wanted to refute the claim of classical theorists that growth would flow to less costly areas. In fact, the opposite often occurs, with "propulsive

industries” that have an edge in technology, wealth and political influence. Perroux argued that these growth poles are linked to other growth poles but not necessarily to the periphery area of the central growth node.

In a related direction, incubator theories introduce the concept of the business incubator, i.e. a central organisation that accelerates and systematizes the process of creating successful enterprises by providing them with a comprehensive and integrated range of support competencies, including: incubator space, business support services, and clustering and networking opportunities and links. By providing local entrepreneurs with services on a 'one-stop-shop' basis and enabling overheads to be reduced by sharing costs, business incubators significantly improve the survival and growth prospects of new start-ups. A successful business incubator will generate a steady flow of new businesses with above average job and wealth creation potential. Differences in stakeholder objectives for incubators, admission and exit criteria, the knowledge intensity of projects, and the precise configuration of facilities and services, exist and distinguish one type of business incubator from another.

Researchers have investigated the incubation phenomenon through the application of economic, organizational and social theories (Bollingtoft & Ulhoi, 2005; Clarysse, 2005; Gassmann & Becker, 2006; Hansen et al., 2000; Peters et al., 2004; Remedios & Cornelius, 2003; Rice, 2002; Studdard, 2006), while others have analyzed how business incubators are organized and managed in an attempt to identify best practices (European Commission, 2002a; Murphy et al., 1996). Another research stream analyzed how business incubators contribute to their tenants (Cooper, 1985; Merrifield, 1987; Grimaldi & von Zedtwitz, 2006), or to regional entrepreneurship and economic development (Aernoudt, 2004; Allen & Rahman, 1985; Honadle, 1990; Lalkaka, 2000).

Quantifying such research findings is a research task that is receiving increasing attention in the incubator field. For example, based on a survey of business incubators in EU Member States, a European Commission report (European Commission, 2002a) indicates that regional and national public authorities are generally the major shareholders in most incubators established in EU countries (see Table 2).

Table 2. Key partners involved in setting up business incubators

Partners (Board Members and other partners)	Number	Percentage
EU and/or other international agencies	36	13.4
National authorities and public agencies	68	25.3
Companies, banks and other private sector organizations	56	20.8
Universities and other R&D organizations	44	16.4
Community and voluntary organizations	34	11.5
TOTAL	269	100

This involvement of local and national governments drives the principal objective of most incubators, which is the contribution to the competitiveness of local economies and the creation of new jobs (see Table 3).

Table 3. Business incubator objectives

Incubator objectives	Ranking (1 = most important)						Average
	1	2	3	4	5	0	
Contribute to competitiveness and job creation	56	14	4	0	1	3	1.3
Help R&D centers commercialize know-how	10	18	19	18	3	9	2.8
Help companies generate spin-off activities	3	23	27	12	5	7	2.9
Help disadvantaged communities/individuals	1	12	12	22	15	16	2.8

As a result, incubators depend heavily on public financing for their operations. From a sample of 88 business incubators in EU countries (European Commission, 2002b), just over a fifth of the set-up costs are subsidized by the EU and other international agencies whilst almost half of the set-up costs (46%) are funded by national, regional and local authorities (see Table 4). This high initial dependency on public financing is in line with expectations, as one of the functions of business incubators is to address market failure and to facilitate accelerated growth of local start-up companies to new businesses which, by their very nature, have little in the way of collateral or revenue until they have reached the mature stage of their development.

Table 4. How business incubators' set-up costs are funded

Source of Funding	Percentage
Subsidies - EU and other international agencies	22
Subsidies - national authorities and public agencies	46
Payments from banks and other private sector organizations	13
Payments from universities and other R&D organizations	5
Other	13
TOTAL	100

The dependence on regional public funds may also play a role on the positive impact that business incubators have on the communities where they are located, by generating employment opportunities for local people. As the European Commission reports (European Commission, 2002a), over 75% of the personnel recruited by EU business incubators comes from the same areas as where the incubators are located. It is, of course, understood that these results are not to be taken for granted: companies engaged in knowledge-intensive activities could be expected to have difficulty finding local people with the required specialist skills. Nevertheless, the above figures point to a favourable impact on regional and local labour markets.

