

This item is the archived peer-reviewed author-version of:

Toward a balanced framework to evaluate and improve the internal functioning of nonprofit economic development business incubators : a study in Belgium

Reference:

Vanderstraeten Johanna, Matthyssens Paul, van Witteloostuijn Arjen.- Toward a balanced framework to evaluate and improve the internal functioning of nonprofit economic development business incubators : a study in Belgium
International Journal of Entrepreneurship and Small Business - ISSN 1476-1297 - 23:4(2014), p. 478-508
DOI: <http://dx.doi.org/doi:10.1504/IJESB.2014.065684>
Handle: <http://hdl.handle.net/10067/1208960151162165141>

Toward a balanced framework to evaluate and improve the internal functioning of non-profit economic development business incubators.

A study in Belgium.

Johanna Vanderstraeten, dr.

Corresponding author

University of Antwerp and Antwerp Management School

Department of Management

Prinsstraat 13, Office C-446, 2000 Antwerp, Belgium

johanna.vanderstraeten@uantwerpen.be

Paul Matthyssens, Prof. dr.

University of Antwerp and Antwerp Management School

Department of Management

Sint-Jacobsmarkt 9-13, Dean's Office, 2000 Antwerp, Belgium

paul.matthyssens@ams.ac.be

Arjen van Witteloostuijn, Prof. dr.

Tilburg University and University of Antwerp

CentER and Department of Management

Warandelaan 2, Office K-126, PO Box 90153, 5000 LE Tilburg, the Netherlands

a.vanwitteloostuijn@uvt.nl

Remark

This paper is a revised and expanded version of a paper entitled “Measuring the performance of business incubators. A critical analysis of effectiveness approaches and performance measurement systems” presented at the International Council for Small Business (ICSB) conference, Cincinnati, US, June 23-27, 2010.

Bibliographical notes

Johanna Vanderstraeten is a doctor-assistant at the Department of Management, University of Antwerp, Belgium. She is also affiliated to the Antwerp Management School, where she teaches Strategy for Innovation. She obtained her doctoral degree in September 2013, with a doctoral thesis entitled “Studies on the Strategy and Performance of Business Incubators”. Her research focuses on strategy, institutional theory, performance measurement and service delivering in the business incubator context. She published in *International Marketing Review* and *Technovation*, and presented papers at various international conferences, such as the International Council for Small Business, the European Council for Small Business and Entrepreneurship and EURAM. From January 2010 until August 2011, she was a visiting researcher at Fundação Getulio Vargas in São Paulo, Brazil.

Paul Matthyssens is dean of the Antwerp Management School and Professor of Strategic Management at the Department of Management, University of Antwerp, Belgium, and the Antwerp Management School (AMS), Belgium. His research focuses on market strategy and strategic innovation in international and business-to-business markets. His work has been published in journals such as *Industrial Marketing Management*, *Long Range Planning*, *Journal of Service Management*, *Journal of Business & Industrial Marketing*, *Journal of International Marketing*, *Journal of International Management*, *Journal of Management Studies*, *Corporate Governance: an International Review*, *Journal of Purchasing & Supply Management* and *Technovation*..

Arjen van Witteloostuijn is vice-dean of research at Tilburg University. He is Professor of Economics and Management at the University of Antwerp in Belgium, and Professor of Organization and Strategy at Tilburg University in the Netherlands. His research interests range from international macroeconomics and personality psychology to industrial economics and law evolution. He has published widely in such international journals as the *Academy of Management Journal*, *Academy of Management Review*, *Accounting, Organizations & Society*, *American Journal of Political Science*, *American Sociological Review*, *Economica*, *Industrial Relations*, *Journal of Economic Behavior and Organization*, *Journal of Economic Psychology*, *Journal of International Business Studies*, *Journal of Management Studies*, *Journal of Public Administration Research and Theory*, *Management Science*, *International Journal of Industrial Organization*, *Organization Science*, *Organization Studies*, *Party Politics*, *Personality and Individual Differences* and *Strategic Management Journal*.

Toward a balanced framework to evaluate and improve the internal functioning of non-profit economic development business incubators.

A study in Belgium.

Abstract

Non-profit organizations, such as economic development incubators, may adapt the balanced scorecard and strategy map in their efforts to improve their internal functioning. In this paper, we employ qualitative research among non-profit economic development incubators in Antwerp, Belgium, to modify these tools. By adapting these frameworks, we extend the current incubator literature where predominantly individual measures (such as tenant survival or the incubator's occupancy rate) are employed to evaluate incubator performance. Incubator managers and their funding organizations may use our adapted strategy map and balanced scorecard to uncover the incubator's internal processes that need improvement. The evaluation tools allow them to go beyond the objective and individual performance measures that often are used to evaluate the incubator's performance. The tools can also be used to benchmark several incubators and help funding organizations to make more informed resource allocation decisions.

Highlights

- > We present current shortcomings in incubator evaluation literature
- > The strategy map and balanced scorecard are adequate tools to improve internal incubator functioning
- > We adapt the strategy map and balanced scorecard for non-profit economic development incubators

Keywords

Business incubator; Internal functioning; Evaluation; Performance; Balanced scorecard; Strategy map; Non-profit; Economic development; Belgium

1. Introduction

By stimulating the development of start-ups, business incubators hope to compensate for the liabilities of smallness and newness typically attributed to new ventures (Freeman et al., 1983; Stinchcombe, 1965). A start-up's lack of build-up credibility, few networking partners or inexperience often lead to network externalities and information asymmetries between start-ups and incumbents (Phan et al., 2005). Through the offering of support services such as business coaching, networking opportunities (Bergek and Norrman, 2008) and the use of the incubator's image (Ferguson and Olofsson, 2004), incubators try to dampen the consequences of such market failure. Historically, incubators have been stimulated by governmental agencies (Plosila and Allen, 1985). In particular economic development incubators often receive substantial public funding (Bergek and Norrman, 2008; Grimaldi and Grandi, 2005). In this way, policy makers hope to foster (local) economic development (Grimaldi and Grandi, 2005; Hannon and Chaplin, 2003; Ratinho and Henriques, 2010; Thierstein and Wilhelm, 2001). The incubator's role in job creation, employment growth (Fonseca et al., 2001) and the development of innovative products and services (European Commission, 2000; Schwartz and Hornych, 2010) is expected to improve a region's "capacity to act and innovate" (Beauregard, 1994, p. 271).

In return for the support offered, policy makers expect optimal functioning and continuous improvement (Bigliardi et al., 2006; McMullan et al., 2001; Schwartz and Göthner, 2009a). Although the incubation process is pivotal for incubator functioning (Bergek and Norrman, 2008), internal processes are often ignored during evaluation exercises (e.g., Schwartz and Göthner, 2009a). Most incubator evaluation methods focus on outcome performance measures such as tenant growth and survival (Aerts et al., 2007; Hackett and Dilts, 2008). This contradicts performance measurement literature stating that a focus on outcome measures limits organizations in their ability to find ways to improve their internal functioning (Johnston et al., 2002; Neely, 2005; Neely et al., 2000). The use of a "balanced" evaluation framework is suggested (Moxham, 2009). In this way, outcome accountability such as reaching long-term strategic goals (McLaughlin, 2004) together with organizational improvements (Boyne, 2003; Slack and Lewis, 2008) might be attained. In this paper, we examine how two existing "balanced" evaluation frameworks can be adapted to the context of non-profit economic development incubators. The frameworks we focus on are the balanced scorecard and the strategy map, originally developed by Kaplan and Norton (2000, 2005).

Although the added value of the balanced scorecard and strategy map is widely recognized (Neely et al., 2000), they have not yet been adapted to the incubator context. To

address this, we answer the following research question in this paper: *How can the balanced scorecard and strategy map be adapted into adequate evaluation tools for non-profit economic development incubators?* This research question is rooted in performance measurement literature, where scholars stress the importance of combining individual evaluation measures and integrated systems (Neely, 2005). Specifically, the use of integrated, balanced evaluation systems, such as the strategy map and the balanced scorecard (Kaplan and Norton, 2000), is advocated. This paper also draws on studies about the development of evaluation tools. In particular Tangen's (2004) system output prerequisites are at the basis of the adaptation process, like the importance of comprehensive lists of individual measures and easily understandable system visualizations.

To empirically address our research question, we conduct a qualitative study. We account for incubator manager, expert and customer (that is, incubator tenant) opinions (Kaplan and Norton, 2005) on integrated incubator evaluation systems and their related individual measures (Neely, 2005). Because most economic development incubators focus on local or regional development (e.g., Ratinho and Henriques, 2010), we selected nine non-profit economic development incubators active in a specific region in the economic heart of Europe: the province of Antwerp in Belgium. In the next section, we explain how the balanced scorecard and strategy map may address current shortcomings in incubator evaluation literature. We then discuss the methodology of our empirical research. Subsequently, we present how the strategy map and balanced scorecard can be adapted to the context of non-profit economic development incubators, and discuss why some of the suggested tools and mechanisms are not employed by the incubators in our study. Finally, we provide the study's main contributions, results and research limitations, and offer some possible avenues for future research.

2. Theoretical background

The balanced scorecard and strategy map are two tools that evaluate organizational functioning by including a balanced set of configurational characteristics and measures. A balanced scorecard offers an easily comprehensible and accessible presentation of individual evaluation measures (Kaplan and Norton, 2005). It "supplements traditional financial measures with criteria that measure performance from three additional perspectives – those of customers, internal business processes, and learning and growth" (Kaplan and Norton, 1996, p. 75). A strategy map depicts how an organization's financial goals drive its strategic objectives (Kaplan and Norton, 2000). It uses a "visual framework ... that embeds the

different items on an organization's balanced scorecard into a cause-and-effect chain, connecting desired outcomes with the drivers of those results" (Kaplan and Norton, 2000, p. 169-70). Following strategic fit scholars (Venkatraman, 1989; Venkatraman and Prescott, 1990), the strategy map assures that an organization's strategic objectives are aligned with external and internal elements. For external alignment, Kaplan and Norton (2000) rely on customer expectations. Addressing client expectations is also at the heart of an incubator's strategic value creation possibilities and internal functioning (Bruneel et al., 2012; Vanderstraeten and Matthyssens, 2012). For internal alignment, Kaplan and Norton (2000) incorporate an analysis of internal business processes and innovation and learning mechanisms.

Most incubator researchers use *individual outcome measures* such as tenant survival and growth or the incubator's occupancy rate to evaluate the incubator's performance (Aerts et al., 2007; European Commission, 2002; Hackett and Dilts, 2008; Lalkaka, 1996). Although difficulties in gaining access to the necessary information often forces researchers to employ such individual measures, it limits an incubator's internal functioning evaluation and hampers the incubator in gaining insights into the necessary areas for improvement (Kaplan and Norton, 2000; Moxham, 2010). Interestingly, besides these outcome measures, also the incubator's *service offerings and organizational resources* have been used to examine its performance. Examining the incubator's service offerings closely relates to the customer perspective of the balanced scorecard and strategy map (Kaplan and Norton, 1996, 2005). Meeting tenant expectations and needs is indeed at the heart of good incubator performance evaluations (Vanderstraeten and Matthyssens, 2012). Some incubator researchers restrict themselves by counting the number of services offered (Chan and Lau, 2005; Smilor, 1987), while others dive deeper into the type and quality of incubator resources and services. For example, it has been argued that incubators able to recruit managers with broad networks (Bøllingtoft and Ulhøi, 2005; Studdard, 2006) or considerable entrepreneurship experience (Costa-David et al., 2002; Mian, 1997) likely achieve better evaluations. The type and quality of the incubator's connection to a university (Tamásy, 2007), its professional service network (Lalkaka, 1996), its financial means and public support (Lalkaka, 1996; Mian, 1994, 1997; Zablocki, 2007), and its image/prestige (Mian, 1997) also have been recognized as important incubator resources leading to incubator success.

