Intrapreneurship-conductive culture in industrial R&D : the design of a simulation game to create awareness and provide insight

Intrapreneurship-conducive culture in industrial R&D

The design of a simulation game to create awareness and provide insight

Hanns Menzel

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Chapter 1

Introduction

It is well recognized that firms should periodically invest in new technologies and engage in the process of radical product innovation (Chandy & Tellis, 1998, 2000; Leifer *et al.*, 2000; Rice *et al.*, 2001; Schumpeter, 1934; Tushman & Nadler, 1986). Expanding world-wide competition, increasingly fragmented markets, as well as emerging technologies force established firms to create new sources of wealth through radical innovation on the basis of new combinations (Guth & Ginsberg, 1990). Radical innovation is an important engine to push internally centered growth into completely new market opportunities unrelated to the current mainstream business activities.

Companies that successfully innovate can make substantial profits and gains in market share, all resulting due to the technological advantage and the (at least temporarily) exceptional competitive position in the market (Ali, 1994; Bingham, 2003; Calantone & di Benedetto, 1988; Chandy & Tellis, 2000; Kleinschmidt & Cooper, 1991; Kumpe & Bolwijn, 1994; Quinn, 1979). To name a few of the most known examples: *Corning* in light bulbs, heat resistant glass, and TV tubes (Fishman, 2000), *3M* in *Post-it*® notes (Fry, 1987; von Hippel *et al.*, 2000), *General Electric* in fluorescent lamps (Chandy & Tellis, 2000), *Sony* and *Philips* in compact disc players (Chandy & Tellis, 2000; Garcia & Calantone, 2002; Rosenberg, 1996), and *Seiko* in analog quartz watches (Chandy & Tellis, 2000).

At the same time radical innovation is an important mechanism for diversification, organizational change (Burgelman, 1983b), as well as organizational rejuvenation (O'Connor & Ayers, 2005). In respect of the typical life cycle of both products (Chandy & Tellis, 1998, 2000) and companies (Greiner, 1972; Höft, 1992), the need to develop radical innovations becomes even clearer. If a company's main business is in the stage of maturity, it has to secure itself from falling into decline by continuously reinventing, broadening, and extending its main businesses.

However, while the relevance of radical innovation is clearly recognized, it seems that large, established companies that are leading in regard to the current product generation often have difficulties developing innovations of a significantly higher degree of novelty. Radical innovations fall into areas of conflict between promising economic opportunities and

immense risk of failure (O'Connor & McDermott, 2004). They feature to a great extent requirements and characteristics that are at odds with what large, established organizations are meant for. Typically, these companies have been described as risk averse (Section 1.1), short-term oriented (Section 1.2), as well as formalized and bureaucratic (Section 1.3). The consequences of these three properties for radical innovation and the organization of R&D are discussed in the following paragraphs.

1.1 Risk aversion

Radically new technologies have a significantly higher degree of uncertainty than incremental improvements of existing technology. During the early stages of development it is inherently difficult to identify and anticipate future uses because it is unclear what the product actually will deliver to which customers and how it actually relates to the existing knowledge and resources of the organization. There is a clear tendency to think of new technologies in terms of old technological systems, a trend that handicaps organizations anticipating future applications that will arise on the basis of new technological paradigms.

Moreover, the impact that a radically new technology may have on the market not only depends on the invention or new technology itself, but also on improvements that take place in related or complementary technologies (see Rosenberg, 1996). Ultimately, as the examples of the telegraph, gas lighting, typewriter (Chandy & Tellis, 2000) and disk drive industry (Christensen, 1997; Christensen & Bower, 1996) show, radical innovations may induce major shifts in technological paradigms that, in turn, may cause changes in the whole industry structure (Christensen, 1997; Christensen & Bower, 1996; Hill & Rothaermel, 2003; Tipping & Zeffren, 1995; Tushman, 2004).

A high degree of uncertainty is often not accepted in established organizations. It is much easier and safer for these firms to stay with the familiar than to explore the unknown (Stevenson & Gumpert, 1985). As a consequence, they will only develop and commercialize incremental innovations that aim at further development and enhancement of the current business (Bingham, 2003; Christensen, 1997; Kelley *et al.*, 2002; Leifer et al., 2000). Senior management is essentially risk-averse and is even rewarded for minimizing risk and surprises (Quinn, 1985). Accordingly, decisions are based on forecast data and market research information to justify its potential returns.

1.2 Short-term orientation

Radical innovations require a long-term orientation to the future, including a challenging vision and imagination of the future technological and market environment. As the example of the *Laser* shows, the discovery of a radically new technology is usually followed by a long period of additional R&D to develop a concrete, commercially successful product (see Rosenberg, 1996). This requires additional sacrifices including long-term pay-off horizons which may take some seven to 15 years from first discovery to profitability (Dean, 1974; Dougherty & Hardy, 1996; Kobe, 2006; Rice et al., 2001; Rosenberg, 1996; Utterback, 1994a).

Breakthrough innovations imply revolutionary change and a deflection from the present practice requiring new knowledge that may make existing knowledge obsolete (Kobe, 2006; Rice et al., 2001). Instead of relating to the current mainstream business radical innovations create new emerging or niche markets with low volumes in the beginning (Kobe, 2006). Moreover, they bear the risk of jeopardizing incomes from existing products (Chandy & Tellis, 1998).

Radical innovations do not solve the problems of established companies that need multi-million euro businesses. These companies are entrenched instead in processes that address current customer needs and provide quick and stable income (Christensen, 1997; Dougherty & Hardy, 1996; Kelley et al., 2002; O'Connor & Ayers, 2005). To boost financial performance and satisfy shareholders, it is tempting for managers to focus on the short-term and dedicate their limited resources to the current business activities (Quinn, 1979, 1985; von Hippel et al., 2000). As a consequence, the focus is on evolutionary change and standard R&D projects, the purpose of which is to refine the existing products that lead to immediate pay-off.

1.3 Formalization and inertia

Radical innovations are based upon completely new technologies, ideas, products, markets, and organizational forms, most probably implying variations within the settings of existing firms. This requires new competences and new organizational structures that would make many of the existing routines obsolete and require the development of new routines, a process that is difficult, costly and risky (Nelson & Winter, 1982). To achieve this, pioneering, exploration, learning in new directions and implementation speed are essential (Galbraith, 1982; Henderson & Clark, 1990; Lorange, 1999; March, 1991; Quinn, 1985). To nurture radical innovations, organizational structures need to be flexible and provide room to

maneuver to facilitate informal and organization-wide collaboration and problem solving (Burgelman, 1983a; Dougherty & Hardy, 1996). This includes out-of-the-box thinking and going beyond what is common understanding and practice today (see Rosenberg, 1996).