Business incubators have also an indirect job creation effect at a regional level (European Commission, 2002b), as: a) for every one incubator company job, a

further 0.4 jobs will have been created indirectly via local supply chains that provide goods and services to the incubator; b) for every one incubator job, a further 1.5 jobs will have been created in the local and regional communities resulting from additional spending on local goods and services by people recruited by incubator companies.

Interestingly, a key characteristic of most of the above theoretical and empirical findings is that they refer to incubation outcomes and effects on regional development (e.g. number of new firms, jobs and firm survival) without relating them to the incubator model – i.e. how incubators organize and manage internally their incubation processes (Bergek & Norrman, 2008). This implies that the incubator model has been treated like a “black box” – an approach that is often unavoidable as commercial sensitivities inhibit internal access to incubators by researchers. The latter may thus:

- not be able to fully investigate how the internal structure of an incubator may influence the incubation outcomes, hence potentially distorting the qualitative and quantitative performance measurements of the incubation effects on regional development;
- have mostly a piecemeal perspective on the incubator model and its components, as many observations are external (“outside-in”), post-implementation findings.

These issues are compounded in the case of incubators focusing on information technology startups - the growth workhorse for many regional and national economies across the globe. Such startups (and thus their incubators) are further characterized by growth factors that heavily depend on endogenous needs, thus increasing the quantity and quality of incubation process parameters that need to be properly managed.

3. Research Objectives

Our aim is to explore how the internal structure of IT-focused business incubators can influence the innovation impetus of IT startups and their resulting effects on regional and national economies. This broad research objective can be decomposed into three key research questions:

- Beyond isolated incubator model components described in current research literature, how can an integrated incubation model be described?
- How does IT affect the design and implementation of an integrated incubator model?
- What are the relevant key success factors that will maximize an incubator’s positive effects on regional development?

4. Research Design and Methodology

As a prerequisite to our research effort, we reviewed a number of current incubator models and IT startup development models. The focus was on understanding their underlying principles and structural elements. Particular emphasis was placed on collecting and analyzing relevant research data from multiple sources, with a varying degree of theoretical rigor and practical insights. For example, we analyzed a large amount of statistical and survey data, collected by trans-national government agencies, such as the European Commission-Enterprise Directorate General. As discussed earlier, the constraint of this approach is that many of the findings under consideration may not be based on full details of the internal structure of incubators (i.e. an “outside-in” viewpoint).

The bulk of our research work was focused on empirical research and longitudinal case studies for developing an IT-focused incubator and extracting relevant research insights from an “inside-out” viewpoint. Longitudinal case study research is an established methodology for the early exploration of a research question (Covin & Slevin, 1989; Galliers & Land, 1987). It can be valuable in establishing research propositions for either more focused case studies or for wider studies involving a multiple case study or survey methodology.

The incubator model described in the following sections is the result of one of the authors’ involvement in the development and operation of an Internet-focused incubator in the UK, through a combination of participation as consultant and observer. The participation took place during the earlier stages of the incubator development but the relationships established were used to continue to observe outcomes after active participation had ceased.

4.1 Addressing biases

Participant observation is an established technique for collecting in-depth evidence on a phenomenon. However, there are biases that must ideally be addressed to preserve validity. Consultant participation introduces an additional challenge to validity, as the observer participates from a position of influence and can introduce bias into the process of observing, and/or influence the subjects and events being observed. The methodology addressed this through data and methodological triangulation:

- Multiple informants. At least two other researchers were involved and took independent roles in the incubator. Semi-structured discussions were also carried out with individuals at weekly after-work events, where members of the incubator met to discuss issues.
- Multiple sources of evidence. The documents generated by the incubation process and the notes taken at meetings were reviewed in detail.