As also suggested in the balanced scorecard and strategy map (Kaplan and Norton, 1996, 2005), some incubator researchers address an incubator's *internal business processes* during evaluation. For example, Lalkaka (1996, p. 270) suggests that optimal incubator functioning

depends on “the careful planning and implementation of the incubation process”. That is, it is not the incubator facility or the number of services offered but the incubation process itself that defines incubator success (Adkins, 2001). Costa-David et al. (2002, p. 8) explain that “the adoption of a business-like approach to running incubators and monitoring clients” is a prerequisite of incubator success. Unfortunately, incubator researchers have not yet fully unravelled these incubation processes (Campbell et al., 1985; Smilor, 1987), which remain something of a “black box” (Hackett and Dilts, 2008). Efforts stress the importance of selection, monitoring and business assistance, resource munificence (Hackett and Dilts, 2008) and networking mediation processes (Bergek and Norrman, 2008), but the link between these internal processes and incubator performance continues to be largely unknown.

Although most incubator researchers tend to use one or a couple of individual measures to examine incubator functioning, there also exist a few more extensive incubator evaluation systems. Löfsten and Lindelöf (2001) provide an incubation process framework; O’Neal (2005) maps anticipated incubator success elements; Mian (1997) provides a conceptual model for assessing and managing incubators; and Voisey et al. (2006) relate incubator functioning to outcome measures. Although all four studies develop conceptual frameworks, two of them (Mian, 1997; O’Neal, 2005) also apply these frameworks to case studies. Unfortunately, none of these evaluation frameworks comply to all of Tangen’s (2004) output prerequisites. These output prerequisites give an indication of the accessibility and usefulness of performance evaluation frameworks. Table 1 gives a summary of these output prerequisites, whether current incubator performance evaluation literature and the four existing incubator evaluation systems comply to these prerequisites, and how the balanced scorecard and strategy map can address shortcomings in existing incubator literature. By proposing the balanced scorecard and strategy map as adequate evaluation tools for non-profit economic development incubators, we follow researchers such as Niven (2008) and Kaplan (2001) who argue that in a non-profit context such as those of economic development incubators, success cannot be measured by financial results alone (Kaplan, 2001). Besides acknowledging the importance of financial results, the strategy map and balanced scorecard also underscore the added value from customer opinions, internal business processes, and innovation and learning processes (Kaplan and Norton, 2005). Moreover, the balanced scorecard and strategy map stress the importance of setting clear goals, educating employees, and communicating goals to those who are implementing them. In so doing, these tools can translate the incubator’s strategic goals into the necessary processes and systems. For example, involving all employees in the development of a strategy map and balanced

scorecard (Kaplan and Norton, 2000, 2005) can help resolve possible problems for the practical execution of the evaluation tools, such as sub-optimization (Tangen, 2004). In addition, depicting the four performance areas and discussing them with the incubator managers would imply that obtaining the measures and targets is feasible (Kaplan and Norton, 2000, 2005). Ideally, an organization such as an incubator would periodically draw on the strategy map and balanced scorecard to examine its performance and tackle potential problem areas (Kaplan and Norton, 2008).

3. Methodology

To adapt the strategy map and balanced scorecard to the context of non-profit economic development incubators, insights into the incubator's strategic objectives, financial situation, internal processes, environmental influences¹ and customer (that is, the incubator's tenants) expectations are needed (Gumbus and Lussier, 2006; Kaplan and Norton, 2000, 2005). In such a broad, complex context, qualitative research is appropriate (Bryman and Bell, 2007; Dul and Hak, 2008; Eisenhardt, 1989; Yin, 1990). With qualitative research, we aim to show that the strategy map and balanced scorecard can be adapted to non-profit economic development incubators (Siggelkow, 2007).

Following Kaplan and Norton's (2005) suggestion, we employed mixed qualitative methods and executed in-depth interviews and workshops. Between June 2009 and December 2011, we first constructed an intermediary balanced scorecard and a strategy map based on nine in-depth interviews with incubator managers, three focus groups with incubator managers and experts, and 30 in-depth interviews with tenants. We then presented the intermediary tools during a discussion and presentation meeting to incubator managers and experts. Finally, we evaluated the feasibility of the tools during nine additional in-depth interviews with the incubator managers from the initial interviews. Based on these interviews, we adapted and finalized the evaluation tools.

¹ In this paper, environmental influences relate to the expectations of the incubator's funding organization. Because our study population is nonprofit economic development incubators, this is the government.

Table 1: Output prerequisites for evaluation frameworks, and link to the balanced scorecard and strategy map

Output prerequisite (Tangen, 2004)	Incubator literature	Suggested solution: Strategy map and balanced scorecard
<p>Support strategic objectives The system supports the organization's strategic objectives and is flexible enough to allow for strategic changes</p>	<p>A link between individual measures and strategy often lacks. For example, O'Neal (2005) argues that an incubator's goal is to reduce "infant mortality among new ventures" (p.11). He cites three result areas (companies, products, and people) yet fails to clarify which objective(s) the incubator should aim for in these areas. Hence, there is no clear link between the strategic objectives and the evaluation framework</p>	<ul style="list-style-type: none"> - The strategy map provides a structured overview of how to link an organization's strategy to each of the four alignment perspectives - The balanced scorecard can be used as a strategic management system that links "long-term strategic objectives with short-term actions" (Kaplan and Norton, 1996, p.75). The processes in place translate the organization's vision, link the various performance aspects, and stimulate business planning, feedback and learning. Thus, there is a clear link between long-term strategic plans, resource allocation and budgeting processes
<p>Have an appropriate balance The system has an appropriate balance and incorporates</p> <ul style="list-style-type: none"> • Short- and long-term results • Different types of performance (for example, cost, quality, delivery, and flexibility) • Various perspectives (such as the customer, the shareholder, and the competitor) • Various organizational levels (for example, global and local) 	<ul style="list-style-type: none"> - It is often unclear why a particular evaluation measure (and hence stakeholder) is highlighted - The measurement systems do not offer clear links between the various performance perspectives - There is a lack of long-term, medium-term and short-term measures in all four measurement systems 	<ul style="list-style-type: none"> - The strategy map and balanced scorecard are two tools developed to answer the quest for <i>balanced</i> performance measurement. Four perspectives are taken into account: financial results, the customer, internal business processes and innovation and learning - The strategy map and balanced scorecard offer clear links among the four perspectives - The strategy map offers long-term strategic objectives and translates them into medium-term goals. Moreover, these medium-term objectives are translated into short-term measures in the balanced scorecard - The strategy map looks at various long-term strategic goals. These should relate to several organizational levels, such as the clients, the organization and the community
<p>Guard against sub-optimization The system guards against the "productivity paradox" (Skinner 1986)^a. Avoiding sub-optimization can be done by establishing a clear link between the company's top (strategy) and bottom (what can employees do to reach these strategic goals)</p>	<p>The viewpoint of incubator employees is forgotten in all four measurement frameworks. Implications on incubator employees are not recognized. None of the assessment frameworks explicitly explain which activities the incubator employees can undertake and how the employees are expected to act</p>	<ul style="list-style-type: none"> - The strategy map and balanced scorecard force managers to translate the organization's vision in such a way that it also has meaning to those who realize the vision in practice - The strategy map and balanced scorecard force managers to set clear goals, educate employees and communicate goals and performance measures. As such, employees know what is expected from them

Sources: Gumbus and Lussier (2006), Kaplan and Norton (2000, 2005), and the incubator evaluation systems from Löfsten and Lindelöf (2001), Mian (1997), O'Neal (2005) and Voisey et al. (2006).

^a Skinner's (1986) "productivity paradox" refers to the fact that poor performance measures might have a negative impact on employee behaviour.

Table 1: Output prerequisites for evaluation frameworks, and link to the balanced scorecard and strategy map (cont.)

Output prerequisite (Tangen, 2004)	Incubator literature	Suggested solution: Strategy map and balanced scorecard
<p>Have a limited number of measures The system does not constitute of too many measures because this could result in data ignorance and/or information overload</p>	<p>Mian (1997), Voisey et al. (2006), and O’Neal (2005) suggest 23, 19, and 17 measures, respectively, and some of the measures have subdivisions</p>	<p>The balanced scorecard allows for a large amount of measures, but organizes them in such a way that they are easily comprehensible. Information overload is avoided thanks to the use of four evaluation areas that are conveniently arranged</p>
<p>Be easily accessible The system provides information “at the right time, to the right person” (p. 728). The necessary information is easily obtainable, it is presented in an accessible way, and it is easily understandable</p>	<p>The proposed evaluation measures are often difficult to obtain. For example, Mian (1997) suggests to measure the incubator’s impact on the university environment. How this can be done is unclear. Thus, the performance evaluation systems are sometimes complex and not that easily understandable</p>	<ul style="list-style-type: none"> - Because the various business units and departments are involved in the development process of a strategy map and balanced scorecard, hands-on information about the feasibility of the proposed measures is taken into account. Difficulties in obtaining information are thus reduced to a minimum in the development phase - The balanced scorecard offers measures for four perspectives and visualizes these in a structured way. This helps to make these tools easily understandable - The strategy map and balanced scorecard are two tools that proved to be easily understandable. They have been applied by both big and small companies
<p>Consist of measures that have comprehensible specifications The system measures’ purpose is clearly defined. It is clear who will use and act upon the measure. This implies that appropriate targets and timeframes for target reaching are developed</p>	<p>Specific targets and timeframes are lacking in all four studies, and none of the frameworks provide information about the frequency at which to collect data. There are no feedback loops in the frameworks</p>	<ul style="list-style-type: none"> - The balanced scorecard offers clear thresholds. Defining thresholds allows organizations to know whether minimum goals are met - The strategy map and balanced scorecard are two tools that ideally should be filled in yearly - The goal of the strategy map and balanced scorecard is to help managers know whether their strategy is being implemented and also to provide them with sufficient information to better understand why (not). The links between the different perspectives allow an organization to encourage double-loop learning

Sources: Gumbus and Lussier (2006), Kaplan and Norton (2000, 2005), and the incubator evaluation systems from Löfsten and Lindelöf (2001), Mian (1997), O’Neal (2005) and Voisey et al. (2006).