However, large, established companies are complex systems, and planning and controlling complexity is seen as one of the most relevant factors for sustained economic success and competitiveness. These companies are generally operating organizations designed to effectively process the millionth loan, manufacture the millionth product, and serve the millionth client. Therefore, they develop a system of administrative facilities, formal rules of communication, and routines to manage complexity and to carry out the repetitive task of manufacturing and distributing large volumes of the current product efficiently (Chandy & Tellis, 2000; Henderson & Clark, 1990; Nelson & Winter, 1982; Rosenberg, 1996; Süssmuth-Dyckerhoff, 1995).

Too many approvals and delays make the system slow and reduce the diversity in behavior, because learning is likely to be incremental and in known directions (Burgelman, 1983a; Dougherty & Hardy, 1996). This results in complacency, structural inertia and restraints against major changes (Hamel, 1999; Hill & Rothaermel, 2003; Süssmuth-Dyckerhoff, 1995; Tushman & Nadler, 1986). As a consequence, the search for breakthrough innovation is not part of the corporate agenda and R&D is pushed towards incremental innovation – that is, towards exploitation, small steps of improvement and cost reduction.

Indeed, the McGraw-Hill annual surveys over a number of years show that most R&D expenditures (around 80%) are devoted to improving products that already exist rather than to the invention of new technologies and the development of completely new products (see Rosenberg, 1996). Given the focus on efficiency and quick returns, R&D is also forced to implement effective and efficient processes – that is, to promote standardization and routines based on available knowledge and current technology. Since routines do not promote search, divergence and openness, they are inefficient to foster radical product innovations (Henderson, 1993).

1.4 Summary and implications for intrapreneurship

To nurture radical innovation these companies need to develop the ability to harness entrepreneurship inside their R&D organizations, both on a corporate and a business unit/business line level (Bingham, 2003; Drucker, 1985; Kelley et al., 2002; Kumpe & Bolwijn, 1994; Souder, 1981b). Entrepreneurship within existing organizations, which is also referred to as intrapreneurship, is of particular importance for the discovery and exploitation

of completely new business opportunities that go beyond the existing mainstream business of the firm (Antoncic & Hisrich, 2003; Burgelman, 1983a; Czernich, 2004; Fayolle, 2003; Hitt *et al.*, 2002; Hornsby *et al.*, 2002; Klein, 2002; Pinchot, 1985). Intrapreneurship is founded in the logic of pursuing entrepreneurial opportunities for entirely new business activity based on introducing a high degree of novelty, addressing and opening up new markets, engaging in risky projects with long-term time horizons until profitability.

In this way mature organizations that may miss these opportunities can develop new business activity that creates completely new customer needs which the latter is not yet aware of. Companies that successfully managed to develop new and profitable businesses on the basis of radical innovation have been involved in intrapreneurship on a continuous base. It is due to its very nature that intrapreneurship is a promising way towards radical product innovation and may even help to prevent that the incumbent companies fail when faced with radical technological change. And it is not a dream; it is and can be reality as an array of intrapreneurial success stories manifests (see, for instance, Pinchot, 1985).

Perhaps the best-known of those is the creation of the *Post-it*® notes by *3M*'s scientist Art Fry, who had the idea for this product while he was singing in a church choir (Fry, 1987; Pinchot, 1985). He was irritated, because the scraps of paper that he was using to bookmark his hymnbook frequently dropped on the floor. There, he remembered that several years ago one of his colleagues had developed an adhesive that was strong enough but could be easily removed. This adhesive was perceived as being useless, but Fry envisioned applying the adhesive to his paper scraps in order to stick them into his hymn book. This would prevent his bookmarks from dropping on the floor, and allow him to remove them without leaving any marks, as well as to use them for the next songs. After surmounting several technological and organizational barriers within *3M*, he developed his idea into a marketable product. Today, the *Post-it*® note is probably one of the best-known office supplies in the world and sells 4.5 million units each year alone in Germany.

Another example is the U.S. based company *Corning*. Fishman's (2000) case study shows how intrapreneurship in R&D helped and helps to continuously sustain *Corning*'s well-being through periodical radical changes in the main business model induced through major technological innovations. Fascinating – and thereby nicely showing the potential of intrapreneurship – is that *Corning* invents a new product, becomes technology and market leader for that product, and when competitors start copying the business model, *Corning* reinvents itself. *Corning* made the first successful light bulbs for Thomas Edison, invented the technology to mass-produce color-TV tubes out of glass, and today optical fiber is among the

most important business segments. As with light bulbs and TV-tubes, optical fiber is transforming human society. As light bulbs and TV-tubes once did, optical fiber dominates the company's revenue and profits today.

This anecdotic evidence of intrapreneurial success stories nicely exemplifies the potential intrapreneurship can have in industrial R&D environments. Another way of clearly showing the relevance of intrapreneurship is studying cases where large, established companies failed to develop radical innovation, or failed when they were confronted with disruptive technological change. Tushman's case study of the *General Radio Company* and Christensen's case study of the disk drive industry show how technological change may destroy fortunes of astutely managed firms that were formerly leading in technology and market (Christensen, 1997; Christensen & Bower, 1996; Tushman, 2004).

Christensen's study clearly reveals that incumbent firms were able to lead the industry in developing technologies of every sort whenever the technologies addressed existing customer needs. However, the same firms failed to develop technologies that initially were only useful in emerging markets that were not yet addressed by the firm. Possible reasons why those companies stumbled when faced with technological change have been discussed above: uncertainty avoidance (see Section 1.1), short-term orientation (see Section 1.2), and organizational formalization and bureaucracy (see Section 1.3). As a consequence, R&D is often not designed for predicting and developing radical innovations, but for incremental, improvement-oriented innovations in order to strengthen current technologies, enhance the current product range and better address well-identified market needs at the short-term.

Interestingly, all new disk drive technologies emerging over time had originally been developed within the organization that was leading at that moment in time. However, the inventors of the technologies have left the firms and engaged in independent entrepreneurship, because the mother organizations were reluctant to engage in processes of radical innovation. They started up their own businesses to develop and market the invented technologies towards successful new products. These entrepreneurial – but not intrapreneurial – innovations served as the basis for the technological paradigm shifts that the incumbent companies could or did not want to follow.

