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# RISK-MANAGEMENT IN INCUBATORS

*Karl Ruping, incTANK, Cambridge, MA\**

*Maximilian von Zedtwitz, IMD-International, Lausanne, Switzerland\*\**

## INTRODUCTION

With the rise and fall of New Economy companies, there has been a sharp increase in the number of incubators followed by a recent correction in the market for this new form of venture capital investment. While in 1980 less than 10 incubators existed world-wide, they numbered over 1,100 by mid-2000 with nearly half located in the United States. In the first half of 2000, six new incubators were established every week (Economist, 2000). The growth was driven by the rapid increase of new ventures and startup companies of all flavors, many of them founded by student entrepreneurs and company defectors.

However, after the crash in the Internet-startup market—the mainstay of new business plans that were attracted to the incubator mode—several incubator IPOs have been cancelled and some of the leaders, such as CMGI and Softbank, were trading at near 10 to 20% of their earlier highs. While incubation may no longer be the ‘flavor of the month’ among investors, there is still a need for this business facilitation, possibly on a smaller scale and more specific areas of technology than what emerged in the heady days of 1999/2000. Indeed, the chances that a high-tech business idea is formalized into a successful public company are 6 in a million (Nesheim, 2000: 1).

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\* Dr. Karl Ruping is Principle of incTANK, an incubator in Cambridge, Massachusetts, and a Fellow of the Advanced Studies Program at MIT, Cambridge. Email: ruping@mit.edu.

\*\* Dr. Max von Zedtwitz is Professor of Technology Management at IMD-International, a business school located in Lausanne, Switzerland. Email: zedtwitz.imd.ch.

This paper looks to the incubator business model in general, not to justify their popularity among investors, but to outline how risk is managed and how other technology facilitation models, such as traditional R&D departments, can benefit from the lessons of incubation. Our research is based on personal experience in incubator management as well as the study of technology incubators in the Boston area and in Switzerland. We consider the various risks involved in incubating fledging technology startups in an environment of uncertain opportunities, changing technologies, and shifting investor interest. The reoccurring and fundamental theme is that incubation risk is bifurcated into one part that can be lessened before engaging into a venture, and a second part that can be managed internally during the period of incubation. While these risks cannot be eliminated completely, there are management strategies that can minimize the overall level of risk across the incubator portfolio and across a strategic distribution of incubation resources.

We begin with a definition of risk, a comparison of the venture supervisor with the R&D project supervisor, and an introduction to the various forms of venture business investment. Section two focuses on the incubator model and the two forms of risk inherent to incubation. Next we discuss the different risk management approaches available across the incubation process. We conclude with a brief comparison of risk strategies between the incubator supervisor and the corporate R&D project advisor.

## **DEFINITIONS: RISK, TYPES OF VENTURE INVESTORS, AND INCUBATORS**

In the context of venture business investment, risk is the finite probability of failure, across a spectrum of possibilities from underperformance to outright bankruptcy, weighted with a factor indicating the significance of the occurring event. A similar definition applies to risk in the context of the traditional corporate R&D department across a spectrum of possibilities from the unsatisfactory pace of development progress to the complete failure to reach a proof of concept.

The venture supervisor is the active investor who, like the traditional R&D project advisor, oversees the performance of the startup team and the development of the new technology. This can be an angel, a professional VC, or a strategic corporate investor. In contrast, the entrepreneur acts like an empowered project manager: both are in charge of developing a business opportunity based on a list of specifications (business plan), a project team (startup team), and a project budget (limited venture capital). Like internal corporate high-risk projects, an entrepreneur faces the pressure to succeed in time and on budget, operates under financial and technological uncertainty, and is subject to the emotional and social stress from employees, corporate peers, and even family members. Differences do exist across this analogy, but these are largely a difference of degree. For example, failure by the

project manager may lead to a lost promotion or dismissal, whereas an entrepreneur's failure leads to unemployment as well as financial loss in terms of foregone salary in the form of worthless stock options.