- Multiple time periods. Incubator development issues were discussed with members of the incubator at a variety of times during the periods of observation. The interpretations of the researcher were also discussed with the main actors and their confirmations or disagreements used to qualify the findings.

Most of the informants were aware of the dual roles of the researcher as being both consultant and active researcher.

5. Developing an Incubator Model: An Empirical Approach

As mentioned above, little has been written about incubator models (i.e. how and in what way incubators operate) and most research findings are based on an “outside-in” viewpoint. Hence, current literature: a) is limited to piecemeal descriptions of incubator model components; and b) does not comprehensively describe how these components can be combined, interact with each other and operate successfully as an integrated entity. For example, (Hackett & Dilts, 2004), (Peters et al, 2004), (Soetanto, 2004), (Bergek & Norrman, 2008) define a number of independent incubator model components. Selection refers to decisions concerning which ventures to accept for entry and which to reject. Infrastructure consists of localities, office facilities and administrative services. Business support is associated with coaching/training activities undertaken to develop the incubatees. Mediation refers to how the incubator connects the incubatees to each other and to the outside world. Finally, graduation is related to exit policies, i.e. decisions concerning under what circumstances incubatees should leave the incubator.

Our involvement in the development of an IT-focused incubator provided a number of research insights on the integration of incubator model components. Figure 1 depicts a high-level view of our integrated incubator model.

Figure 1. High-level presentation of our integrated incubator model

Incubator Model		
Goals and Outcome indicators	Incubator Structure	Incubation Process

5.1 Goals and outcome indicators

The goal of the observed incubator was two-fold:

1. to enhance economic development and reduce unemployment in the region by facilitating the start-up of local new companies, increasing their survival rate and growth, while training local entrepreneurs. A key outcome indicator should be the number of employees, as a measure of job creation;

2. to specifically stimulate Internet-related IT startups. A key outcome indicator should be growth in sales for each of the incubated ventures, as a measure of commercial success.

These goals heavily affect the overall design of the incubator model and the integration of its components, as IT startups are traditionally characterized by growth factors that depend on endogenous needs. Accounting for these factors may, in turn, affect the quantity and quality of incubation process parameters that need to be properly managed.

In order to address the above issues, we identified a number of critical factors for the development of IT startups, based on extensive literature review (see Table 5). These factors were accounted for in the design of the incubator model.

Table 5. Critical factors for the development of IT start-ups

	Innovation capacity	Marketing strategy	Organizational structure	Leadership	Community support
Rothwell et al. (1974)	√	√	√	√	
Maidique and Zirger (1984)	√	√	√		
Cooper (1981)	√	√			
Miller (1983)		√			
Rubinstein (1976)	√	√	√	√	
Smilor (1987)	√	√		√	√
Campbell et al (1985)				√	√
Merrifield (1987)	√	√	√	√	√
Kuratko and Lafollette (1987)					√
Feeser and Willard (1989)	√			√	√
Greene and Butler (1996)					√
Oakey (2003)	√	√	√		
CUMULATIVE	8	8	5	6	6

5.2 Incubator structure

Current research on incubator models often blurs the boundaries between the structure of the incubator (e.g. support services to incubatees) and the incubation process (e.g. incubatee selection strategies). In addition, most research insights on incubation structures are generic and disconnected from the specific goals of an

incubator. We attribute these shortcomings to the aforementioned “black box” constraints encountered by most research efforts in this field.

Based on the development of the observed IT-focused incubator, we claim that in order to account for incubator goals and provide practical support to incubatees, an incubator structure must be comprised of two key components: a) capabilities (“who runs the incubator”); and b) venture management and service provision strategies (“how they run it”).