This raises the question of what had happened if the incumbents would have been able to accommodate intrapreneurship and internally pursue the development of these disruptive technologies. Sure, this is difficult to answer, but clear is that it was thanks to independent entrepreneurship that the technological opportunities have been developed into successfully commercialized products. So, how can intrapreneurship be fostered on a continuous base in

large, established companies and in their R&D organizations in particular? This is the basic question that I want to answer in the scope of this doctoral dissertation. Moreover, it is my personal goal not only to answer the question and contribute to theory, but also to improve business practice by providing a practicable approach – namely, an intervention (in the form of a scenario-based simulation game) that can be used to foster intrapreneurship within the context of industrial R&D organizations.

Chapter 2

Intrapreneurship

Intrapreneurship is an important topic for most managers in companies of any size nowadays. In the last two decades intrapreneurship has become more and more recognized as a vital element in organizational development, having relevance not only for the company but also the individual employee. Many researchers have discovered the importance of intrapreneurship and its role in organizational renewal, innovation, and the creation of new businesses (Antoncic & Hisrich, 2001; Pinchot, 1985). It became a subject of interest because of its effect on revitalization and performance of the firm (Draeger-Ernst, 2003; Kuratko *et al.*, 1990; Lumpkin & Dess, 1996; Zahra & Gravis, 2000). Various studies focused on the organizational factors that influence intrapreneurship (Pinchot, 1985; Hornsby et al., 2002) and on the characteristics of entrepreneurial individuals in existing organization (Fayolle, 2004; Howell & Higgins, 1990b; Kauffmann, 2003; Souder, 1981b).

Even though intrapreneurship has been appearing in the scientific literature for approximately two decades, there is still no generally accepted definition, nor is there unanimity about how the concept should be understood (Guth & Ginsberg, 1990; Maes, 2004). One of the few aspects that seems to be clear is that the term intrapreneurship has been coined by Pinchot (1985) whose publication attracted a lot of interest among scholars and practitioners so that many papers on the subject have been published since. Intrapreneurship consists of the prefix *intra* meaning *inside* or *within* and a shortened form of *entrepreneurship*. Consequently, *"...entrepreneurship within an organization ..."* can be used as a general, very broad definition.

Attempting to describe the phenomenon of entrepreneurship within an organization authors use virtually as many definitions as there are publications about the subject. Moreover, many authors use different terms to describe the same subject (Antoncic & Hisrich, 2003; Burgelman, 1984; Carrier, 1997; Stopford & Baden-Fuller, 1994; Süssmuth-Dyckerhoff, 1995), whilst other authors use the same term to describe different concepts (Draeger-Ernst, 2003; Eesley & Longenecker, 2006; Pinchot, 1985; Stevenson & Jarillo, 1990); some authors even use different terms in one and the same paper (Antoncic & Hisrich, 2003; Kuratko et al.,

1990; Russell, 1999; Schmid, 1987). A collection of terms used and their corresponding sources is given in Table 2-1 below.

Table 2-1: Terms used to describe the phenomenon of entrepreneurship within existing organizations

Term used	Source
Corporate entrepreneurship	(Burgelman, 1983b, 1984; Carrier, 1997; Cohen, 2002; Covin & Miles, 1999; Dess *et al.*, 1999; Hitt et al., 2002; Hornsby et al., 2002; Roberts, 1980; Russell, 1999; Stevenson & Jarillo, 1990; Thornberry, 2001; Zahra, 1991; Zahra & Covin, 1995)
Internal corporate entrepreneurship	(Jones & Butler, 1992; Schollhammer, 1982)
Internal entrepreneurship	(Burgelman, 1983a; Jansen & van Wees, 1994; Kumpe & Bolwijn, 1994; Schollhammer, 1982; Vesper, 1984)
Intrapreneurship	(Antoncic & Hisrich, 2001; Bitzer, 1991; Eesley & Longenecker, 2006; Fayolle, 2003; Heinonen & Korvela, 2003; Pinchot, 1985; Stevenson & Jarillo, 1990; Süssmuth-Dyckerhoff, 1995)
Intrapreneuring	(Kauffmann, 2003; Klein, 2002; Klein & Specht, 2002; Pinchot, 1988; Pinchot & Pellman, 1999; Süssmuth-Dyckerhoff, 1995; Thornberry, 2001)
(Internal) corporate venturing	(Block & MacMillan, 1993; Burgelman, 1983b; Cooper & Kleinschmidt, 1996; Hisrich & Peters, 1986; Klein, 2002; Klein & Specht, 2002; MacMillan *et al.*, 1986; Miles & Covin, 2002; Stopford & Baden-Fuller, 1994; Thornberry, 2001)

Despite the lack of a common definition, there is broad consensus both in the academic and business practice about the relevance and the need to bring entrepreneurship – however named and understood – into the settings of established companies. Already Schumpeter (1934), who stated that *"new enterprises are mostly founded by new man and the old business sink into insignificance"*, identified the need to instill the logic of entrepreneurship into the established businesses. Besides existing small and medium sized companies (Aaltio, 2002; Carrier, 1994, 1997; Fayolle, 2003; Veenker *et al.*, 2004), especially big companies are turning towards intrapreneurship because they are not getting the continual innovation, growth, and value creation that they once had (Heinonen & Korvela, 2003; Mair, 2005; Pinchot, 1985; Pinchot & Pellman, 1999).

In order to comprehend the phenomenon of entrepreneurship within existing organizations, we need to better understand what entrepreneurship is all about and how this concept is linked to innovation and radical innovation in particular (Section 2.1). On the basis of this understanding, Section 2.2 presents the concept of intrapreneurship and its underlying conflict that is often antecedent to successful intrapreneurship. As a response to this, Section 2.3 postulates that in order to overcome the conflict intrapreneurship is founded in a dialogic approach between the internal entrepreneur and the existing organization. Finally, Section 2.4 explicates the research problem.

2.1 The entrepreneurship process from opportunity to innovation

The term entrepreneurship has been introduced about three hundred years ago, but it was not before the beginning of the 20th century that it started to attract major interest. It was Schumpeter (1934) who provided a first framework for today's understanding of entrepreneurship. He explains that *"[...] it is the carrying out of new combinations that constitutes the entrepreneur [...]"*. He also specified the kind of new combinations he had in mind, including new products, new methods of production, new markets, new sources of supply and new organizations. Thereby, he associates entrepreneurship with innovation.