The traditional R&D project and the venture startup both face funding uncertainties. High-risk corporate research projects typically have a singular funding source with a secure short-term and medium-term budgeting, competing for a limited budget with other R&D projects. Projects are terminated for a number of mostly company-internal reasons, such as reprioritization of corporate research objectives. The entrepreneur's funding sources are typically more varied and subject to greater risk. Capital is obtained from an open market where general economic conditions determine capital flows, changing financial market sentiment impacts startup valuations, and the flavor-of-the-week business plan leads investor interest. And this funding is not free. Capital investment buys ownership rights as well as some form of management control by which the capital provider seeks to minimize investment risks.

There are generally four categories of venture investors. First, the *corporate investor* is the mature company seeking investments in startups that have some strategic importance to its industry, market or technology. Generally these funds invest in mezzanine startups or mature companies that have a complete business plan, a defined product, and a secure management team. Among the largest is Intel Capital, which boasts \$7.5 billion in valuation across 450 invested companies. A new chip factory costs Intel up to \$6 billion, but with the newly intensified competition it is far from certain whether this chip will actually pay back the investment. Hence, Intel may be well advised to invest a few billion dollars on a number of competing startups. Each has a high rate of failure but only one has to succeed to justify Intel's strategy.

Second is the traditional *venture capital fund* that invests across industries, technologies, and markets. Professional VCs select their investment candidates after a rigorous evaluation process that considers growth opportunities, business plans, industry and market factors, as well as the strength of the technology and team. These experienced investors usually secure board positions and certain management participation rights, serving as advisors and mentors to the startup team.

Third, *angel investors* are affluent individuals or industry professionals who provide high-risk capital at the early stage. Typically this investment is not based on exhaustive industry or venture team/technology evaluation; rather, angel investors act on an intuitive understanding of the business opportunity or area of technology; often they are motivated by the achievement of higher goals or a certain self-imposed mission. Similar to angel investors are the Three F's: friends, family, and fools. These emotional participants are available in the establishment stage. While their investment may be high risk and with equity ownership, the Three F's tend to have little involvement or professional role in the business itself (unless they are part of the founding startup team).

A relatively new form of venture support—but at the center of this paper—is *incubation*. A cross between professional angel investors and established VCs, incubators provide high-risk seed money and early stage advice. Their investment decisions are based on a professional due diligence review, but the depth of this review is limited by the early nature of startup team and the uncertain (or yet to be conceived) business plan. Incubators are actively involved in the establishment and initial management of the new company. Indeed, some business plans come from internal brainstorming of the incubator staff. Such is the case of one of the most successful incubators, IdeaLab.

The incubator model is itself in development, with subcategories emerging. A traditional (or “real”) incubator offers physical office space along with resident support staff and local professional services. A “virtual incubator” offers no dedicated office, but does provide direct managerial support and seed funding to get the startup up and running. A further appellation is the “accelerator”, an incubator that supplements the startup team and brushes up the business plan to a level sufficient to attract a VC or strategic corporate investor.

## **OPERATION/INTERNAL RISK VS. ENVIRONMENTAL/INCOMING RISK**

Identifying the nature of investment risks is the first step in adopting a mitigation strategy for the incubator or the R&D manager. In recent years, risk has been moved from a task delegated to actuarial specialists or lower-level managers to the top of a CEO’s agenda. Particularly in competitive industries, risk is not considered a disadvantage but an opportunity to maximize commercial returns under a strategy of dynamic strategic planning (see e.g. de Neufville, 1990). As such, risk has been dissected in multiple ways. Since the main value-added of incubators is their direct involvement in running and leading a venture at the early stage of its development, we choose to distinguish between operational and environmental risk:

1. *Operational or Internal Risk*: Operational risk is internal to the investment promotion process where the choice of activities determines the likelihood of success. In short, these are activities under the investor’s control. Operational risk can be managed by the apportionment of resources, quality of management assistance, and distribution of investment funds across the stable of startup clients. Poor technology, incompetent management, and unqualified employees all increase the risk of internal failure of the venture, and ultimately the performance of the investor’s portfolio.
2. *Environmental or Incoming Risk*: Environmental risk is risk inherent to early stage investment that is beyond the control of the investor. For example, unforeseeable shifts in an industry, the introduction of superior technology by a competitor, sectoral stock market fluctuations, or natural disasters may negatively affect the viability of a new venture.