3.1. Population and research context

To increase external validity and lower extraneous variation in qualitative research, Eisenhardt (1989) suggests to add a clear description of the target population. We selected the incubators for our qualitative study based on the incubator's strategic goal and its funding/support organization. Because most incubators are non-profit organizations aimed at enhancing local economic development (Bruneel et al., 2012; Knopp, 2007; Ratinho and Henriques, 2010), we only selected non-profit incubators that seek to pursue local economic development. Moreover, because most economic development incubators receive some kind of government support (Bergek and Norrman, 2008; Grimaldi and Grandi, 2005), we only selected incubators that were linked with a governmental organization.

Belgium is a small country (30.530 km²) located in the economic and political centre of Europe. There are three economically and culturally distinct regions in the country: Brussels, Wallonia and Flanders. At the time of our study, there were 9 incubators in Brussels, 13 in Wallonia and 56 in Flanders. Flanders comprises of five provinces: Antwerp (16 incubators), West-Flanders (9), East-Flanders (11), Limburg (10), and Flemish-Brabant (10). In each province, a provincial development authority offers support to some of the incubators. This development authority might, for example, buy the incubator's land, help the incubator with a marketing campaign, or offer advice at reduced fees. Moreover, the development authority is often one of the incubator's shareholders and is thus involved in setting out the incubator's strategic goals.

At the time of our study, Antwerp, a province located in northern Belgium, hosted the greatest number of incubators. We chose this province for our qualitative research. In Antwerp, there were nine non-profit economic development incubators linked to the provincial development authority. Thanks to good relationships with the development authority, we were able to add all nine incubators to our empirical study. From these nine incubators, five allowed all types of companies to enter the incubator. Four incubators only allowed companies active in a specific sector. More specifically, incubator D focused on companies active in sustainable building, incubator E only allowed companies in the creative sector (such as architects or interior designers), and incubator G had companies active in the energy and environmental technology sectors. Incubator I focused on high-tech companies only, such as life sciences and ICT. Most incubators already exist since the 1980s and 1990s. There were two incubators that recently opened their doors, incubator D and incubator G. Table 2 gives an overview of the incubator characteristics.

As indicated, we also interviewed the incubator's tenants. Because incorporating the opinions of only one type of tenants can lead to biased results (Mian, 1996), we made sure that in each incubator different tenant types were interviewed. For example, in incubator A, we managed to interview a tenant (tenant A3), already located in the incubator for a long period of time. We also interviewed another tenant (tenant A1), who recently joined the incubator. This allowed us to get information from tenants with various experience levels with the incubator's functioning. We also assured that the tenants were active in a wide variety of activities. For example, company I1 is a training and consultancy centre, while company C1 organizes air transport. This allowed us to look beyond the specifics of one specific sector while adapting the balanced scorecard and strategy map to the context of non-profit economic development incubators (see table 3 for an overview of tenant characteristics).

Table 2: Incubator characteristics

Incubator	Interviewee job	Year of founding	Size, office space (m²)	Average occupancy rate (07–09)	Sector or technology focus
A	Manager	1986	2.267 m ²	57%	None
B	Manager	1986	649 m ²	84%	None
C	Manager	1985	1.069 m ²	91%	None
D ^a	Manager	1 st : 2006 2 nd : 2009	1 st : 350 m ² 2 nd : 450 m ²	1 st : 21% 2 nd : 0% (2009)	Building sector, sustainable building
E	Manager	2000	618 m ²	97%	Creative sector
F	Manager	2000	550 m ²	70%	None
G	Manager	2009	720 m ²	17% (2009)	Energy and environmental technology
H	Manager	1995	1.045 m ²	95%	None
I	Manager	1993	1.160 m ²	85%	High-tech, life sciences and information & communication technology

^aThis incubator has two buildings in the same location.

Table 3: Tenant characteristics

Inc.	Tenant	Interviewee job	Year of founding	N° of FTE	Year joined incubator	Activity
A	A1	CEO	2008	2	2008	Gifts for private businesses
	A2	CEO	2001	45	2009	Catering services
	A3	General Manager	1982 (BE: '92)	9,2	1992	Multimedia, gaming, and computer accessories for retail distribution
	A4	CEO	1999	1	2006	Wireless systems and appliances
	A5	CEO	1995	4	2007	Computerizing processes
B	B1	Coordinator	1984 ^a	2	2004	Promotion and awareness stimulation of sustainable energy use and environmental protection
	B2	Managing partner	1992	40	1993	Information and communication technology service provision
	B3	Manager	2009	6	2009	Integrated services for health care
C	C1	CEO	1998	3	1998	Air transport
	C2	Sales Manager	2000 (BE: '08)	2	2008	Market research in foodservices market
	C3	General Manager	1998	7	2007	Chemical: water and paper treatment
	C4	CEO	2006	1	2006	Consultancy: crisis management
	C5	CEO	2006	18	2008	Information and communication technology: optimizing business processes
D	D1	CEO	2009	4	2008	Sales and installation of solar panels and applications
	D2	CEO	2007	1	2007	Study centre: engineering
	D3	Regional Director	1811 (BE: '75)	27	2008	Elevators
E	E1	CEO	2001	4	2009	Interior designer
	E2	CEO	2008	2	2008	Communication expert
	E3	Adviser	1998 (Antwerp: '07)	2	2007	Advice organization for artists
F	F1	CEO	1998	14	2001	Specialized in dry-cleaning cars
	F2	CEO	2007	1	2008	Consultancy: events
	F3	CEO	1999	1	2005	Design and publicity
G	G1	CEO	2008	32	2009	Research and development: pharmaceuticals
	G2	CEO	2009	4	2009	Study centre: subterranean energy storage and heat pumps
H	H1	CEO	1991	4	2000	Audio-visual communication and documentaries
	H2	Employee	1999 (BE: '03)	2	2005	Hardware development
	H3	CEO	1999	2	2000	Communication expert
	H4	CEO	2008	2	2008	Publishing company
I	I1	Employee	1977	1,5	1993	Training, advice, and knowledge centre creative thinking
	I2	CEO	2006	2	2009	Software development

^a First as part of a large organization, then a separate company.

Note: BE = Belgium

3.2. Research design, data gathering, and study quality

To improve this study's reliability and validity (Bryman and Bell, 2007; Eisenhardt and Graebner, 2007), we achieved researcher, method, and data source triangulation (Mathison, 1988). To minimize researcher bias (Bøllingtoft, 2007), we worked as a team of four researchers and held regular team meetings (Eisenhardt, 1989). Two researchers took charge of the data gathering and analysis process; two other researchers served consulting roles. Moreover, we achieved method and data source triangulation by combining primary data from in-depth interviews, focus groups, and open discussion presentations with secondary data from websites, internal documents, and brochures.

We enhanced the credibility of our interpretations through member checks, a research method introduced by Lincoln and Guba (1985) and Hirschman (1986). These member checks allow researchers to verify their intermediate interpretations throughout the data collection and analysis process. First, all the interviews were tape recorded and transcribed; we then sent summaries of the interviews to the participants and asked for their approval. Participants could make any comments needed. Second, we organized focus groups and formal presentations to discuss (intermediate) results, and invited comments from participants.

We conducted two in-depth interview waves with incubator managers. In the first wave, the semi-structured interview protocol focused on the incubator's strategy, functioning, and external influences. During the second wave, we discussed the first version of the adapted balanced scorecard and strategy map, and asked incubator managers if they agreed with the constructs and if the measures we proposed were feasible. The 30 tenant interviews took place during the same period as the first wave of the incubator interviews. The semi-structured interview protocol for tenants focused on the incubator's strategy, service offering, internal organization, and external influences. Thus, we checked tenant viewpoints against those of incubator managers and experts.

We also conducted three focus group sessions in the same period. Combining focus groups and interviews offered the advantage of gathering both in-depth (interviews) and more broad (focus groups) information. Moreover, alternating in-depth interviews with focus groups has an advantage, in that the focus groups can be used to check interview conclusions, as well as to gather input for interview topics (Morgan, 1996). Overall, nine incubator managers and five external experts participated in the focus groups. The incubator managers also participated in in-depth interviews, and the experts were members of non-profit government agencies. We created relatively homogenous focus groups (Krueger, 1988; Morgan, 1988). The first included incubator managers and took place before the individual in-

depth interviews; during this focus group, we discussed factors that might influence an incubator's internal functioning and the context within which it operates. In the second focus group, we included incubator experts, presented our intermediate results, and encouraged a closer examination of the external context. Finally, the third focus group combined the viewpoints from incubator managers and experts. Again, we presented our intermediate results, followed by an in-depth discussion of internal aspects and the external context.

From our first 9 incubator manager interviews, 3 focus groups, and 30 tenant interviews, we made a first adapted version of the balanced scorecard and strategy map, which we refer to as BSEDI (balanced scorecard for economic development incubators) and SMEDI (strategy map for economic development incubators). We then presented these tools during a discussion meeting with incubator managers and experts. Beyond this general presentation, we discussed the SMEDI and BSEDI in-depth during a second wave of semi-structured interviews with the nine incubator managers who participated in the first round, focusing in this case on the practical applicability and usefulness of the intermediary SMEDI and BSEDI. In line with our literature review, we used Tangen's (2004) output prerequisites to check their practical applicability, usefulness, and accessibility. That is, the interviewees indicated whether they agreed with the presented long-term strategic objectives and measurement balance. We also asked their opinion about our efforts to take the viewpoints of incubator employees into account and the feasibility of the measures. Finally, we checked whether the measurement tools were accessible and could result in action. From the input, we adapted the tools to develop the final versions of our SMEDI and BSEDI.

4. Empirical results

To present the findings from our empirical study, we first report interviewee opinions about an incubator's financial situation, measurement methods and targets. Then, we examine the suggested long-term strategic goals to attain healthy financial performance. For each long-term strategic objective, customer expectations, internal processes, and innovation and learning possibilities are discussed. These aspects lead to the different constructs of the strategy map. Thereafter, we present how the customer, internal processes, and innovation and learning perspectives can be measured. We also discuss the suggested targets. This leads to a further development of the BSEDI. Although the incubators in our study already apply parts of the balanced scorecard and strategy map, none of them employ the tools as a whole. The reasons for this are explained throughout the narrative of the empirical study.

4.1. Financial sustainability

Notwithstanding their non-profit focus, interviewees stress that financial sustainability is key for economic development incubators. To this end, all incubator managers rely on *rent from tenants*. Some of them also receive *income from paid services*. The incubators in our study work with a basic service package for tenants. On top of these services, some of them also offer the possibility to buy additional services. Generalist incubators (that is, incubators that allow tenants from various sectors) offer paid non-core business support services, such as doing the bookkeeping or offering operational support during the organization of events. Specialists (that is, incubators that focus on one specific sector) provide core business support such as setting up a business plan for potential investors. Our empirical study also reveals that some tenants do not buy the incubator's additional services, but search them elsewhere. The reason for this is that, although the incubator's services are often reasonable in price, they are sometimes of inferior quality, or outdated. Incubator managers might detect such quality problems during individual tenant or group meetings about their service offerings. Finally, incubator managers warn against becoming too dependent upon income from such paid services. They argue that because small start-ups are not in a financial position to yearly buy a large amount of additional services, income from paid services can be very volatile. Therefore, they advocate to mainly rely on income from rent, and suggest a minimum 85 per cent incubator occupancy rate to attain sufficient rent income.