Stemming from the Latin word *innovatio*, innovation means newness or difference, and to innovate means to make changes, introduce new things (Hornby *et al.*, 2000), or bring in new methods and ideas, make change (Soanes & Stevenson, 2004). In business economics the term innovation can be interpreted as creating, managing, and marketing newness or difference. The criteria for success in innovation are commercial (economical) rather than purely technical so that entrepreneurship goes beyond the invention of ideas to effective commercialization and acceptance in the marketplace (Burgelman *et al.*, 2004; Hitt et al., 2002). More specifically, innovation is when the cost of the original development is justified and additional returns to the developing organization are generated. In other words, the economic value of any new idea is the price that users pay to obtain the benefits that the technology provides in the form of, for instance, new products, services, processes or structures.

Hence, innovation is a concept that includes both technological (new products, services, processes, etc.) and non-technological aspects (value-added to the market, applicant, or customer, social impact, etc.). Invention or technology can be solitary but innovation never is. More specifically, innovation can be defined as a means-ends relationship (Garcia & Calantone, 2002; Gemünden, 2004; Hauschildt, 2004; Salomo, 2003). A certain technology represents a means that is deployed to achieve specific ends – that is, to fulfill certain needs in the market. On the basis of this two-dimensional framework innovations can be distinguished according to their degree of novelty on both the technological and the market dimension. As depicted in Figure 2-1 below, this leads to a continuum of innovativeness ranging from incremental to radical innovation.

Incremental innovations – also referred to as continuous (Morone, 1993; Veryzer, 1998), improvement (Weule, 2002), competence enhancing (Aldrich, 1999), or evolutional innovation (Burgelman et al., 2004) – show lower degrees of both technology and market newness. Usually, the emphasis is on cost reductions, new product features and line

extensions, as well as new products to augment an existing line of business (Bingham, 2003; Garcia & Calantone, 2002; Leifer et al., 2000). Incremental innovation is the result of efficient exploitation of existing resources and competencies and concerns activities focused on constantly improving the existing knowledge base in a routine manner in order to get an improved understanding (Aldrich, 1999; Gilsing, 2005; March, 1991). Thus, it is improvement regarding the existing technological paradigm addressing current and well understood markets and customer needs.

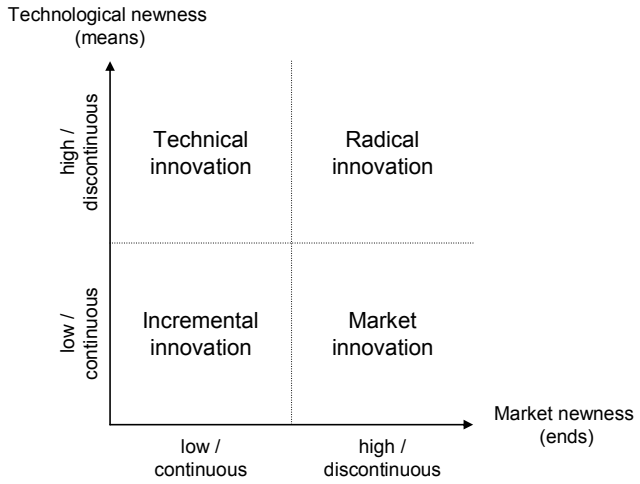


Figure 2-1: Innovation defined as a means-ends relationship (Garcia & Calantone, 2002; Gemünden, 2004; Hauschildt, 2004; Salomo, 2003)

In contrast, radical innovations – also referred to as discontinuous (Morone, 1993; Veryzer, 1998), breakthrough (Weule, 2002), competence destroying (Aldrich, 1999), or revolutionary innovation (Burgelman et al., 2004) – are based on a high degree of novelty, the application of fundamentally new logics and technologies, or a significant combination of those (Tushman & Nadler, 1986; Weule, 2002). This requires exploration competencies to break away from the present practice and to perform activities that are explicitly aimed at the generation of new knowledge (Aldrich, 1999; Garcia & Calantone, 2002; Gilsing, 2005; Leifer et al., 2000; March, 1991; Vanhaverbeke & Kirschbaum, 2005).

Radical innovations have a strong impact on the market, in terms of offering entirely new benefits, and on the firm, in terms of its ability to revitalize the existing and create new businesses (O'Connor & Ayers, 2005; Weule, 2002). They have even the capacity to transform the economies of a business by destroying skills and investments made over the years and may even change the shape of entire industries (Chandy & Tellis, 1998, 2000; Christensen, 1997; Christensen & Bower, 1996; Leifer et al., 2000). This sort of innovation refers to what Schumpeter labeled new combinations – that is, new products, new methods of

production, new markets, new sources of supply and new organizations – having the potential to shape new firms, new markets and even new industries.

Hence, entrepreneurship can be understood as the process to create new means-ends relationships in the form of innovations that serve as the basis to start-up new business activity. Venkataraman (1997) suggests that entrepreneurship is a process of discovery and exploitation of entrepreneurial opportunities to create future goods and services. Based on this, Shane and Venkataraman (2000) go a step further and delimit entrepreneurship as a process that occurs as the nexus of basically two phenomena: the presence of lucrative, entrepreneurial opportunities and the presence of enterprising individuals. Indeed, there is increasing consensus that entrepreneurship research should centre on the pursuit of opportunity (for an review of literature and definitions see Maes, 2004; van der Veen & Wakkee, 2004).

Elaborating on the possibilities for new profit potential, Casson (1982) defines opportunity as a situation in which new goods, services, raw materials and organizing methods can be introduced and sold with a greater value than their cost. Stevenson and Jarillo (1990) define opportunity as a desirable future state that is different from the current state and deemed feasible to achieve. Christensen et al. (1994) distinguish business opportunities from general opportunities as a possibility for new profit potential, through the founding and formation of a new venture, or the significant improvement of an existing venture.

Kirzner (1997) distinguishes entrepreneurial opportunities from the larger set of business opportunities for profit because the former centre on the discovery of new means-end relationships, whereas the latter also include optimization within existing means-end relationships. Kirzner's understanding of entrepreneurial opportunities as the discovery of new means-ends relationships clearly refers to the understanding of innovation elaborated above. In this sense, an entrepreneurial opportunity is given when a new technology – or a (re-)combination of existing technologies – can be used to serve market needs in a way that was not identified before.