Business angels, venture capitalists and incubators are all exposed to these two types of risk. Each category of investor, however, is affected differently by operational and environmental risk:

- Business Angels are exposed to both types of risk without much ability to control the occurrence of detrimental events of either type, or to manage the impact of these events on their risk portfolio;
- Venture Capitalists and Corporate Investors may hedge against environmental risk by building cross-industry or multinational investment portfolios, but remain exposed to internal risk as their influence on day-to-day startup management is limited;
- Incubators are vulnerable to external risk as they must focus on a particular technology or a geographic region, but they attempt to control internal risk by actively participating in the management of the startup.

In this contribution we focus exclusively on real incubators: venture capitalists that provide office space and on-site management support for budding startups. We address two major issues for these incubators:

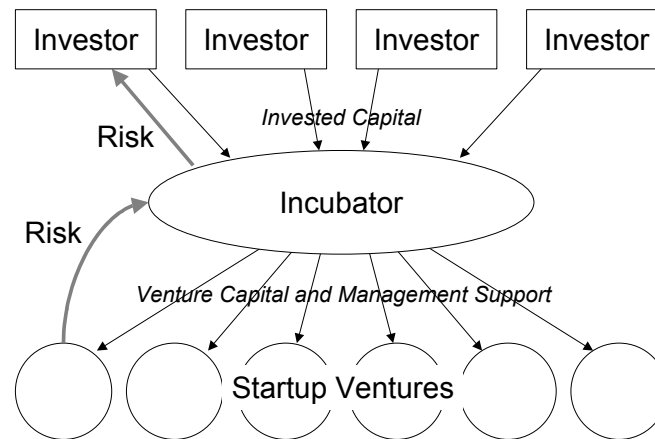
1. How to lower external or environmental risk.
2. How to manage internal or operational risk.

We expect these findings to be valuable for internal and independent entrepreneurs as well as venture capitalists and other high-risk project supervisors.

## **HOW TO PROACTIVELY MINIMIZE ENVIRONMENTAL OR EXTERNAL RISK**

There are three stakeholder groups in the incubation process: investors of the incubator fund, incubator management, and entrepreneurs being incubated. The investor provides capital resources to the incubator much like in a traditional VC fund. The incubator then invests these funds into a small number of early-stage startup ventures. An incubator also invests resources in the form of managerial support, professional assistance, and suitable office space. The incubator assumes the risk of individual startups, while the investors of the incubator fund are exposed to the pooled risk of these investments. In this respect, incubators act not only as capital brokers but also as risk brokers between startups and senior investors (see Fig. 4.1).

The nature of risk between investor and incubator is different from the risk between incubator and startup. On the one hand, investors seek to keep their risk at a minimum by adopting portfolio-based strategies that determine their capital investments across a menu of incubators, venture capital funds, and other investment vehicles. On the other hand, the startup entrepreneur faces a single risk matrix that cannot be managed over a portfolio strategy. Indeed, incubators attract startups with inexperienced management and immature technology



*Fig. 4.1. Risk and capital flows: Incubators as risk brokers.*

through a crude form of adverse selection. This is because a more experienced or self-dependent startup would not need the incubation support, and would more likely be financed by a pure venture capitalist. Also, dependency on a geographical or industrial area (economic risks) will determine the risk level of the individual startup. In this chapter we focus on the risks of *selecting* new startups and managing those startups once they are funded by the incubator or VC investor.

Entrepreneurship is a business in which risk-taking and failure are two related fundamental elements. A startup may falter due to unpredictable changes in the particular industry, technology or market sector. Operating in an environment of inevitable uncertainty, an incubator cannot completely avoid this environmental risk. The challenge is to minimize environmental risk by engaging in portfolio-based investment strategies. Every startup is associated with a unique risk matrix based on its particular characteristics, such as management team experience, level of technological advancement, and competitive status. When investing in several startups, the joint risk level may be a function of its parts if these risk matrixes are complementary. The incubator can hedge, to a certain extent, against environmental risk by investing in a diversified portfolio of startup clients with differing risk matrixes.

Portfolio diversity for environmental risk can be realized across various startup characteristics. The most significant diversification criteria are:

1. Industry, technology, or market sector;
2. Geographical markets;
3. Development stage of portfolio startups; or
4. Investment size of fund across portfolio startups.