Besides income from rent and paid services, all interviewees stress *cost cutting*. Although an in-depth yearly audit of the balance sheet and annual report does not take place in our incubators because of time and money restrictions, interviewees do acknowledge that such an analysis might increase the efficient use of resources. Currently, the balance sheet and annual report mainly serve to check the incubator's financial position, and not to improve its efficient functioning. All incubator managers warn against situations in which operating and overhead costs exceed income from rent and paid services. They argue that in such cases, structural *subsidies or sponsorships* are necessary to attain break-even. Some incubator managers strongly oppose such life-long support, because it does not stimulate them to work as efficiently as possible. Although they do acknowledge that subsidies and sponsorships might be required for sporadic, larger investments, they also stress that cost cutting and high enough income from rent and paid services might help them to (slowly) build their own reserves.

Finally, all incubators encounter frequent difficulties in attaining financial sustainability. To address these issues, some of them execute *commercial side-activities*, such as call centres or renting out business sites to larger companies. Such commercial activities can generate

additional profit flows that can be invested in the incubator and thus help it to attain financial sustainability. However, not all incubators in need for additional income execute such commercial activities. The reasons for this are a lack of space, manpower or financial means for large investments. With regard to the latter, interviewees explain that government does not provide support for the setting-up of commercial activities. Because private sponsorship is rather limited, incubators often lack the financial means to start a side-activity. Again, this shows that being too dependent upon subsidies (or sponsorship) limits an incubator in its activities. The incubator managers and experts also warn for becoming financially too dependent upon a commercial activity. They argue that an incubator's main activity remains incubation and stimulating economic development. One of the incubator managers suggests a maximum side income of 10 per cent of the total income. Because this commercial activity has little to do with the incubator's main activities (that is, nurturing start-ups), we do not consider its implications for the four vertical building blocks in the SMEDI (see Figure 1). For the same reason, we do not discuss this aspect further in the context of internal and external alignment.

4.2. How to attain financial sustainability: long-term strategic goals and alignment

To attain the four financial pillars – rent from tenants, paid services, cost cutting, and subsidies/sponsorships – an incubator must pursue long-term strategic goals. We summarize the strategic goals suggested, and discuss the external and internal alignment prerequisites for each.

4.2.1 Structurally stable and diverse tenant portfolio

All interviewees stress that to ensure income from rent, a structurally stable and diverse tenant portfolio is pivotal. Incubators whose companies are all in the same incubation stage face the risk that these companies will reach their final incubation stage around the same time. In this case, the incubator might lose a relatively large number of tenants at the same period, prompting a drastic subsequent drop in rent income. Moreover, tenant interviewees indicate that each time a new tenant enters the incubator, *resource and information sharing* thrive. This gradually decreases when there are no new entrants. Thus, both incubator and tenant interviewees prefer a mix of young starters and companies in later development stages. To achieve this goal, they suggest the development of a professional *selection process*. Although the incubators in our study already employ some “objective” financial and market criteria, interviewees emphasize the need to address an entrepreneur's personal and team

characteristics as well. When asked to explain which selection criteria they would like to add to the selection process, they suggest to add the willingness to cooperate. They argue that it is a strong foundation for a good working climate in the incubator because cooperation leads to cross-fertilization. Tenants state that it is in particular this cross-fertilization that makes them choose for location in an incubator rather than another type of location.

Moreover, because tenant expectations differ and incubators have different service offerings (for example, generalists offer more basic services, and specialists offer services adapted to a particular sector; see above), tenant and incubator interviewees indicate the need for a “fit” between the incubator’s service offerings and the company’s service expectations. Some tenant interviewees point out that their core business does not match with the incubator’s sector focus. Consequently, they cannot use the incubator’s core business services, such as a laboratory or contacts with sector organizations. This shows that some companies would fit better in another incubator than the one they originally contacted. A *structured incubator network*, in which multiple incubators work together to attain *optimal service fit* for each company, can help in this effort. Although some incubator interviewees give examples of companies changing location to attain a better fit, others state that their difficulties in attaining financial sustainability (and thus need for income from rent) often force them to select companies without perfect match.

Although the selection process is pivotal for a structurally stable and diverse tenant portfolio, the *graduation process* also has a prominent role. Most tenants stress that they are eager to learn new things. This demands periodic changes in the tenant portfolio to allow them to broaden their networks and find new possibilities for knowledge transfer constantly. Although all incubators and experts agree that tenants need thus leave the incubator in timely fashion, the appropriate graduation criteria for an incubator are somewhat unclear. Some incubator managers employ a time-bound criterion, such as three to five years. Others merely look at the tenant’s service needs and urge tenants to leave as soon as they are less in need of the services offered or start to grow too large. Although employed in practice, our interviewees warn against pure time-related criteria, because they can obligate the tenant company to leave at a moment when it is not yet “ready” for the market. Neither do they believe that a focus on pure space-bound criteria is advisable, because it would imply that small, non-growing companies never have to leave. They agree that service need criteria are most adequate: Companies no longer in need of incubator services are ready to leave the incubator. Because many incubator services require a willingness-to-interact attitude (for example, internal incubator networks require idea and information exchanges), changes in this

attitude often result from service need changes. In turn, companies not willing to cooperate are urged to leave the incubator.

4.2.2 Value creation effectiveness

Another long-term strategic objective is value creation effectiveness. The tenant interviewees in our study stress that value creation is indispensable for convincing tenants to pay for incubator services. Although service proximity is a clear advantage of incubators that cannot be replicated easily by other start-up service providers such as advice organizations, tenant interviewees indicate that *high service quality, proactiveness, and in-depth service offerings* are equally important. Unfortunately, the interviewees also explain that it are exactly these service characteristics that their incubators often struggle to provide.

Proactiveness, according to the tenants, requires the incubator to offer services adapted to their specific development stage. That is, they expect the incubator management team to follow up actively with its tenants. This is possible if incubator employees possess entrepreneurship-related knowledge pertaining to company needs in varying development stages, and regular contact occurs between the incubator management team and its tenants. However, incubator managers indicate that stressful day-to-day preoccupations often prevent them from closely following upon their tenants. In addition, generalist incubators face challenges in their efforts to offer sector-related, in-depth services to all tenants. To resolve this, our interviewees suggest close *networking schemes with external experts*, which would mean that the incubator employees do not need to possess in-depth knowledge about a wide variety of sectors. Instead, they can refer tenants to the appropriate experts. However, the tenants emphasize that, currently, some incubators only offer a list of possible experts. They find this insufficient; personal incubator contacts with external experts are indispensable to “open doors”.

Our analysis further reveals that interviewees highly value a *knowledge management system* to store relevant service-related knowledge, such as sector information or ways to find company funding. Such a system turns out to be a perfect example of *in-depth service offering*. Currently, none of the incubators have such a system in place, again because of resource constraints. Finally, one of the incubator managers suggests that offering *high-quality services* can be assured through a total quality management (TQM) or ISO system, which is designed to follow up on and improve organizational quality. Another incubator manager, who already had implemented an ISO system, confirms this impression by noting that reflecting on and structuring the incubator’s procedures allowed it to work more

efficiently while also offering higher quality and *continuous service innovation and improvement*.

4.2.3 Efficient functioning

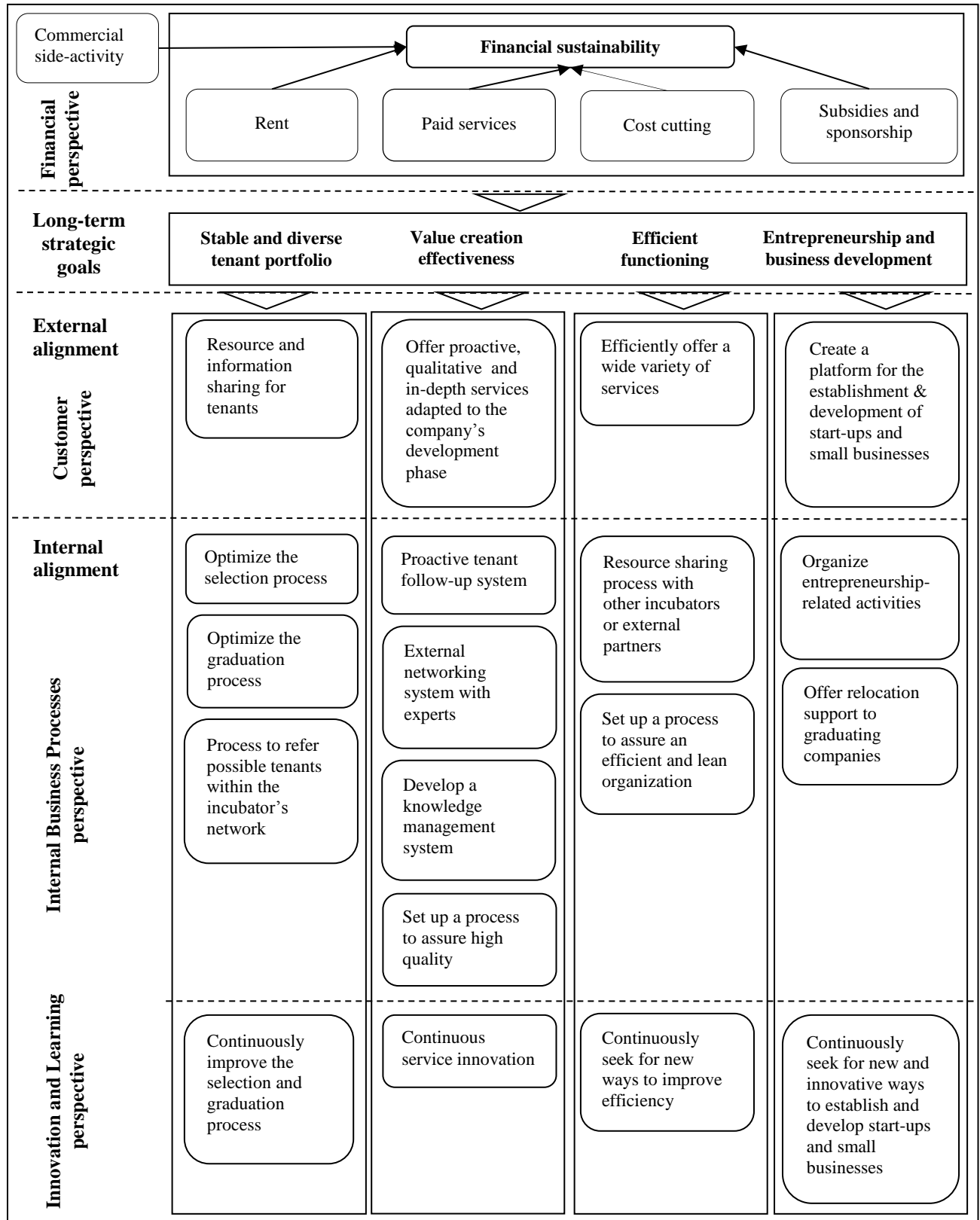
A third long-term strategic objective is efficient functioning. Incubator experts explain that in times of scarcity, subsidy and sponsorship organizations have constrained budgets, and incubators often receive less financial resources. As a consequence, the incubator interviewees explain that they feel great pressure to ensure optimal, efficient resource uses. As explained above, continuous cost cutting is pivotal and the incubator *constantly must find ways to increase its efficient functioning*. Although not often used in practice because of time and resource constraints, the incubator interviewees stress that the pressure to work more efficiently demands a permanent search for explicit *formats and standardized procedures*, as well as a focus on *potential synergies* with external experts and incubators to offer services that are needed only sporadically. Although this point may seem obvious, it is difficult to realize in an organization with a reactive mind-set (that means serving each customer in response to a simple request) and limited staff (that means no time for reflection on existing processes). Some interviewees suggested, though, that their implementation of an ISO system allows them to work more efficiently.