As shown in Figure 2-2 below, the discovery of an entrepreneurial opportunity forms the starting point of the entrepreneurship process. Discovery is about the creation, recognition, elaboration, and articulation of opportunities for which two alternative explanations exist: search and recognition (Shane, 2000). Entrepreneurs recognize opportunities that are related to prior knowledge – that is, to information that they already posses about available technology and market needs (van der Veen & Wakkee, 2004; Venkataraman, 1997). One cannot search for opportunity because, by definition, it is unknown until it is discovered. In

his study on how prior knowledge affects the discovery of entrepreneurial opportunities, Shane (2000) empirically shows that neither all individuals are equally able to recognize opportunities, nor they identify the same set of opportunities.

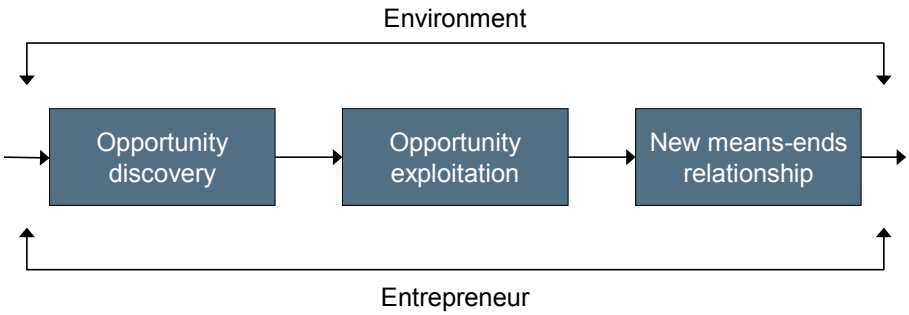


Figure 2-2: The process of entrepreneurship

Once an entrepreneurial opportunity is discovered a decision must be made as to whether and how to exploit it. Kirzner (1997) and Gaglio (1997) point out that opportunity discovery implies opportunity exploitation; otherwise it would not be an entrepreneurial opportunity. In other words, if an opportunity does not lead to the creation of a new venture, it was maybe perceived as an entrepreneurial opportunity but, in fact, it was not one. What remains is the decision on how the opportunity will be exploited. In principal, two modes of exploitation exist. Either the entrepreneur creates a new, legally separate business or the opportunity will be exploited to the benefit of an existing company. Involving efforts to set up an organization, raise funding, and allocate resources (van der Veen & Wakkee, 2004), opportunity exploitation results in a new means-end relationship, such as a concrete business concept to create value both for the customer/user and the entrepreneur.

Putting it differently, this process could also be described as discovering and exploiting the opportunity to develop a product or service which will be brought to the market quickly, based on the understanding of what the market needs. In any case, it is important to note that entrepreneurship is not – as often assumed – a personal trait or mindset or a culture of a group of people but a discrete, episodically occurring process that runs on the condition of the presence of both a lucrative, entrepreneurial opportunity and an enterprising individual. Hence, entrepreneurship can be defined as follows: "*Entrepreneurship is the process, during the course of which an entrepreneur discovers and exploits an entrepreneurial opportunity to develop new means-ends relationships (independently or within an existing organization)".*

One may criticize that a definition of entrepreneurship should involve innovation as the specific outcome of the entrepreneurship process, in the way Schumpeter defines it. But defining entrepreneurship on the basis of opportunity does by no means exclude innovation.

In fact, it merely takes one step back because before innovation there has to be an opportunity, which has to be discovered and pursued. By contrast, defining entrepreneurship through innovation (only) may exclude aspects that are closely related to entrepreneurship, such as small, newly founded or sole proprietor companies, as well as establishing new businesses. This brings us to the question of how large, established firms can implement entrepreneurship within their settings in order to develop radical innovation as the basis for completely new business. This will be discussed in the following sections.

2.2 The intrapreneurship process and its underlying conflict

Intrapreneurship is founded in the logic of pursuing entrepreneurial opportunities for new business activity within the boundaries of existing organizations. Hence, intrapreneurship is a specific form of entrepreneurship and should be defined in function of the definition of entrepreneurship that is given in Section 2.1. This definition does not limit entrepreneurship to starting up new, independent firms. It explicitly includes other outcomes such as new products, services, strategies or competitive postures that can be wholly contained within the corporation, absorbed into an existing unit, or spun off as a separate company along with some insiders, or eventually sold. This leads to the following definition: *"Intrapreneurship is the process, during the course of which an intrapreneur discovers and exploits an entrepreneurial opportunity to develop new means-ends relationships within an existing organization"*.

In compliance with the definition of entrepreneurship, intrapreneurship is a discrete, episodically (re)-occurring process evolving through the nexus of intrapreneur and opportunity. It is evident that the individual intrapreneur – or group of intrapreneurs – plays a major role in this process. If no intrapreneur is present, there will not be any intrapreneurship. However, it is equally evident that intrapreneurship – in clear contrast to independent entrepreneurship – also involves the organization as a necessary process agent. In other words, a nascent intrapreneur – that is, someone who initiated serious activities that are intended to develop a viable new business venture within the boundaries of an existing organization (Aldrich, 1999) – needs to take into account the organization as a given variable. Also the external, remote environment, in which the organization as a whole operates, needs to be considered by the intrapreneur.

This means that – in accordance with the entrepreneurship process – the presence of both opportunity and intrapreneur are necessary conditions, but not sufficient to define intrapreneurship in its entirety. In addition, the organization and the remote environment need

to be taken into account as two contextual variables. Accordingly, Figure 2-3 below illustrates the intrapreneurship process from opportunity discovery to the creation of new means-ends relationships, executing through the interaction between the intrapreneur (individual level) and the company's management (organizational level) embedded into a larger context (remote environment).