### **Focus in industry/technology/market sectors**

Part of an individual startup's risk is dependent on the particular industry, technology, or product/service market in which it operates. Despite the efforts of the startup team or professional advisors, an early stage investment is exposed to unforeseen technological change or the emergence of new competition in a particular sector. Investors may therefore aim at distributing risk across different, sometimes competing technologies. An example comes from the battle between JVC and Sony over video format. Despite the fundamental strengths of an investment in the technically superior Betamax video format, the success of the competing VHS model rendered a genre of products unprofitable in the early 1980s. VHS won and Betamax lost; JVC reaped substantial revenues and Sony faced a setback in terms of R&D investment as well as—more importantly—time. Within the market for video players, a diverse investment strategy across different technologies would have resulted in a less risky portfolio for the consumer electronics manufacturer.

The venture capital investor enjoys an advantage over the corporate R&D project supervisor in that the high exposure of one technology or market can be partly offset by investing in a different sector through an unrelated company. A weakening in B2B dot-com companies, for example, may be offset by strong interest in biotechnology startups. Extending this further, the rational investor should seek a portfolio across multiple industrial, technological, and market sectors with divergent environmental characteristics and, thus, risk matrixes. The environmental risks of any one startup cannot be eliminated, but the aggregate risks of an investment portfolio can be reduced by strategic diversification.

Despite the benefits of a diversified investment strategy, the incubator has limited flexibility in minimizing its exposure across different sectors. Rather, an incubator's "investment charter" is limited to a particular set of industries, technology areas or markets. This investment charter is generally a contractual limitation on the scope of investment that the incubator management can pursue. Usually there is a range of investments with some logical relationship, such as investments in information technology and Internet e-Commerce. A more tenuous charter would feature disparate technologies such as biotechnology and new media entertainment.

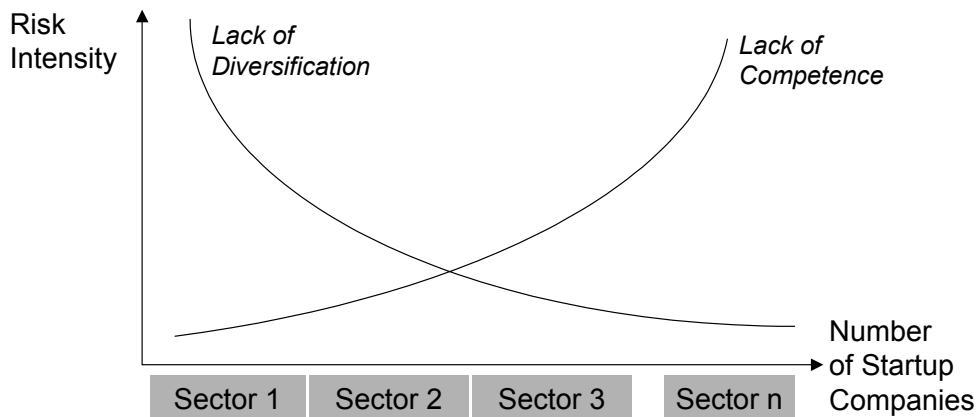
Why do incubators have a defined investment charter that limits their investment strategy? There are two reasons: upward signaling to investors (external limitation), and institutional competence or synergy (internal limitation). Both external and internal limitations are core elements of the incubator's risk management strategy.

To begin with, investors are an external limitation on the scope of an incubator's investment charter. The senior investor is engaged in its own risk management strategy of ensuring a diversified portfolio across defined sectors. An incubator is just one investment in a

portfolio that may include competing VC funds and structured capital investments. To maintain such a portfolio, senior investors prefer to invest in incubators with a clear sector focus.

An internal limitation on portfolio scope is the incubator's area of professional competence. Management skills, professional experience, and networking exposure tend toward one sector a set of related sectors. When departing beyond the incubator's "scope of competence", risk of failure increases. Moreover, internal diversification reduces the potential synergy that may arise from small ventures of similar sectors being incubated under the same roof. Part of why a startup team chooses to approach a particular incubator is the expected synergy generated from cooperating with complementary startups already present in the incubator or more mature companies that have graduated from the incubator.