4.2.4 Entrepreneurship and business development

Finally, the interviewees indicated that subsidy and sponsorship organizations increasingly apply a commercial logic, expecting something in return for their funding - namely, that the incubator pursues the funding organization's goals. With our focus on economic development incubators, it is not surprising that interviewees indicate that these goals focus on the facilitation and stimulation of entrepreneurship and successful business development in their local area. The tenants we interviewed argue that business development and entrepreneurship stimulation require an *organized platform* that allows them to broaden their networks beyond the incubator borders. Such a platform can be created easily by *organizing entrepreneurship-related activities*, such as business plan competitions, seminars, workshops, or (international) conferences. Our research also reveals that the economic development incubators tend to *relocate their tenants in the local region* after they graduate, to stimulate the local entrepreneurial spirit and economic development. For example, one of the incubator managers offers active relocation support and works closely with local real estate agents to find nearby offices.

Figure 1 visualizes the above-discussed aspects from the strategy map for non-profit economic development incubators (SMEDI).

Figure 1: SMEDI: strategy map for non-profit economic development incubators



4.3. How to measure internal and external alignment

In what follows, we suggest measures and targets to check for internal and external alignment. Combining these results with those suggested for the financial perspective leads into the BSEDI (balanced scorecard for non-profit economic development incubators) summarized in Figure 2.

4.3.1 External alignment

For external alignment, we followed Kaplan and Norton (2000) and incorporated the customer perspective. Interviewees indicate that *tenant satisfaction* is key. Periodic (for example, semi-annual) tenant meetings, to discuss tenant needs and complaints, are deemed appropriate. Interestingly, tenant interviewees complain that sometimes decisions resulting from these meetings are not clearly communicated. Therefore, they suggest to take minutes of the meetings and explicitly *follow-up and communicate on issues raised*. The meetings can be organized in groups or individually. Incubator interviewees indicate that the former offer the advantage of uncovering complaints or suggestions from a large number of tenants in one meeting; the latter have the advantage of more detailed discussions of individual needs.

Our analysis also revealed that beyond measuring tenant satisfaction, other assessments are necessary. Because tenant satisfaction is rather subjective, interviewees suggest to also employ objective measures. They indicate that knowledge transfer and networking stimulation can be measured with objective criteria, such as the *number of organized contact moments* between tenants (for example, presentation seminars, formal discussion groups, receptions, and team-building activities). Tenants stress that such contact moments are most appropriate when held on a monthly basis. One incubator manager advocates that the *architectural design of the incubator site* also provides a measure of knowledge transfer and networking. A well thought-out design facilitates “accidental” contacts among tenants as much as possible, such as in pleasant gathering rooms. Measuring such accidental contacts quantitatively is not easy, though, so the incubator manager suggests comparing the incubator’s communal surface against its total individual office space. The manager prefers offices that are small, relative to the available communal spaces and advocates that at the least, the total communal surface should be as large as the total individual office space.

Finally, interviewees explain that networking and knowledge transfer can be stimulated through the creation of an entrepreneurship and business development platform, which not only enhances tenant development but also can incorporate other entrepreneurs and companies in the region. To measure the creation of such a platform, they suggest a listing of

the number and type of events, as well as *the number of participants and their affiliations*. Counting the number of events shows how active the incubator is in creating a platform, whereas the number of participants and their affiliations indicate whether the incubator can reach both tenants and entrepreneurs outside the incubator. Finally, making a list of the topics that these events cover reveals whether the incubator is reaching entrepreneurs without a venture and those already running a business but seeking business development after their initial founding.

4.3.2 Internal alignment

If we turn our attention to the internal business processes perspective, most of our interviewees suggest employing *tenant satisfaction* about, for example, the selection process, the incubator's knowledge about company development phases, the accessibility of external experts, and service quality. As explained above, such assessments are possible through systematically organized individual or group meetings. Again, *follow-up and communication on the issues raised* appears very important for the tenant interviewees.

Furthermore, the interviewees suggest a direct evaluation of incubation processes, such as close examinations of the selection criteria. Specifically, they argue for a *balanced selection process*, with attention focused on not only the company's market and financial characteristics but also its personal and team characteristics, such as a willingness to cooperate. In close relation, they emphasize the need for *clearly defined graduation criteria*. Because these interviewees value service-bound graduation criteria, they argue that a company should leave the incubator once its business reaches a predefined development phase.

The selection and graduation processes provide the basis for good incubator functioning, yet our analysis shows that the incubation process itself cannot be ignored. For example, external networking turns out to provide a basis for incubator service offerings, such as business support and the development of an entrepreneurship and business development platform. To measure it, interviewees suggest to *count networking events* and the *number of external experts affiliated with the incubator*. In the latter case, a tenant interviewee suggests to *map the areas of expertise of external experts* because it would reveal the breadth of the incubator's expert network. Moreover, the tenant argues that this mapping and counting exercise could help the incubator provide tenants with a structured overview of its network.

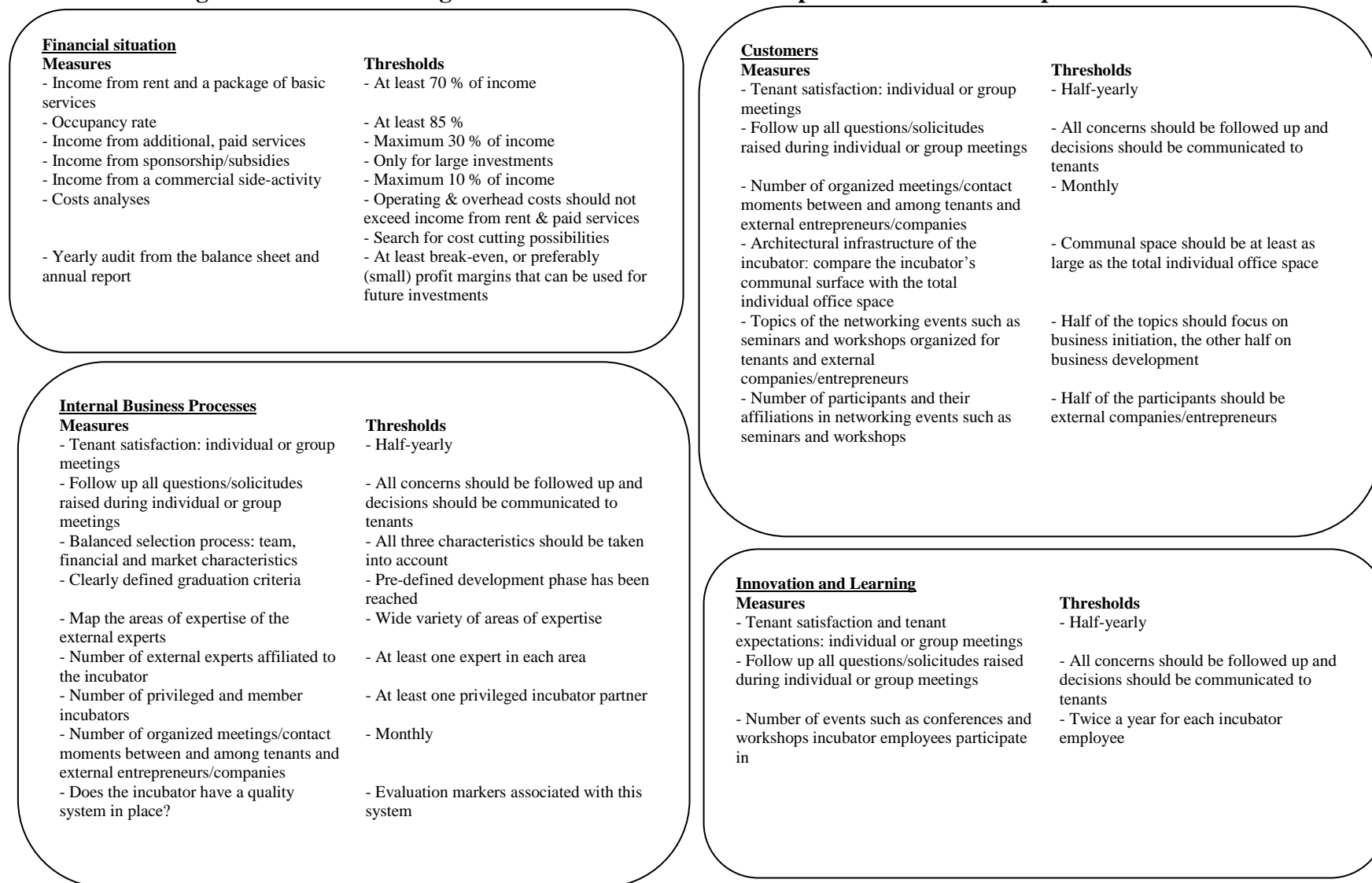
Our analysis of the strategy map reveals that resource sharing is pivotal for incubators. To measure this, interviewees suggest to *count the number of fellow incubators* with which a focal incubator has close connections. For example, a classification might divide incubator

partners into privileged partners and member organizations. For the former, resource sharing and referrals of possible tenants occur frequently; for the latter, contacts can be more sporadic. The incubator managers we interviewed indicate that incubators willing to work as efficiently as possible need to have at least one incubator with which they work closely together for resource sharing, to increase their scale advantages. Finally, to sustain *high quality*, they suggest systems such as TQM or ISO; the evaluation markers associated with these systems can be tracked by the incubator.

Our analysis of the innovation and learning perspective shows that there are two main sources to increase innovation and learning within the incubator. The first is an analysis of *tenant satisfaction and tenant expectations*. These form an important starting point for the necessary services innovations. Our interviewees suggest that this can be examined directly by asking tenants their opinions about the incubator's need for innovativeness. Again, this can occur through the semi-annual individual or group meetings and *follow-up* we noted previously.

The second source is related to the incubator's in-house expertise and openness to learning. Interviewees indicate that incubator employees need to constantly develop their incubation and business knowledge. Some incubator managers give examples from conferences or workshops that they attended, and that helped them to learn new incubation practices. Therefore, it is suggested to count *the number of networking and information events in which incubator employees participate*. Although, in practice, many incubator managers in our study do have neither the time nor the resources to participate in these events, interviewees do suggest that a two-yearly participation seems a minimum.