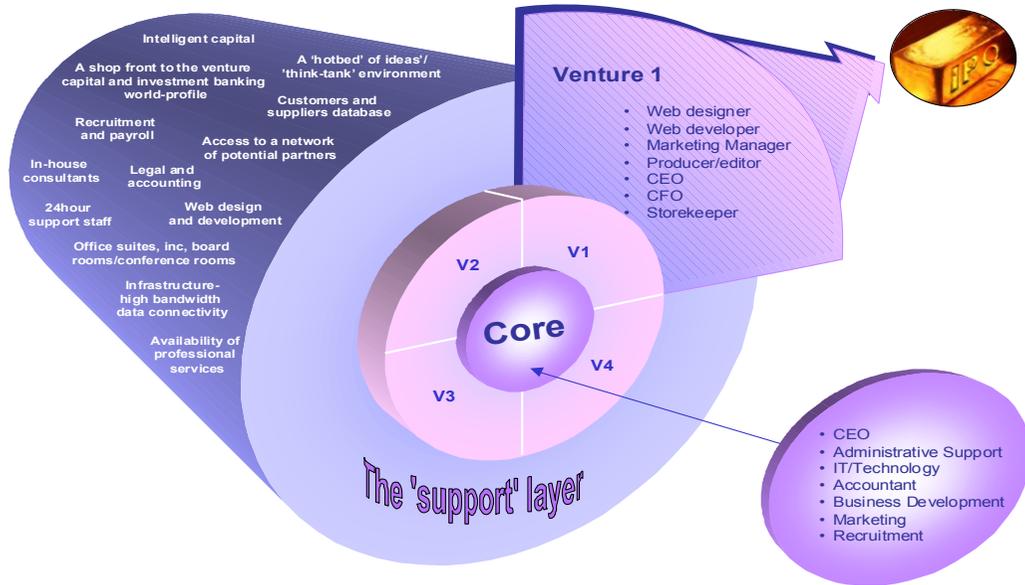
Capabilities refer to the human resources that are responsible for running the incubator’s own operations as well as for supporting the incubatees’ strategic and operational needs. In the observed incubator, the goal of nurturing Internet startups necessitated the recruitment of multi-talented personnel that had to combine: a) business experience in innovation management and business growth; and b) information technology skills and know-how.

For example, the incubator’s CEO had already setup two successful Internet companies in the UK. In addition, highly qualified web designers and online marketing experts were members of the incubator staff.

Combined with capabilities, venture management and service provision (VMSP) strategies provide a basic infrastructure for supporting incubatees and running the incubation process. VMSP strategies refer to the incubator’s role in the incubation process and to the services it provides to incubatees. On one end, the incubator may “hold the hand” of an incubated venture as it progresses through the phases of the incubation process. This was the case for the observed incubator, whereby incubatees were also provided with complete management teams. On the other end of the spectrum, the incubator staff may intervene in a venture either for providing general guidelines at the beginning of each phase of the incubation process or for assisting incubatees on an as-needed basis.

A key link between capabilities and VMSP strategies lies with “capability boundary” decisions: which capabilities need to be permanently part of the incubator structure and which ones can be sourced externally and used whenever relevant needs arise. In the observed incubator, the separation of capabilities was implemented as a three-layer structure with services common across all incubated IT ventures (see Figure 2). The result was the creation of an efficient operational environment of shared costs and know-how.

Figure 2. Internal structure of the observed IT-focused incubator



The Core Layer is the brain of the incubator. It includes services and processes necessary for the overall management of the incubator and coordination of the incubated ventures. Such services include administrative support, accounting support, marketing, IT and communications infrastructure, building facilities and facilities management, and recruitment.

The Support Layer is the heart of the incubator. It is comprised of common services and processes that incubated ventures can tailor to their circumstances and deploy them as and when they need them. Such services may range from web design and development to linking with external financing advisors, legal service providers and the investment community.

The Venture Layer is the womb of the incubator, comprised of all the incubated ventures. Each venture is an independent entity, utilizing the services offered by the other layers. This creates a portfolio of innovation, leading to cross-fertilization of ideas and sharing of best practice. Such a portfolio approach further provides a risk diversification mechanism, thus increasing the probability of success as compared to a single start-up.