Portfolio scope results in two conflicting dynamics in terms of environmental risk management: a broad range of investments in diverse sectors vs. a limited range of investments in one's sector of competence. In one respect, risk is reduced with a larger portfolio of investments across sectors with counterbalancing risk matrixes (see Fig. 4.2, lack of diversification). With a given management skill set, however, risk increases as the number of investments extends beyond the sector or sectors in which the incubator is competent to operate (see Fig. 4.2, lack of competence). The horizontal axis lists individual startup investment opportunities classified in sectors and ranked according to competence attractiveness. This is a dynamic list, revised with every new start-up candidate or the adoption of new business sectors. It is a challenging and critically important responsibility of the incubator to prioritize new start-up opportunities based on his objective assessment of several ambivalent factors. Due to the discretization by individual startups, both risk curves will look rugged rather than smooth as depicted. On any single startup increment to an existing portfolio, incubator management seek to balance the benefit of portfolio risk dilution relative to increased risk of investing beyond the scope of competence.



*Fig. 4.2. Competence focus versus portfolio diversification*



In practice, there is some flexibility in an incubator's focus. Investors may approve the decision of an incubator to accept a particularly attractive venture opportunity even if it lies outside the incubator's original charter. For some larger or more established incubators, a strong track record and the breadth of experience may justify a broader investment scope. Leading incubators and VCs such as CMGI or Softbank enjoy more flexibility in establishing a diversified stable of startups. But even if investors can be convinced of this deviation, the effectiveness of a multi-segmented incubator is not certain.

### **Focus on Geographical Location**

Investment risk has a geographical element beyond the industry, technology, or product/service area in which the startup operates. Fluctuations in regional market demand, changes in local or national politics, and unexpected natural disasters are truly environmental risk factors. The individual startup has limited control over these geographical risks. The incubator's exposure to such risks can be minimized across in a geographically diversified investment portfolio.

In today's global financial market the VC's money is portable, but the incubator's physical plant is not. Immobile office space and other physical assets are at the center of traditional incubation, and are the major attraction for the startup client. Further, professional service networks are often in close proximity to the office: in-house counsel, accountants, human resource consultants, and professional secretaries are not fungible assets that can be easily mobilized beyond commuting distances, much less time zones.

Incubators attract a local population of potential entrepreneurs. The desire of a diverse portfolio and the demands of remaining within one's area of competence must be satisfied within constraints that are far more narrow than that faced by a traditional VC. For an incubator to function efficiently, this local population must supply a sufficient number of technologically sophisticated personnel that need the expertise of experienced incubator managers. Thus this risk element depends on both the supply of business plans and the supply of other incubators.

The importance of geographical limitation is easily overlooked. Particularly in the Internet economy and the biotech sector, startups think and act global from the very beginning. The point here is not the client's access to distant markets, but the incubator's operation in a particular location, and its attractiveness to a local supply of potential startup clients.

### **Focus on Development Stage**

An investment portfolio comprising different stages of corporate maturity is a possible tool to reduce the impact of environmental risk. Venture companies are from across the spectrum of pre-establishment, early stage, mezzanine and mature/pre-IPO. The underlying assumption is that the longer a venture survives and the further along a technology is in development, the

lower the risk of failure. A corollary is that the more advanced the company, the closer the product or service is to market and the sooner the exit opportunity. Simply put, risk decreases with time.

Similarly to R&D budget allocation in large organizations, venture capital funding can be spread across initial, early, mezzanine and mature stages of investment to secure the optimal portfolio. By contrast, the incubators' choice of investment is restricted to pre-establishment and early-stage startups. Why? An incubator attracts inexperienced management teams by the turn-key operations and professional management.

There are advantages to focusing on early stage ventures. The opportunity for the experienced investor/entrepreneur to control the establishment of a new venture, for example, will reduce the likelihood of damaging mistakes made by inexperienced teams acting alone. Further, the return on a successful venture investment is greatest for those who secured an early equity position. Many of these advantages are realized much later, after a startup has 'graduated' from the incubator and a portfolio of mature equity investments has been developed, or at the exit event.

There are competing pressures between investing in mature companies with marketable products or technology and lower risk, and early startups having higher potential rates of return and more opportunity for control but with higher risk in terms of reaching maturity and eventual exit. The incubator's selection is limited to the set of early stage startup clients, a population of venture companies with high potential returns but also the highest rate of attrition.