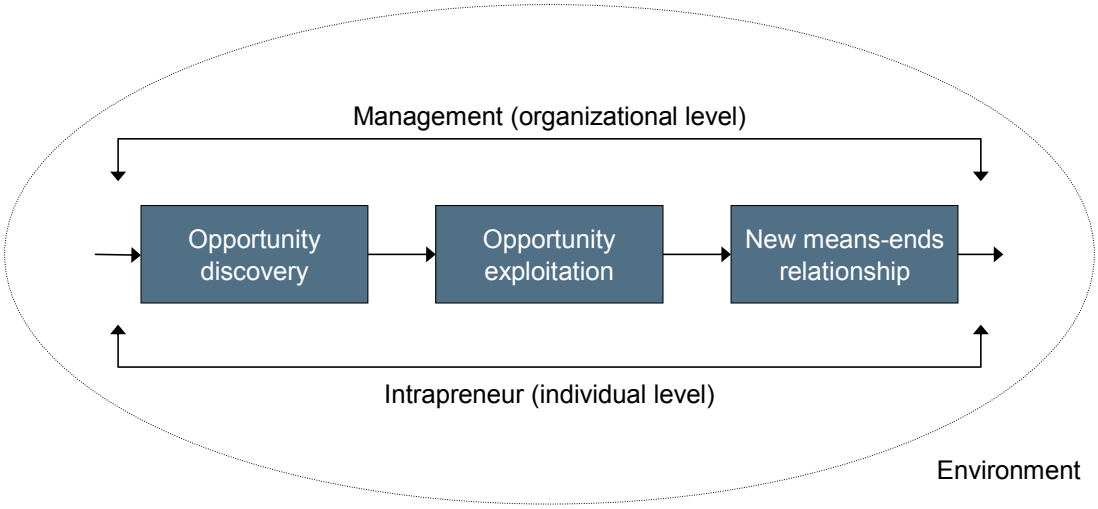


Figure 2-3: The process of intrapreneurship (adapted from Figure 2-2)

This definition of intrapreneurship implies that opportunity discovery and exploitation must evolve in close interaction and cooperation between the individual (intrapreneur) and the organizational (management) process level. Both the intrapreneur and the management must have or build a common understanding of the opportunity and the mode of exploitation. In situations where both the individual's and the organization's desire for it are simultaneously present or absent, no special problems for intrapreneurship would arise. Paradoxical or conflictive situations arise, however, if intrapreneurial initiatives emerge but the management has no interest in pursuing them (the same holds true if top management's interest is not matched by significant number of entrepreneurial initiatives).

This conflict, often antecedent to successful intrapreneurship, comes up because entrepreneurship and the administrative mode of the established organization simply do not match regarding the pursuit of entrepreneurial opportunities (Block & MacMillan, 1993; Burgelman, 1983a, 1984; Czernich, 2004; Fayolle, 2003; Gibb, 1999; Heinonen & Korvela, 2003; Hitt et al., 2002; March, 1991; Morris *et al.*, 1993; Stevenson & Gumpert, 1985). At its very roots entrepreneurship – associated with newness, change, higher risk, need for flexibility, and responsiveness – is at odds with administrative strategies of established organizations that can be typified by rules, procedures, stability, consistency, alert planning

and regular improvement. Figure 2-4 below sketches this conflict in the form of very extreme positions.

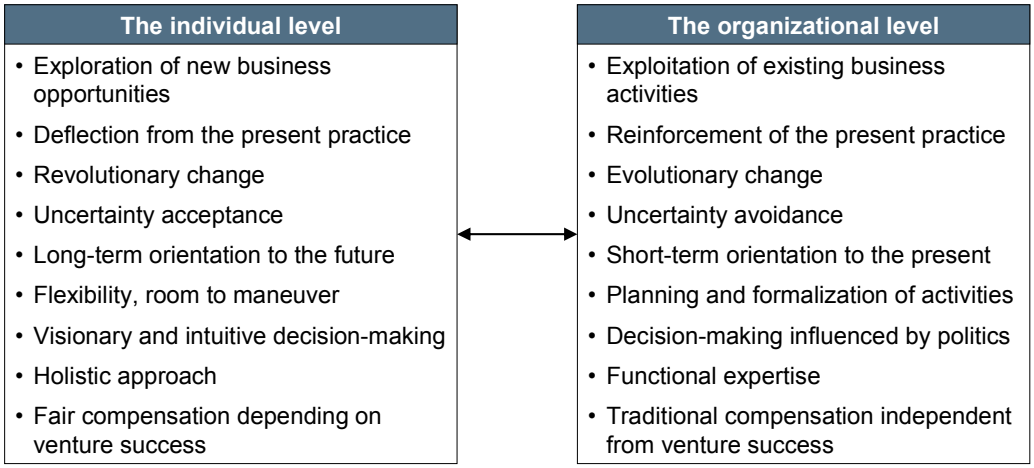


Figure 2-4: The underlying conflict of intrapreneurship: the individual vs. the organizational level

Basically, the difficulties arise because of the diverging reading of the opportunity; due to information asymmetries between what the intrapreneur and the resource allocators know about the emerging venture (see Czernich, 2004). Intrapreneurs tend to read the opportunity as ‘good’, whereas administrators or managers understand opportunities as ‘bad’ and turn those into problems for fear of losing strength. Despite all ambiguity, the intrapreneur is still the only one who knows the most about the idea and the venture and he or she might exploit this fact to his or her advantage.

Therefore, entrepreneurial activity within the firm often takes shape outside of the current organizational context so that intrapreneurs operate at organizational margins, or in the white spaces of existing business areas and not at the organizational core (Burgelman, 1983a, 1984; Lorange, 1999). Intrapreneurs seek for higher degrees of autonomy than the organization can offer. They pursue experimental or explorative approaches, and have a rather long-term perspective to the future. In contrast, the organizational core consists of managing of the customary, where the major concern is with formalization, existing routines, their repetition, control over processes and individuals, and rather short-term time orientation. Hence, the essence of intrapreneurship is to overcome this conflict which often is a challenge, for both the individual and the organization. How to overcome it? This will be elucidated in the following section.

2.3 A dialogic approach to overcome the conflict of intrapreneurship

Even though the conflict between the individual and the organizational level of intrapreneurship is well recognized and understood (as elaborated in Section 2.2), intrapreneurship research does not provide much evidence to answer the question of how to resolve the conflict. Considering the basic process model of intrapreneurship (see Figure 2-3 above), one might assume that most intrapreneurship research would be dedicated to studying the interaction between the individual and organizational process levels. On the contrary, the two levels are mainly studied separately resulting in two main streams of literature – one addressing the individual and the other focusing on the organizational level of intrapreneurship.

The body of literature centering on the individual asserts that personal characteristics determine intrapreneurial behavior. This stream is mainly concerned with personal and professional attributes of intrapreneurs, such as pushing for change, taking risks, being enthusiastic, visionary, persistent, influential, analytic, intuitive, honest and the like (Dougherty & Hardy, 1996; Fry, 1987; Howell & Higgins, 1990b; Howell *et al.*, 2005; Leifer et al., 2000; Maidique, 1980; Morris et al., 1993; Pinchot, 1985; Quinn, 1979; Roberts, 1988; Schön, 1963; Ulijn *et al.*, 2007). So, the basic question in this respect is how intrapreneurs are best characterized, identified, and trained.