5.3 Incubation process

Current research on incubation processes is mostly focused on selection strategies (Hackett & Dilts, 2004). Selection strategies refer to the first step of the incubation process: the decision-making framework for accepting/rejecting candidate ventures for incubation. Such strategies form the basis for effective

allocation of an incubator's resources, with respect to both individual incubators (Lumpkin & Ireland, 1988) and to regional economies (Hackett & Dilts, 2004).

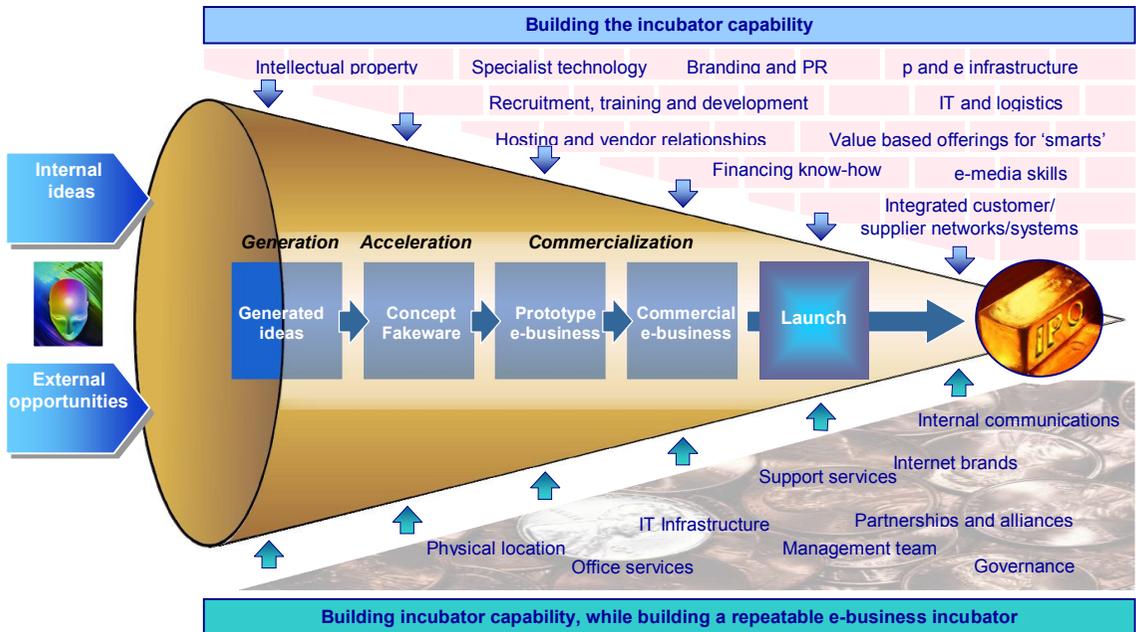
There are two general types of selection strategies: a) selection is focused primarily on the idea; and b) selection is focused primarily on the entrepreneur. This implies that selection strategies are the key link between the incubator structure and the incubation process. For example, in order to pursue an idea-selection strategy, incubator personnel must have (or have access to) deep knowledge in relevant information technologies for assessing the commercial viability of ideas. In contrast, the entrepreneur-selection strategy requires incubator personnel to have the ability to judge personality as well as to have business development expertise for evaluating an entrepreneur's experiences and future potential.

Beyond selection strategies, little can be found in the research literature about the intrinsic structure of other phases of an incubator process. In the observed incubator, a significant point of innovation can be found in the process step following incubatee selection. As selected incubatees were Internet focused by definition, we introduced the idea of 'concept fakeware' – the extensive use of Internet technologies for quickly prototyping ideas qualified by the incubator's selection strategy.