### **Investment Volume**

A final portfolio strategy is investment volume. Generally, a conservative investor should distribute funds across a large number of companies to ensure a market rate of return. Even an aggressive VC investor will want to avoid a portfolio focused on a small number of volatile ventures. Similar to projects in pharmaceutical drug development pipelines, the higher the number of individual projects, the lower is the variance of average success of survival, hence the better are the predictions of average return on investment. Here again, the incubator model has limited flexibility in engaging in a well-diversified portfolio strategy.

The pursuit of a high number of individual projects/ventures would be outside the scope and possibility of an incubator. Even most industrial R&D organizations make use of rules-of-thumb when assessing the investment values of current R&D projects.

An incubator does not have the opportunity to distribute risk across a comfortable number of individual clients, as one would advise in an uncertain environment. The incubator's value proposition is providing a fertile environment within which the startup client can develop a business plan, build a functioning team/technology, and secure sufficient VC funding before it becomes independent. These activities require physical resources – in the form of office

space and infrastructure. The incubator must find the optimal size given the volume of startup “traffic” and the demands of the particular industry/technology/market genre. Virtual incubators and VC funds do not have this strict physical plant limitation.

The incubator is further limited in engaging in high-volume investing by personnel bandwidth. The greater the volume of investments, the more the incubator operations will be constrained by overhead limitations, management inefficiencies and information costs. This model is not easily scalable. Business plans are drafted, teams supplemented, technology developed, and market strategy researched with the assistance of incubator staff at a critical stage in the startup lifecycle.

In this chapter we have focused on the environmental or external risk of real incubators. We have seen that an incubator is more limited in the choice of startup ventures; at the same time the incubator attracts a different clientele of entrepreneurs. In conclusion, the total incoming risk is on average higher for incubators than for venture capitalists. Incubators accept this disadvantage because unlike more distant capital providers, they can actively lower the attrition of prospective entrepreneurs by becoming involved in managing their startup operations. This is the topic of the next section: internal risk management.

## **HOW TO MANAGE OPERATIONAL OR INTERNAL RISK**

Portfolio techniques cannot eliminate all risks. As we have seen in the previous section, for instance, the incubator has limited flexibility in reducing the environmental risks inherent to technology innovation. In this chapter we focus on how—relative to alternative forms of technology investment—an incubator is more effective and efficient in *managing* operational risks, otherwise known as internal risks.

Incubators actively participate in the conception, inception and internal management of new startups. A “real” incubator provides a physical office and the infrastructure needed to get a startup established and operational in a short period of time. In addition the incubator supplies professional services and human resources that an inexperienced team may not be able to attract or afford. In short, the startup is under the incubator’s roof and immersed in the incubator’s staff. For this menu of services and the investment in high-risk early startups, the incubator demands an equity premium that a mezzanine or mature team is not willing to pay. It is this community of early startups that incubators attract as clients. It is also the population of venture companies that is the most distant from an inventor’s payoff: the exit event.

There are two results of this near-symbiotic relationship between incubator and client: information flow (a prerequisite for risk evaluation) and management control (i.e. risk management). First, the incubator model allows for a direct, daily flow of information between the neophyte startup and the experienced incubator staff. From the incubator manager’s perspective, this allows for direct monitoring of the startup’s performance and, thus, risk

scenario. With incubator staff actively involved in the day-to-day operations, the internal problems of a startup are rapidly brought to the incubator's attention. Issues that may otherwise take a period of time to percolate up to the VC are immediately visible and readily addressed by the incubator. From the perspective of the new entrepreneur, this on-site guidance provides real-time assistance and direct advice. Further, an inexperienced team is exposed to the professional environment of the incubator staff and can also learn from more mature startups associated with the incubator.

Second, the incubator generally enjoys, and exercises, greater managerial control over a startup during its period of incubation. This is defined formally in the incubation contract, and develops further with the close proximity and daily involvement of startup management with incubator staff. This control translates to operational risk management—an incubator's involvement in decision-making matters will ensure that certain growth strategies or corporate policies are firmly in place. This does not ensure success, but it does provide the more experienced incubator manager a direct role in affecting necessary change. And this is not necessarily adverse to the startup. Indeed, an outside investor may feel more comfortable with a startup that has emerged from a competent incubator.