Figure 2: BSEDI and targets: balanced scorecard for non-profit economic development incubators



5. Contribution to the literature

The current economic climate exerts negative impacts on the funding of non-profit organizations in general (Moxham, 2010) and business incubators in particular. Financial sustainability has always been a main preoccupation of incubators (von Zedtwitz, 2003); small incubators often seem unable to reach a financially sound situation due to their capacity restrictions (Zablocki, 2007). Our empirical analysis suggests that incubators should avoid depending too heavily on subsidy or sponsorship organizations, and should consider a commercial side-activity that provides some additional income while minimizing their costs for society (Bøllingtoft, 2012). The pressures on non-profit organizations to find efficiencies affect business incubators too (Brainard and Siplon, 2004; Privett and Erhun, 2011), and some societies question whether these support organizations are able to reach optimal functioning and offer sufficient returns (Bergek and Norrman, 2008). To address these doubts, sound evaluation frameworks that can pinpoint possible organizational areas for functioning improvement are badly needed (Amezcuca, 2010; Phan et al., 2005; Sherman, 1999). Our empirical results confirm that evaluation frameworks, such as Kaplan and Norton's (2000, 2005) strategy map and balanced framework, can be translated to the context of non-profit economic development business incubators.

Our assessment of incubator evaluation measures reaffirms the importance of both tenants (Bruneel et al., 2012; Chan and Lau, 2005; Jungman et al., 2004) and funding organizations (Haapasalo and Ekholm, 2004; Patton and Marlow, 2011; Rice, 2002; Sherman, 1999) as incubator stakeholders that should not be ignored in measures of incubator evaluation. In turn, we reject the common practice of using one stakeholder perspective (for example, Abduh et al., 2007) and follow Schwartz and Göthner (2009b, p. 9) who advocate that "the employment of sole indicators is insufficient to capture the performance of business incubators". We advocate integrated measurement frameworks that combine various measures instead and gathered the viewpoints of incubator managers, tenants, and external experts to adapt the balanced scorecard and strategy map. As such, we have incorporated both internal and external perspectives, as advocated by general performance measurement literature (Andrews et al., 2011). Moreover, by investigating various business incubation processes, we follow general performance measurement research, such as Simons' (2000, p. 59) argument that "performance measurement and control information can be understood only by reference to some model of underlying organizational processes".

The measures and targets we suggest for the balanced scorecard extend current incubator measurement literature, in which only one contribution offers specific thresholds: Lalkaka

(2000) offers a list of evaluation measures. This author also suggests targets for some measures. Our empirical study thus offers the results of a first attempt to not only suggest performance *measures*, but also their related *targets* for non-profit economic development incubators.

When discussing our results in relation to extant incubator functioning literature, we find that even small incubators can attain scale advantages by working together with external actors (Hansen et al., 2000). We however also find that most research attends only to tenant advantages, such as networking possibilities with consultancy firms or government agencies (Mian, 1994; Schwartz and Hornych, 2010; Spithoven and Knockaert, 2011). Our results reintroduce the incubator level, and show that an incubator can improve its efficient and effective functioning by working together with service experts and with other incubators to gain economies of scale at logistic and administrative levels.

As another extension of existing incubator functioning literature, we reaffirm that a selection process must be balanced (Aerts et al., 2007; Lumpkin and Ireland, 1988; Merrifield, 1987), but also highlight the lack of prior attention granted to personal attitudes, such as the entrepreneur's attitude toward cooperation and interaction with other tenants and the incubator team. Social network theory similarly states that "the value in a network is only realized through the owner-manager's positive use of the resources contacted within" (Ostgaard and Birley, 1994, p. 282). Findings from network (Falemo, 1989; Hormiga et al., 2011; Ostgaard and Birley, 1996) and incubator (Bøllingtoft, 2012; McAdam and Marlow, 2007) research indicate that interaction and cooperation can channel resources and enhance company development. Our extension also emphasizes the need for a good "fit" between company expectations and incubator offerings. Service literature also notes the criticality of fit—in that case, between service offerings to achieve good quality perceptions and customer satisfaction (Grigorescu, 2008).

In this context, we introduce another key incubation process (Bergek and Norrman, 2008; Patton et al., 2009): the incubator's graduation process, which surprisingly has been largely overlooked in studies on incubation functioning (Hackett and Dilts, 2008). The most widely used graduation criterion relates to the time the company stays in the incubator (European Commission, 2002). Our more fine-grained analysis shows that this time-bound criterion is too simplistic. We advocate service-bound criteria instead, and thereby advance the notion of changing service needs based on a company's development stage (Chan and Lau, 2005), including the moment the company can survive on its own and should thus leave the incubator (Hackett and Dilts, 2008). Forcing companies to leave the incubator when they are not in need

of the services offered allows other weak but promising firms to enter (Hackett and Dilts, 2008). This creates new learning (Wu et al., 2007), interaction (Cooper et al., 2012; Ozel, 2012; Scillitoe and Chakrabarti, 2010), and knowledge diffusion and transfer (Ozel, 2012; Salvador, 2011) opportunities, and thus accelerates company development and growth (Soetanto and Jack, 2013; Sohal et al., 2002).

Finally, we also find that an incubator's functioning and value creation possibilities largely depend upon service quality (Priest, 1999), proactiveness (Chan and Lau, 2005), and the offering of in-depth services (Mole et al., 2011). Extant incubator literature suggests that these characteristics can be attained through incubator service co-creation (Rice, 2002). In co-creation studies, scholars argue that co-creation offers customers the possibility to provide ideas for the development of new, or the improvement of existing, products and services (Ernst et al., 2010). Through co-creation, customers become empowered to participate in product or service value creation (Hoyer et al., 2010), which leads to improved quality (Bendapudi and Leone, 2003), proactiveness (Hoyer et al., 2010), and products or services better adapted to customer needs (Ernst et al., 2010). Our empirical analysis confirms this for non-profit economic development incubators.

To conclude, the SMEDI and BSEDI are balanced tools that integrate various incubator evaluation perspectives and link the incubator's long-term strategic goals to its medium-term objectives and short-term pursuits. An annual evaluation of the SMEDI and BSEDI assures feedback loops. Measures such as the number of times incubator employees participate in events incorporate incubator employee behaviour. Because we conferred again with the incubator managers to discuss the practical usefulness of a working version of the SMEDI and BSEDI, we emerged with an easily obtainable, accessible, and comprehensible incubator evaluation toolkit with clear markers. To the best of our knowledge, this toolkit is the first to meet Tangen's (2004) prerequisites for evaluation systems in the incubator domain.

6. Implications for practice and policy

Incubator managers and funding organizations can draw on these results to measure the effectiveness and efficiency of their non-profit economic development incubators (Schwartz and Göthner, 2009a; Sherman, 1999), benchmark such organizations against other incubators, and make more informed resource allocation decisions (Tornatzky et al., 2002). Moreover, the SMEDI and BSEDI help incubator managers and funding organizations target internal incubator processes that need improvement (Hackett and Dilts, 2008). Thanks to our second interview round during which we checked for feasibility and applicability of our intermediate

SMEDI and BSEDI, we were able to adapt target areas and measures that did not appear to be feasible. For example, one of the incubator managers argued that “offering relocation support to graduating companies” should not be a medium-term goal of the “stable and diverse tenant portfolio” pillar (where we originally placed this business process), but that this target area belongs to the “entrepreneurship and business development” pillar instead. This manager rightfully indicated that it is in particular the governmental funding organization that values relocation close to the incubator to stimulate local economic development. One of the measures that have been altered after the feasibility check with incubator managers is “tenant satisfaction”. We originally suggested the execution of a yearly questionnaire among the tenants. Several incubator managers indicated that earlier attempts to execute yearly questionnaires failed; mainly because tenants were not willing to spend time on such time-consuming and impersonal questionnaires. The incubator managers indicated that individual or group meetings during which areas for incubator functioning improvement were discussed were much more informing and efficient. We thus suggested to organize such meetings in our BSEDI instead.

Although our incubator manager interviews revealed that the managers in our sample were all interested in implementing the SMEDI and BSEDI, they also showed that the managers are confronted with time and resource constraints. These hamper the actual implementation of such evaluation tools. The managers indicated that stressful day-to-day preoccupations and limited staff often prevent them from implementing new business processes, such as the SMEDI and BSEDI. This suggests to funding organizations willing to more closely follow up incubator evaluation and improvement to consider sponsoring the implementation of the SMEDI and BSEDI, after which the incubator can take over and assure a yearly evaluation. Such an investment is justified because “training and assistance programs for practicing entrepreneurs are expensive both in money for sponsors and in time for participants” (McMullan et al., 2011, p. 37) and the effectiveness of incubators has been questioned (Schwartz, 2013). Moreover, functional improvements and performance enhancements require transparent evaluation tools (Boyne, 2003; Giannakis, 2007; Slack and Lewis, 2008). The development and implementation of relevant evaluation tools is thus badly needed, and adequate evaluation tools such as the SMEDI and BSEDI can offer clearer insights into the effective and efficient functioning of non-profit economic development incubators. Finally, our SMEDI and BSEDI also add value for tenants. Because tenant opinions take a prominent place in the SMEDI and BSEDI, we extend current measurement methods that often integrate

only objective outcome measures, such as tenant survival (Aerts et al., 2007) or occupancy rate (European Commission, 2002).

7. Future research avenues

This study features some possible future research avenues. First, we detail different constructs, measures, and targets for non-profit economic development incubators, yet much work remains to develop in-depth understanding of these tools in *other* non-profit organizations. Future researchers might provide assessments of adequate constructs for other non-profit organizations, such as hospitals or voluntary organizations (Kaplan, 2001). For this, they might rely on our methodology, and first develop an intermediary evaluation framework which is then checked for feasibility and applicability during a second interview round. We also suggest to employ Tangen's (2004) output prerequisites to check whether the evaluation framework is comprehensible, guards against sub-optimization and is accessible.

Second, the qualitative methodology we employed provides insights into the applicability and feasibility of the SMEDI and BSEDI in the incubators that participated, but for the many and varied incubator types (von Zedtwitz, 2003), the SMEDI and BSEDI need to be adapted to their specific situations. For example, basic research incubators aim to commercialize university research (Aernoudt, 2004), so the university must be a primary stakeholder in related basic research incubator models. In our SMEDI and BSEDI, the university viewpoint has not been added. Future researches might, as we did, execute focus groups with the external experts of their interest to assure that their viewpoints are added to the balanced scorecard and strategy map.

Third, because the SMEDI and BSEDI mainly focus on incubator functioning, they offer only limited attention to the incubator's role in the wider, regional, entrepreneurial ecosystem. Further research might expand our evaluation frameworks, perhaps using the vast research on regional innovation systems (Cooke, 2005), such as the triple-helix model (Etzkowitz and Leydesdorff, 2000) or Brännback et al.'s (2008) bottom-up double helix framework. In such frameworks, an in-depth analysis of the funding organization's strategy can provide insights into the incubator's degrees of freedom during strategy formulation.

Fourth and finally, from a public policy perspective, our research does not denote the added value of specific, government-related incentives for incubators. Longitudinal SMEDI and BSEDI case studies might help governing bodies follow up on the support provided and performance resulting from such public incentives. For example, governing bodies might zoom in on the entrepreneurship and business development pillar and thereby further unravel

the performance indicators that result from public subsidies. For this, they can annually fill out the entrepreneurship and business development pillar of the SMEDI and BSEDI and gradually unravel and detail the performance indicators that are of highest importance for them.