In contrast, the stream of literature that focuses on the organization as the primary level of analysis contests that context triggers entrepreneurial behavior and action and seeks to enhance the understanding of organizational factors that are considered to nurture intrapreneurship (Burgelman, 1983a; Dougherty & Hardy, 1996; Howell & Higgins, 1990b; Kuratko et al., 1990; Lumpkin & Dess, 1996; Mair, 2005; Miron *et al.*, 2004; Schollhammer, 1982). This includes concepts such as the entrepreneurial organization where entrepreneurial activity is considered to be a natural and integral part (Burgelman, 1984; Stevenson & Jarillo, 1990) as well as institutionalized organizational structures and processes as, for instance, internal corporate venturing and new venture units (Cooper & Kleinschmidt, 1996; Hisrich & Peters, 1986; Lewis *et al.*, 2002), corporate incubators (O'Connor & Ayers, 2005), radical innovation hubs (O'Connor & Ayers, 2005), or skunk works as informal underground projects (Brown, 2004; Peters & Waterman, 1982).

Evidently, both the former and the latter process level are necessary components of intrapreneurship, but considered separately they are not sufficient to explain intrapreneurship as a whole; studying the two levels separately simply contradicts the logic of intrapreneurship. The individual level is of major relevance and a necessary but not a sufficient condition for

intrapreneurship. Considering the individual level alone ignores relevant organization-related factors of intrapreneurship such as corporate culture, availability of knowledge and resources, or cooperation with others. Moreover, recent research questions that personal traits and characteristics of entrepreneurs can explain entrepreneurship (Davidsson, 2005; Gartner, 1988; Shane & Venkataraman, 2000). On the other hand, providing an organizational setting that promotes intrapreneurship is necessary but not sufficient either. An intrapreneur is certainly needed.

Thus, it seems that the isolated consideration of the individual and the organizational level of intrapreneurship will not further advance the understanding of the phenomenon. Rather, a dialogic approach is required that converges the apparently conflictive logics of intrapreneurial individuals and the administrative organization and management. The term dialogic – used by the Russian philosopher Mikhail Bakhtin in his work on literary theory (The Dialogic Imagination: Four Essays, 1981) – is constituted by the interactive, responsive nature of dialogue rather than by the single-mindedness of monologue (see Baldick, 2004). Intrapreneurship requires this sort of responsive dialogue between the individual and the organizational level of intrapreneurship.

In the context of organizational complexity dialogic is referred to as the complementariness of the antagonism between organization and disorganization. Two or more different elements (their logics may be simultaneously complementary, concurrent, and antagonistic) are combined in a complex way and form a system that can not be divided if it is to be understood, even though, for utilitarian reasons, sometimes its components have to be isolated in order to analyze them (Klabbers, 2003b; Morin, 1999). Intrapreneurship forms such a complex system of conflicting or antagonist goals, interests, and positions, and a dialogic approach is required in order to resolve the conflict (Fayolle, 2003).

Given this, intrapreneurship can be understood as an intra-organizational negotiation processes *"in which two or more entities discuss common and (apparently) different interests and objectives in order to reach an agreement or a compromise (contract) in mutual dependence because they see benefits in doing so"* (Ulijn & Strother, 1995). This means that the individual and organizational level of intrapreneurship have to build a common understanding and convey their differing viewpoints to an agreement, or, even better, to a win-win situation. Thus, the specific characteristic of the intrapreneurship process is the dialogic interaction between the individual and the organizational process level to achieve a common understanding of the opportunity.

Yet, over the past decades, during which intrapreneurship received increasing attention in both scholarly and practice-oriented literature, only a few authors ascribe relevance to the dialogic element of intrapreneurship or address it at least indirectly. Burgelman (1983a, 1984) notes that a better understanding of the process of corporate entrepreneurship would facilitate the collaboration between firms and their internal entrepreneurs. To his understanding intrapreneurship would depend both on the capabilities of the individual level participants to discover and exploit entrepreneurial opportunities and on the perception of management that there is a need for intrapreneurship at the particular moment in its development.

Elaborating upon Burgelman's contributions, both Süssmuth-Dyckerhoff (1995) and Hitt et al. (2002) understand intrapreneurship as the synthesis of a top-down process by the level of the organization and a bottom-up process by the level of the individual. Howell and Higgins (1990b) speculate about the interaction between the individuals' predispositions and the contextual variables to engage in technological innovation. According to social learning theory (see Mischel, 1973), they argue that intrapreneurship would emerge when both entrepreneurial employees are present and technological and organizational constraints are weak. Putting this positively, environments with, for instance, a low degree of social stratification and decentralization of decision-making enhance more strongly and with greater difference the emergence and expression of individual entrepreneurial behavior.

Further insight is gained by Dougherty and Hardy's (1996) in-depth study in 15 large, mature firms in the United States, Canada and the United Kingdom (averaging 96 years of age, 54,000 employees, and USD 9,400 million in revenues). They find that individual innovators play a key role for innovation by bucking the anti-innovation configuration of the rest of the organization. They suggest increasing the innovation-to-organization interaction through the presence of both individual champions, who are able to challenge the organizational system, and a reconfiguration of the organizational system and the distribution of power.

Glynn (1996) takes up another angle by studying the relationship between organizational intelligence (as a social product of the individuals' intelligence) and innovation. According to her, organizational innovation is impossible in the absence of intrapreneurs, who initiate innovation processes, and intelligent organizational systems that recognize and support viable information. Both the individuals' intelligence and creativity and the organizational context are needed to harness innovation. On the one hand this means that employees must be placed into jobs that fit their intelligence and abilities, and on the other that organizations must

provide a setting that enables the expression of individual intelligence and motivates its application to creative solutions.

Altogether, these contributions seem to underscore that intrapreneurship processes depend both on individual innovators or intrapreneurs and an organizational setting that foster intrapreneurship. Moreover, to overcome organizational barriers and inertia and resolve the underlying conflict of intrapreneurship the individual and the organizational level of intrapreneurship need to pursue a dialogic approach.

2.4 Summary and implications for the research approach

As elaborated so far, intrapreneurship can be defined as *"the process, during the course of which an intrapreneur discovers and exploits an entrepreneurial opportunity to develop new means-ends relationships within an existing organization"*. Intrapreneurship is of paramount importance in the context of industrial R&D to develop radical innovation as the basis of new business activity that is unrelated to the current mainstream business of the firm. However, many companies, especially the large and established ones, have difficulty implementing this process within their R&D organizations. Industrial R&D is rather designed for incremental innovation focusing on current business activity than for radical innovations aiming at the development of new business domains.