In contrast, the traditional VC monitors an investment externally from the boardroom or through periodic management meetings. Upper-level staffing and professional outsourcing services may be referred by the VC, but even drastic measures to steer a startup back on track are usually motioned through the startup management team. The VC exercises control and engages in communication as does the incubator, but the VC's have a more distant and a narrower per-startup bandwidth. The startup team has a tendency to filter out negative operational news such as internal team conflict, technical glitches, negative market feedback, etc. Thus, the VC faces certain operational risks internal to the investment startup even when playing an active, but still distant, managerial role.

How does operational risk strategy actually function? The role of the incubator manager is critical. This individual is assigned to a particular startup, interfaces with the new team and directs the specific incubation process. Generally he or she mentors the startup management team with strategic advice and personal resources. While staff members and professionals may be assisting the startup, it is ultimately the incubator manager who commissions the human resources. The incubation manager rarely oversees more than two startups at a time, acting like a parent to fledgling children: Protection while they are in their infancy, strict oversight during development, and gradual introduction to the world of business. The faster this process takes place, the better for both parties.

## **CONCLUSION**

Venture business investors face the risk of unproven technology, changing markets, emerging competition, and uncertain funding. In this paper we have looked to the nature of risk management among incubators. While a traditional venture capital fund can diversify relatively effortlessly across sectors, an incubator's investment strategy is restricted in scope by the demands of senior investors, the realities of professional competence, the narrow segment of early stage startup clients, and the support needs of these clients. The fundamental dilemma for the incubator remains the scope of competence versus scope of investment portfolio, i.e. the incubator's investment charter versus the senior investor's own interest in portfolio diversification.

Incubation is an investment niche with a great deal of inherent risks. To minimize exposure, the incubator should differentiate between external and internal risk and adopt the appropriate risk strategies for each. External or environmental risk may be lowered by a diversified portfolio across market sectors, geographical locations, development stages, and investment volume. This form of risk can also be reduced by attracting startups that fit the incubator's internal competence profile. Internal or operational risk depends on the mix of financial and human resources employed across the portfolio companies during the incubation process. With these investment strategies, direct monitoring of early progress, and active management control are interdependent factors that the intermediary risk broker - the incubator - can efficiently manage on behalf of the senior investors.

The incubator and the corporate R&D manager face similar challenges in high-risk projects: they have limited flexibility in reducing environmental risks. They are able, and expected, to reduce residual risk by playing an integral role in the development of a venture or a project. They differ in that the incubator operates under harsh market conditions, competing for capital inflow from various sources and vying for entrepreneurs who have a number of incubation options. The corporate R&D supervisor, on the other hand, is relatively insulated with greater job security, more secure financing, and an established internal labor pool. These characteristics may in part account for the poor reputation corporate R&D labs have for managing high-risk projects.

Corporations can look to incubators as both a model and as a tool. Internal incubators may be a means of stimulating technological innovation, a process that generally occurs outside of the corporate lab. The R&D manager can look outside of the corporation to venture startups as a source of newly emerging technologies. A startup that has been nurtured in an incubator has also been exposed to risk minimization strategies that should appeal to the more conservative corporate partner or suitor. Indeed, corporations have become senior investors in leading technology incubators to both enjoy high investment returns and to secure access to promising new technologies that would not otherwise thrive in their R&D labs.

A new alternative model is to create internal incubators, much like some companies have established internal VC funds. The path to internal incubation, however, may require significant changes in the internal corporate bureaucracy, managerial mindset, and R&D culture that developed over the lifetime of the established corporation. Traditional industrial R&D and new venture incubation are approaches not in conflict but rather in competition. We are confident both will be able to co-exist and benefit from each other.

As the venture investment community continues to evolve in an environment of uncertainty, a new breed of sophisticated incubators will emerge. These successful technology and business facilitators will be successful in their ability to initially select investments such to minimize environmental risks and in their ability to manage their portfolio companies such to minimize operational risks. The result will be a larger probability of success among the incubated venture startups and higher returns for senior investors. It is these incubators that will offer a model both for corporate R&D departments to emulate and for business scholars to study.

## **BIBLIOGRAPHY**

*Economist* (2000): Hatching a new plan. August 10, 2000.

Nesheim, J. (2000): *High Tech Startup*. New York, The Free Press.

de Neufville, R. (1990): *Applied Systems Analysis*. New York, McGraw-Hill.