Bibliography

- Abduh, M., D'Souza, C., Quazi, A. and Burley H.T. (2007) 'Building futures or stealing secrets? Entrepreneurial cooperation and conflict within business incubators'. *Managing Service Quality*, Vol.17, No.1, pp.74-91.
- Adkins, D. (2001) *A Report for the Japan Association of New Business Incubation Organizations (JANBO): Summary of the U.S. Incubator Industry*. Athens, OH: National Business Incubation Association.
- Aernoudt, R. (2004) 'Incubators: Tool for Entrepreneurship?' *Small Business Economics*, Vol.23, pp.127-135.
- Aerts, K., Matthyssens, P. and Vandenbempt, K. (2007) 'Critical Role and Screening Practices of European Business Incubators'. *Technovation*, Vol.27, No.5, pp.254-267.
- Amezcuca, A.S. (2010) *Boon or Boondoggle? Business incubation as entrepreneurship policy*. PhD thesis, Syracuse University.
- Andrews, R., Boyne, G. and Walker, R. (2011) 'The Impact of Management on Administrative and Survey Measures of Organizational Performance'. *Public Management Review*, Vol.13, pp.227-255.
- Beauregard, R.A. (1994) 'Constituting economic development'. In R.D. Bingham, Mier R. (Eds.), *Theories of local economic development*, Thousand Oaks, CA: Sage, pp.267-283.
- Bendapudi, N. and Leone, R.P. (2003) 'Psychological Implications of Customer Participation in Co-Production'. *Journal of Marketing*, Vol.67, No.1, pp.14-28.
- Bergek, A. and Norrman, C. (2008) 'Incubator Best Practice: a Framework'. *Technovation*, Vol.28, pp.20-28.
- Bigliardi, B., Dormio, A.I., Nosella, A. and Petroni, G. (2006) 'Assessing science parks' performances: directions from selected Italian case studies'. *Technovation*, Vol.26, pp.20-28.
- Bøllingtoft, A. (2007) 'A critical realist approach to quality in observation studies'. In H. Neergaard, Ulhøi J.P. (Eds.), *Handbook of Qualitative Research Methods in Entrepreneurship*, Cheltenham, UK: Edward Elgar, pp.406-433.
- Bøllingtoft, A. (2012) 'The Bottom-up Business Incubator: Leverage to Networking and Cooperation Practices in a Self-generated, Entrepreneurial-enabled Environment'. *Technovation*, Vol.32, pp.304-315.
- Bøllingtoft, A. and Ulhøi, J.P. (2005) 'The Networked Business Incubator - Leveraging Entrepreneurial Agency?' *Journal of Business Venturing*, Vol.20, No.2, pp.265-290.
- Boyne, G.A. (2003) 'Sources of Public Service Improvement: A critical review and research agenda'. *Journal of Public Administration Research and Theory*. Vol.13, No.3, pp.367-394.
- Brainard, L.A. and Siplon, P.D. (2004) 'Toward Non-profit Organization Reform in the Voluntary Spirit: Lessons from the Internet'. *Non-profit and Voluntary Sector Quarterly*, Vol.33, No.3, pp.435-457.
- Brännback, M., Carsrud, A., Krueger, N. and Elfving, J. (2008) 'Challenging the triple helix model of regional innovation systems: A venture-centric model'. *International Journal of Technoentrepreneurship*, Vol.1, No.3, pp.257-277.
- Bruneel, J., Ratinho, T., Clarysse, B. and Groen, A. (2012) 'The Evolution of Business Incubators: Comparing Demand and Supply of Business Incubation Services across Different Incubator Generations'. *Technovation*, Vol.32, pp.110-121.
- Bryman, A. and Bell, E. (2007) *Business Research Methods*, Oxford, UK: Oxford University Press.

- Campbell, C., Kendrick, R.C. and Samuelson, D.S. (1985) 'Stalking the Latent Entrepreneur: Business Incubators and Economic Development'. *Economic Development Review*, Summer, pp.43-48.
- Chan, K.F. and Lau, T. (2005) 'Assessing Technology Incubator Programs in the Science Park: The Good, the Bad and the Ugly'. *Technovation*, Vol.25, No.10, pp.1215-1228.
- Cooke, P. (2005) 'Regional asymmetric knowledge capabilities and open innovation Exploring 'globalisation 2': a new model of industry organization'. *Research Policy*, Vol.34, pp.1128-1149.
- Cooper, C.E., Hamel, S.A. and Connaughton, S.L. (2012) 'Motivations and Obstacles to Networking in a University Business Incubator'. *Journal of Technology Transfer*, Vol.37, No.4, pp.433-453.
- Costa-David, J., Malan, J. and Lalkaka, R. (2002) 'Improving Business Incubator Performance Through Benchmarking and Evaluation: Lessons Learned from Europe'. Paper presented at the 16th *International Conference on Business Incubation*, Toronto, Canada, April.
- Dul, J. and Hak, T. (2008) *Case Study Methodology in Business Research*, Oxford, UK: Elsevier.
- Eisenhardt, K.M. (1989) 'Building Theories from Case Study Research'. *Academy of Management Review*, Vol.14, No.4, pp.532-550.
- Eisenhardt, K.M. and Graebner, M.E. (2007) 'Theory Building from Cases: Opportunities and Challenges'. *Academy of Management Journal*, Vol.50, No.1, pp.25-32.
- Ernst, H., Hoyer W.D., Krafft, M. and Soll, J.-H. (2010) *Consumer Idea Generation*, Working paper, WHU, Vallendar.
- Etzkowitz, H. and Leydesdorff, L. (2000) 'The dynamics of innovation: from national systems and 'Mode 2' to a triple helix of university-industry-government relation'. *Research Policy*, Vol.29, pp.109-123.
- European Commission (2000) *Mededeling van de Commissie aan de Raad en het Europees Parlement: Innovatie in een Kenniseconomie*, Brussels: European Commission.
- European Commission (2002) *Benchmarking of Business Incubators*, Brussels: Centre for Strategy and Evaluation Services.
- Falemo, B. (1989) 'The Firm's External Persons: Entrepreneurs or Network Actors?' *Entrepreneurship and Regional Development*, Vol.1, pp.167-177.
- Ferguson, R. and Olofsson, C. (2004) 'Science parks and the development of NTBFs – location, survival and growth'. *Journal of Technology Transfer*, Vol.29, pp.5-17.
- Fonseca, R., Lopez-Garcia, P. and Pissarides, C.A. (2001) 'Entrepreneurship, Start-Up Costs and Employment'. *European Economic Review*, Vol.45, No.4/6, pp.692-705.
- Freeman, J., Carroll, G.R. and Hannan M.T. (1983) 'The liability of newness: age dependence in organizational death rates'. *American Sociological Review*, Vol.48, No.5, 692-710.
- Giannakis, M. (2007) 'Performance Measurement of Supplier Relationships'. *Supply Chain Management: An International Journal*, Vol.12, No.6, pp.400-411.
- Grigorescu, A. (2008) 'Quality and Customer Satisfaction in Public Services'. *Amfiteatru Economic*, pp.130-135.
- Grimaldi, R. and Grandi, A. (2005) 'Business incubators and new venture creation: an assessment of incubating models'. *Technovation*, Vol.25, No.2, pp.111-121.
- Gumbus, A. and Lussier, R.N. (2006) 'Entrepreneurs use a balanced scorecard to translate strategy into performance measures'. *Journal of Small Business Management*, Vol.44, No.3, pp.407-425.
- Haapasalo, H. and Ekholm, T. (2004) 'A profile of European incubators: a Framework for Commercializing Innovations'. *International Journal of Entrepreneurship and Innovation Management*, Vol.4, No.2/3, pp.248-270.

- Hackett, S.M. and Dilts, D.M. (2008) 'Inside the Black Box of Business Incubation: Study B – Scale Assessment, Model Refinement, and Incubation Outcomes'. *The Journal of Technology Transfer*, Vol.33, pp.439-471.
- Hannon, P.D. and Chaplin, P. (2003) 'Are incubators good for business? Understanding incubation practice – the challenges for policy'. *Environment and Planning C: Government and Policy*, Vol.21, pp.861-881.
- Hansen, M.T., Chesbrough, H.W., Nohria, N. and Sull, D.N. (2000) 'Networked Incubators: Hothouses of the New Economy'. *Harvard Business Review*, Vol.78, No.5, pp.74-84.
- Hirschman, E.C. (1986) 'Humanistic inquiry in marketing research: philosophy, method, and criteria'. *Journal of Marketing Research*, Vol.23, August, pp.237-249.
- Hormiga, E., Batista-Canino, R.M. and Sanchez-Medina, A. (2011) 'The Impact of Relational Capital on the Success of New Business Start-Ups'. *Journal of Small Business Management*, Vol.49, No.4, pp.617-638.
- Hoyer, W.D., Chandy, R., Dorotic, M., Krafft, M. and Singh, S.S. (2010) 'Consumer Co-creation in New Product Development'. *Journal of Service Research*, Vol.13, No.3, pp.283-296.
- Johnston, R., Brignall, S. and Fitzgerald, L. (2002) "'Good Enough' Performance Measurement: a Trade-Off between Activity and Action". *Journal of the Operational Research Society*, Vol.53, pp.256-262.
- Jungman, H., Okkonen, J., Rasila, T. and Seppä, M. (2004) 'Use of Performance Measurement in V2C Activity'. *Benchmarking: An International Journal*, Vol.11, No.2, pp.175-189.
- Kaplan, R.S. (2001) 'Strategic Performance Measurement and Management in Non-profit Organizations'. *Non-profit Management and Leadership*, Vol.11, No.3, pp.353-370.
- Kaplan, R.S. and Norton, D.P. (1996) 'Linking the balanced scorecard to strategy'. *California Management Review*, Vol.39, No.1, pp.53-79.
- Kaplan, R.S. and Norton, D.P. (2000) 'Having trouble with your strategy? Then map it'. *Harvard Business Review*, September-October, pp.167-176.
- Kaplan, R.S. and Norton, D.P. (2005) 'The balanced scorecard: Measures that drive performance'. *Harvard Business Review*, July-August, pp.172-180.
- Kaplan, R.S. and Norton, D.P. (2008) 'Mastering the management system'. *Harvard Business Review*, January, pp.63-77.
- Knopp, L. (2007) *2006 State of the Business Incubation Industry*, Athens, OH: NBIA Publications.
- Krueger, R.A. (1988) *Focus Groups*, Newbury Park: Sage.
- Lalkaka, R. (1996) 'Technology Business Incubators: Critical Determinants of Success'. *Annals of the New York Academy Sciences*, Vol.798, pp.270-290.
- Lalkaka, R. (2000) 'Assessing the Performance and Sustainability of Technology Business Incubators'. Paper presented at the *New Economy and Entrepreneurial Business Creation in Mediterranean Countries Conference*, Trieste, Italy, December.
- Lincoln, Y.S. and Guba, E.G. (1985) *Naturalistic Inquiry*, Beverly Hills, CA: Sage.
- Löfsten, H. and Lindelöf, P. (2001) 'Science Parks in Sweden – Industrial Renewal and Development'. *R&D Management*, Vol.31, No.3, pp.309-322.
- 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*, Vol.12, pp.59-81.
- Mathison, S. (1988) 'Why triangulate?'. *Educational Research*, Vol.17, No.2, pp.13-17.
- McAdam, M. and Marlow, S. (2007) 'Building Futures or Stealing Secrets? Entrepreneurial Cooperation and Conflict within Business Incubators'. *International Small Business Journal*, Vol.25, No.4, pp.361-382.