The observed incubator implemented a Concept Fakeware Lab that provided incubatees with a scaled down IT infrastructure of a web design agency and hosting provider. Incubatees can use the services of the Lab to quickly develop an online presence and reach test markets for their products and/or services. The direct benefit is the generation of real-market feedback as early as possible in a venture's lifecycle, thus helping: a) the incubatees, to improve and enrich their business plans; b) the incubator, to decide whether or not to continue allocating resources for moving the venture into the next phase of the incubation process. For example, one of the selected venture ideas that were tested in the Lab was the development of an online service for anonymous online shopping. Although the original idea was about letting users make purchases from any website, 'fakeware' feedback from test-target market indicated that users would not trust even an anonymous service for shopping from any website. The business plan was consequently modified to include a "walled garden" of certified websites from which users of the service could make anonymous purchases.

A high-level form of the observed incubator's incubation process is depicted in Figure 3.

Figure 3. Incubation process of the observed IT-focused incubator



The Generation phase of the process provides the ‘fuel’ of ideas for the incubator, as qualified by its idea-selection strategy. New ideas are stretched by an early evaluation of their value potential. It should not come as a surprise that a large number of ideas can be generated at this stage but only a handful of them may stand up to the scrutiny of business acumen. The refinement of ideas builds heavily on the networked nature of the incubator, as experts from other ventures as well as from the Core and Support Layers of the incubator offer significant specialist input at this stage.

The Acceleration phase of the process is the ‘combustion chamber’ of the incubator, where the ideas qualified in the Generation phase are structured as commercial propositions. At this stage, the process and IT infrastructure for the venture are prototyped and the basic capabilities needed for its commercial take-off are investigated and sourced. The bulk of work is separated into two work streams:

- Business Modeling, where the initial commercial profile of the venture is developed, alternative scenarios are defined and strategic options are identified. This workstream is focusing on researching potential target markets, identifying revenue streams for the new venture, projecting its capacity for growth and evaluating its sustainability.
- Venture Prototyping, where a qualified idea is quickly set up as a skeleton business and tested in the Concept Fakeware Lab, in order to establish its market acceptance. This workstream is focusing on deploying the basic infrastructure for the new venture, evaluating the qualified idea’s

main characteristics with a test market, and providing real-market feedback for business modeling.

The Commercialization phase of the process is the ‘after-burner’ of the incubator engine, where the propositions that were proved commercially viable in the previous stage are now fully developed into independently operating business entities. At this stage, the incubation efforts are focusing on going from prototype to mass commercialization. Support functions like branding, advertising and public relations are implemented in full force while scaling up of the infrastructure occurs in line with the growth projections for the venture.

6. Conclusions and Future Research

The aim of this paper was to shed light into the internal structure (incubator model) of an IT-focused incubator, as a first step in gaining higher quality insights on how incubator models affect incubation outcomes and influence regional economies.

Our review of research literature on incubation revealed that most theoretical and empirical findings refer to incubation outcomes, often drawn independently from the incubator model. This “outside-in” approach is justified as an unavoidable constraint caused by commercial sensitivities that preclude researchers from internal access to incubators. At the same time, this approach creates a number of problems.

First, current research efforts are limited in scope to a piecemeal description of incubator model components, without exploring how these components can be combined, interact with each other and operate successfully as an integrated entity. Second, the bulk of research findings on the incubation process refer to selection strategies but little else is recorded and analyzed about the details of the overall incubation process.

In order to remedy these problems, we provided an “inside-out” perspective which is based on our involvement in and observation of the development of an IT-focused incubator in the UK. We described a practical incubator model with three integrated components: a) Goals and outcome indicators; b) Incubator structure; and c) Incubation process.

With respect to incubator structure, we addressed two key components – capabilities, venture management and service provision (VMSP) strategies – and suggested that VMSP strategies may be positioned on a scale ranging from “hand holding” to “as needed”. These components are then organized in the form of a three-layer structure in a way that promotes an efficient operational environment of shared costs and know-how.

In terms of the incubation process, we discussed the effect of IT technologies in its design and implementation. We introduced the idea of “concept fakeware” and discussed its benefits and implementation specifics in the context of our observed incubator. We then described the intrinsic details of the observed

incubator's incubation process which is implemented as a series of three stages: Generation, Acceleration, and Commercialization.

In the next phase of our research, we will further observe the operation of the IT-focused incubator in order to:

- identify obstacles and catalysts in IT startup development
- fully structure the link between our incubator model and regional development theories, by exploring the impact of incubation outcomes on the regional economy.

Relevant research questions that we aim to pursue are:

- Do selection strategies differ depending on the surrounding context of the incubator? (Is it, for example, reasonable to use the same selection criteria in rural as in urban areas?)
- How does alignment of our incubator components influence regional economies? Which combinations of goals, incubator structures and incubation process implementations may maximize the impact on a region's development?
- The issue of efficient use of regional resources needs to be investigated: do some incubator models require sourcing of fewer resources in order to achieve the same level of performance than other models?

References

1. Aernoudt R. (2004) Incubators: Tool for Entrepreneurship? *Small Business Economics*, 23(2), pp. 27-40.
2. Allen, D.N. and Rahman, S. (1985) Small Business Incubators: A Positive Environment for Entrepreneurship. *Journal of Small Business Management*, July 1985.
3. Bergek, A. and Norrman, C. (2008) Incubator Best Practice: A Framework. *Technovation* 28(2008), pp. 20-28.
4. Bollingtoft, A. and Ulhoi, J. (2005) The networked business incubator – leveraging entrepreneurial agency? *Journal of Business Venturing*, 20, pp. 265-290.
5. Campbell, C., Kedrik, R.C. and Samuelson, D.S. (1985) Stalking the Latent Entrepreneur: Business Incubators and Economic Development. *Economic Development Review*, 3(2), pp. 43-49.
6. Clarysee, B. (2005) Spinning out new ventures: a typology of incubation strategies from European research institutions. *Journal of Business Venturing*, 20, pp. 183-216.
7. Cooper, C.A. (1985) The Role of Incubator Organizations in the Founding of Growth Oriented Firms. *Journal of Business Venturing*, 1, pp. 23-29.
8. Cooper, R.G. (1981) An Empirically Derived New Product Selection Model. *IEEE Transactions on Engineering Management*, 28, pp. 54-61.
9. Covin, J.G. and Slevin, D.P. (1989) Strategic Management of Small Firms in Hostile and Benign Environments. *Strategic Management Journal*, 10(1), pp. 75-87.
10. European Commission Enterprise Directorate General (2002a) Benchmarking of Business Incubators. Final Report, February 2002
11. European Commission Enterprise Directorate General (2002b) Benchmarking the Management of Incubators. Final Report, February 2002