- McLaughlin, K. (2004) 'Towards a "modernized" voluntary and community sector?' *Public Management Review*. Vol.6, No.4, pp.555-562.
- McMullan, E., Chrisman, J.J. and Vesper, K. (2001) 'Some Problems in Using Subjective Measures of Effectiveness to Evaluate Entrepreneurial Assistance Programs'. *Entrepreneurship: Theory and Practice*, Fall, pp.37-54.
- Merrifield, D.B. (1987) 'New Business Incubators'. *Journal of Business Venturing*, Vol.2, pp.277-284.
- Mian, S.A. (1994) 'US university sponsored technology incubators: an overview of management, policies and performance'. *Technovation*, Vol.14, No.8, pp.515-528.
- Mian, S.A. (1996) 'Assessing Value-added Contributions of University Technology Business Incubators to Tenant Forms'. *Research Policy*, Vol.25, pp.325-335.
- Mian, S.A. (1997) 'Assessing and Managing the University Technology Business Incubator: an Integrative Framework'. *Journal of Business Venturing*, Vol.12, pp.251-285.
- Mole, K.F., Hart, M., Roper, S. and Saal, D.S. (2011) 'Broader or Deeper? Exploring the most Effective Intervention Profile for Public Small Business Support'. *Environment and Planning A*, Vol.43, No.1, pp.87-105.
- Morgan, D.L. (1988) *Focus Groups as Qualitative Research*, Newbury Park: Sage.
- Morgan, D.L. (1996) 'Focus Groups'. *Annual Review Sociology*, Vol.22, pp.129-152.
- Moxham, C. (2009) 'Performance Measurement: Examining the Applicability of the Existing Body of Knowledge to Non-profit Organizations'. *International Journal of Operations and Production Management*, Vol.29, No.7, pp.740-763.
- Moxham, C. (2010) 'Help or hindrance? Examining the Role of Performance Measurement in UK Non-profit Organizations'. *Public Performance and Management Review*, Vol.33, No.3, pp.342-354.
- Neely, A. (2005) 'The Evolution of Performance Measurement Research – Developments in the Last Decade and a Research Agenda for the Next'. *International Journal of Operations and Production Management*, Vol.25, No.12, pp.1264-1277.
- Neely, A., Mills, J., Platts, K., Richards, H., Gregory, M., Bourne, M. and Kennerly, M. (2000) 'Performance Measurement System Design: Developing and Testing a Process-Based Approach'. *International Journal of Operations and Production Management*, Vol.20, No.10, pp.1119-1145.
- Niven, P.R. (2008) *Balanced scorecard step-by-step for government and non-profit agencies*, 2nd ed., Wiley, New Jersey, Canada.
- O'Neal, T. (2005) 'Evolving a Successful University-Based Incubator: Lessons Learned from the UCF Technology Incubator'. *Engineering Management Journal*, Vol.17, No.3, pp.11-25.
- Ostgaard, T.A. and Birley, S. (1994) 'Personal Networks and Firm Competitive Strategy – A Strategic or Coincidental Match?' *Journal of Business Venturing*, Vol.9, 2 pp.81-305.
- Ostgaard, T.A. and Birley, S. (1996) 'New Venture Growth and Personal Networks'. *Journal of Business Research*, Vol.36, pp.37-50.
- Ozel, B. (2012) 'Collaboration Structure and Knowledge Diffusion in Turkish Management Academia'. *Scientometrics*, Vol.93, No.1, pp.183-206.
- Patton, D. and Marlow, S. (2011) 'University technology business incubators: helping new entrepreneurial firms to learn to grow'. *Environment and Planning C: Government and Policy*, Vol.29, pp.911-926.
- Patton, D., Warren, L. and Bream, D. (2009) 'Elements that Underpin High-tech Business Incubation Processes'. *Journal of Technology Transfer*, Vol.34, pp.621-636.
- Phan, P.H., Siegel, D.S. and Wright, M. (2005) 'Science Parks and Incubators: Observations, Synthesis and Future Research'. *Journal of Business Venturing*, Vol.20, No.2, pp.165-182.

- Plosila, W.H. and Allen, D.N. (1985) 'Small business incubators and public policy: implications for state and local development strategies'. *Policy Studies Journal*, Vol.13, No.4, pp.729-734.
- Priest, S.J. (1999) 'Business Link services to Small and Medium-sized Enterprises: Targeting, Innovation, and Charging'. *Environment and Planning C: Government and Policy*, Vol.17, No.2, pp.177-193.
- Privett, N. and Erhun, F. (2011) 'Efficient Funding: Auditing in the Non-profit Sector'. *MandSOM – Manufacturing and Service Operations Management*, Vol.13, No.4, pp.471-488.
- Ratinho, T. and Henriques, E. (2010) 'The role of science parks and business incubators in converging countries: evidence from Portugal'. *Technovation*, Vol.30, pp.278-290.
- Rice, M.P. (2002) 'Co-Production of Business Assistance in Business Incubators: an Exploratory Study'. *Journal of Business Venturing*, Vol.17, No.2, pp.163-187.
- Salvador, E. (2011) 'Are science parks and incubators good "brand names" for spin-offs? The case study of Turin'. *Journal of Technology Transfer*, Vol.36, No.2, pp.203-232.
- Schwartz, M. (2013) 'A Control Group Study of Incubator's Impact to Promote Firm Survival'. *Journal of Technology Transfer*. Vol.38, pp.302-331.
- Schwartz, M. and Göthner, M. (2009a) 'A Multidimensional Evaluation of the Effectiveness of Business Incubators: an Application of the PROMETHEE Outranking Method'. *Environment and Planning C: Government and Policy*, Vol.27, pp.1072-1087.
- Schwartz, M. and Göthner, M. (2009b) *A Novel Approach to Incubator Evaluations: The PROMETHEE outranking procedures*, IWH-Discussion Papers, January, no1.
- Schwartz, M. and Hornych, C. (2010) 'Cooperation patterns of incubator firms and the impact of incubator specialization: Empirical evidence from Germany'. *Technovation*, Vol.30, pp.485-495.
- Scillitoe, J.L. and Chakrabarti, A.K. (2010) 'The Role of Incubator Interactions in Assisting New Ventures'. *Technovation*, Vol.30, No.3, pp.155-167.
- Sherman, H. (1999) 'Assessing the Intervention Effectiveness of Business Incubation Programs on New Business Start-Ups'. *Journal of Developmental Entrepreneurship*, Vol.4, No.2, pp.117-133.
- Siggelkow, N. (2007) 'Persuasion with case studies'. *Academy of Management Journal*, Vol.50, No.1, pp.20-24.
- Simons, R. (2000) *Performance Measurement and Control Systems for Implementing Strategy: Text and Cases*, Upper Saddle River, NJ: Prentice Hall.
- Skinner, W. (1986) 'The Productivity Paradox'. *Harvard Business Review*, July-August, pp.55-59.
- Slack, N. and Lewis, M. (2008) *Operations Strategy*, Harlow, UK: Pearson Education.
- Smilor, R.W. (1987) 'Commercializing Technology through New Business Incubators'. *Research Management*, Vol.30, No.5, pp.36-41.
- Soetanto, D.P. and Jack, S.L. (2013) 'Business Incubators and the Networks of Technology-based Firms'. *Journal of Technology Transfer*, Vol.38, pp.432-453.
- Sohal, A.S., Morrison, M. and Pratt, P. (2002) 'Creating a Regional Learning Environment for Accelerating Company Development and Growth'. *Total Quality Management*, Vol.13, No.2, pp.183-194.
- Spithoven, A. and Knockaert, M. (2011) 'The Role of Business Centres in Firms' Networking Capabilities and Performance'. *Science and Public Policy*, Vol.38, No.7, pp.569-580.
- Stinchcombe, A.L. (1965) 'Social structure and organizations'. In March, J.G. (Ed.), *Handbook of Organizations*, Rand McNally, Chicago, pp.153-193.

- Studdard, N.L. (2006) 'The Effectiveness of Entrepreneurial Firm's Knowledge Acquisition from a Business Incubator'. *International Entrepreneurship Management Journal*, Vol.2, pp.211-225.
- Tamásy, C. (2007) 'Rethinking Technology-Oriented Business Incubators: Developing a Robust Policy Instrument for Entrepreneurship, Innovation, and Regional Development'. *Growth and Change*, Vol.38, No.3, pp.460-473.
- Tangen, S. (2004) 'Performance Measurement: From Philosophy to Practice'. *International Journal of productivity and Performance Management*, Vol.53, No.8, pp.726-737.
- Thierstein, A. and Wilhelm, B. (2001) 'Incubator, technology, and innovation centres in Switzerland: features and policy implications'. *Entrepreneurship and Regional Development*, Vol.13, pp.315-331.
- Tornatzky, L., Sherman, H. and Adkins, D. (2002) *A National Benchmarking Analysis of Technology Business Incubator Performance and Practices*, US: National Business Incubation Association.
- Vanderstraeten, J. and Matthyssens, P. (2012) 'Service-based differentiation strategies for business incubators: exploring external and internal alignment'. *Technovation*, Vol.32, pp.656-670.
- Venkatraman, N. (1989) 'The concept of fit in strategy research: towards verbal and statistical correspondence'. *Academy of Management Review*, Vol.14, pp.423-444.
- Venkatraman, N. and Prescott, J.E. (1990) 'Environment-strategy coalignment: an empirical test of its performance implications'. *Strategic Management Journal*, Vol.11, No.1, pp.1-23.
- Voisey, P., Gornall, L., Jones, P. and Thomas, B. (2006) 'The Measurement of Success in a Business Incubation Project'. *Journal of Small Business and Enterprise Development*, Vol.13, No.3, pp.454-468.
- Von Zedtwitz, M. (2003) 'Classification and Management of Incubators: Aligning Strategic Objectives and Competitive Scope for New Business Facilitation'. *International Journal of Entrepreneurship and Innovation Management*, Vol.3, No.1/2, pp.176-196.
- Wu, W.-L., Hsu, B.-F. and Yeh, R.-S. (2007) 'Fostering the Determinants of Knowledge Transfer: a Team-Level Analysis'. *Journal of Information Science*, Vol.33, No.3, pp.326-339.
- Yin, R.K. (1990) *Case study research: design and methods*. Applied Social Research Methods Series, Vol.5, Beverly Hills, California: Sage Publications.
- Zablocki, E.M. (2007) 'Formation of a business incubator'. In A. Krattiger, R.T. Mahoney, L. Nelsen, et al. (Eds.), *Intellectual property management in health care and agricultural innovation: a handbook of best practices*, Oxford, UK: MIHR, and Davis, US: PIPRA, pp.1305-1314.