12. Feeser, H.R. and Willard, G.E. (1989) Incubator and performance: a comparison of high and low growth high tech firms. *Journal of Business Venturing*, 4, pp. 429-442.
13. Galliers, R.D. and Land, F.F. (1987) Choosing an Appropriate Information Systems Research Methodology. *Communications of the ACM*, 30(8), pp. 8-18.
14. Gassmann, O. and Becker, B. (2006) Towards a Resource-Based View of Corporate Incubators. *International Journal of Innovation Management*, 10(1), pp. 22-34.
15. Greene, P.G. and Butler, J.S. (1996) The Minority Community as a Natural Business Incubator. *Journal of Business Research*, 36, pp. 51-58.
16. Grimaldi, R. and von Zedtwitz, M. (2006) Are Service Profiles Incubator-Specific? Results from an Empirical Investigation in Italy. *Journal of Technology Transfer*, 31, pp. 77-89.
17. Hackett, S.M. and Dilts, D.M. (2004) A systematic review of business incubation research. *Journal of Technology Transfer*, 29(1), pp. 55-82.
18. Hamel, G. (2000) *Leading the Revolution*, Harvard Business School Press, Boston.
19. Hansen, M.T., Chesbrough, H.W., Nohria, N. and Sull, D.N. (2001) Networked Incubators; Hothouses of New Economy. *Harvard Business Review*, June 2001.
20. Honadle, B.W. (1990) Business Incubators as an Economic Development Tool: Co-operative Extension Programming Responds. *Economic Development Review*, 8(1), pp. 56-69.
21. Kuratko, D.F. and LaFollete, W.R. (1997) Small Business Incubators for Local Economic Development. *Economic Development Review*, 5(2), pp. 49-55.
22. Lalkaka R. (2000) Best Practices in Business Incubation: Lessons (yet to be) Learned. Paper presented at the International Conference on Business Centers: Actors for Economic & Social Development, Brussels 2000.
23. Lumpkin, J.R. and Ireland, R.D. (1988) Screening practices of new business incubators: the evaluation of critical success factors. *American Journal of Small Business*, 12(4), pp. 59-81.
24. Maidique, M.A. and Zirger, B.J. (1984) A study of success and failure in product innovation: the case of the US electronics industry. *IEEE Transactions on Engineering Management*, 31, pp. 192-203.
25. Merrifield, D.B. (1987) New Business Incubators. *Journal of Business Venturing*, 2, pp. 277-284.
26. Miller, D. (1983) The correlates of entrepreneurship in three types of firms. *Management Science*, 29, pp. 770-791.
27. Murphy, B.G., Traylor, W. J. and Hill, C. R. (1996) Measuring Performance in Entrepreneurship Research. *Journal of Business Research*, 36(15), pp. 45-53
28. Oakey, R.P. (2003) Technical entrepreneurship in high technology small firms: some observations on the implications for management, *Technovation*, 23, pp. 679-688.
29. Perroux, F. (1988) The Pole of Development's New Place in a General Theory of Economic Activity. In Higgins, B., and Savoie, D.J. (eds.), *Regional Economic Development: Essays in Honour of François Perroux*, Unwin Hyman, Boston, Mass., pp. 48-76.
30. Peters, L., Rice, M. and Sundararajan, M. (2004) The role of incubators in the entrepreneurial process. *Journal of Technology Transfer*, 29(1), pp. 83-91.
31. Porter, M. and Ketels, C. (2003) UK Competitiveness: Moving to the Next Stage. UK Department of Trade & Industry, Economics Paper.
32. Remedios, B. and Cornelius, B. (2003) Cracks in the egg: improving performance measures in business incubator research. Paper presented at the 16th Annual Conference of Small Enterprise Association of Australia and New Zealand, Ballarat, 2003.
33. Rice, M. P. (2002) Co-production of business assistance in business incubators: An exploratory study. *Journal of Business Venturing*, 17, pp. 35-46.

34. Rothewell, R., Freeman, C., Horsely, A., Jervis V.T.P., Robertson, A.B. and Townsend, J. (1974) Project Sappho phase II. *Research Policy*, 3, pp. 258-291.
35. Rubinstein, A.H., Cjhakrabarti, A.K., O'Keefe, R.D., Souder, W.E. and Young, H.C. (1976) Factors influencing innovation success at the project level. *Research Management*, 6, pp. 15-20.
36. Smilor, R.W. (1987) Managing the Incubator System : Critical success factors to Accelerate new Company Development. *IEEE Transactions on Engineering Management*, 34, pp. 146-156.
37. Soetanto, D.P. (2004) Research of the role of the incubation policy in helping the growth of new technology based firms. *Globelics Academy*, Lisbon.
38. Studdard, L.N. (2006) The effectiveness of entrepreneurial firm's knowledge acquisition from a business incubator. *International Entrepreneurship and Management Journal*, 2, pp. 11-21.
39. Terluin, I.J. (2001) Rural regions in the EU: Exploring differences in economic development. *Rijksuniversiteit Groningen Research Report*.