A major reason for this is the underlying conflict of intrapreneurship, which often remains unsolved. Typically, this conflict arises when intrapreneurial initiatives emerge on the level of the individual employee, but the management shows no interest in pursuing them, or if the management's interest in intrapreneurship is not matched by a significant number of intrapreneurial initiatives originating from the individual level. The entrepreneurial is clearly contradictory to the administrative mode of established organizations so that intra-organizational entrepreneurship processes become subject to a number of constraints and opportunities that are not found in independent entrepreneurship.

Hence, for intrapreneurship to be successful, it is essential to resolve this conflict by taking an integrative perspective – that is, by abandoning the separated consideration of the individual and organizational level. Evidently, both process levels are necessary conditions for intrapreneurship to emerge, but considered alone they are not sufficient to explain intrapreneurship as a whole. This means that the intrapreneur and the management need to pursue a dialogic approach and develop a common understanding of the opportunity and how it will be exploited. Interaction in the form of an intra-organizational negotiation process is

essential to resolve the underlying conflict of intrapreneurship. Otherwise, the implementation of intrapreneurship will continue to fail.

Given this, it seems that the true challenge of intrapreneurship is to shape an environment in which the individual and organizational process levels are encouraged to interact so that intrapreneurship can develop again and again. Both individual, intrapreneurial initiative and an intrapreneurship-friendly organization must be simultaneously present. In this respect, an emergent body of literature seeks to identify the conditions required for intrapreneurship to occur in organizations (Carrier, 1994). More specifically, several authors stress that entrepreneurial and innovating behaviors of both individuals and firms strongly depend on cultural factors (Anfuso, 1999; Carrier, 1994; Eesley & Longenecker, 2006; Fayolle *et al.*, 2005; Miles & Covin, 2002; Morris et al., 1993; O'Connor & Ayers, 2005; Smith, 1998; Sommerlatte, 2001; Ulijn & Brown, 2004; Ulijn *et al.*, 2001; Ulijn & Weggeman, 2001).

Indeed, an appreciation of culture and cultural differences has high relevance for intrapreneurship because, from an organization's point of view, intrapreneurship is basically built around interaction processes between individuals, the surrounding organization, and the outside world. As outlined above, it is the defining characteristic of the intrapreneurship process that it aims at converging the apparently conflictive logics of the person of the intrapreneur and the administrative organization and management. Negotiation and conflict resolution are group level processes and involve, by definition, individuals interacting with one another. Thereby, the cultural background of the group must be considered because it affects their mutual perception (Ulijn & St. Amant, 2000) and the way in which people solve problems and reconcile dilemmas (Schein, 2004).

Thus, a culture is needed that supports the interaction of individual and organizational level in a sustainable way. Culture refers to a set of shared norms, values, beliefs, and attitudes held by the members of a group, such as a nation, an organization, or a profession (Hofstede & Hofstede, 2005; Leonard-Barton & Swap, 1999; Sirmon & Lane, 2004; Ulijn et al., 2001). One may even argue that, above all, intrapreneurship is basically a question of culture – that is, a question of the cultural background of the entire group of individuals involved. Such a culture would be built around all principles relating to the way an organization operates that will raise opportunities for creating profitable newness or difference in doing business. Yet, it is not fully clear yet how to define, measure, and implement such a culture that supports intrapreneurship in industrial R&D.

To influence or change the current culture or to implement a new culture the organization's or group's members must acquire cultural knowledge, skills, or attitudes – that is, they must

learn. Usually, cultural change processes require that people recognize that the survival of the community is at stake (Trompenaars & Hampden-Turner, 2001). They have to realize that a certain habit of doing things does not work anymore. Hence, for an effective development of an intrapreneurship-conducive culture the members would have to experience a situation that clearly shows that intrapreneurship is most important to facilitate radical innovation, as well as that the actual way of working is not promising.

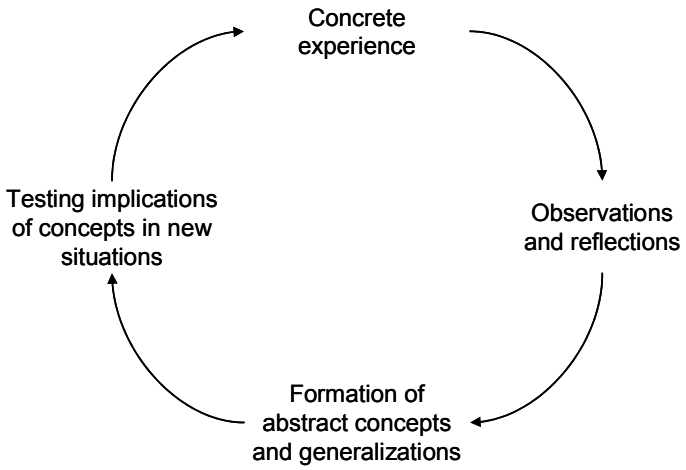


Figure 2-5: Experiential learning cycle (Kolb, 1976)

Hence, experiential learning could be a promising approach to promote an intrapreneurship-conducive culture. As Kolb's (1976) learning theory suggests, learning is modeled as a four stage cyclic process that endlessly progresses and constantly repeats itself (see Figure 2-5 above). Immediate concrete experiences are the basis for observation, reflection, awareness and insight which is assimilated into theory from which in turn new implications for action can be deduced. These implications or hypotheses then serve as guides in acting to create new experiences.

Indeed, as Harris' (1989, 1994) concept of schemas suggests, it is only when individuals experience events that are discrepant from their day-to-day patterns as well as from the dominant cultural value system that consciousness about this event and new behavioral responses are created (see Bloor & Dawson, 1994). Creating awareness of self and others – that is, how individuals behave, interact, communicate, or negotiate – is a necessary step toward building cultural knowledge and developing skills that can be applied in real-life. A new mindset of intrapreneurship – both on the individual and the organizational level – can develop in the process from collective experience, reflection, analysis to action.

This finds support from the training rigor theory by Black and Mendenhall (1989, 1990), the ideas by Mintzberg and Gosling (2002) on management education in general, as well as

Lempereur's (2002) approach to teaching negotiation: *"doing, showing and telling"*. The education classroom can be a place where members of the individual and organizational process level reflect thoughtfully on their experience beyond the classic professor-student interaction. This does not mean a jump into the dark as the American style of learning by doing, or learning from your mistakes, or the French/Latin teaching *ex cathedra*, but a combination of both teaching and training on the basis of experience.

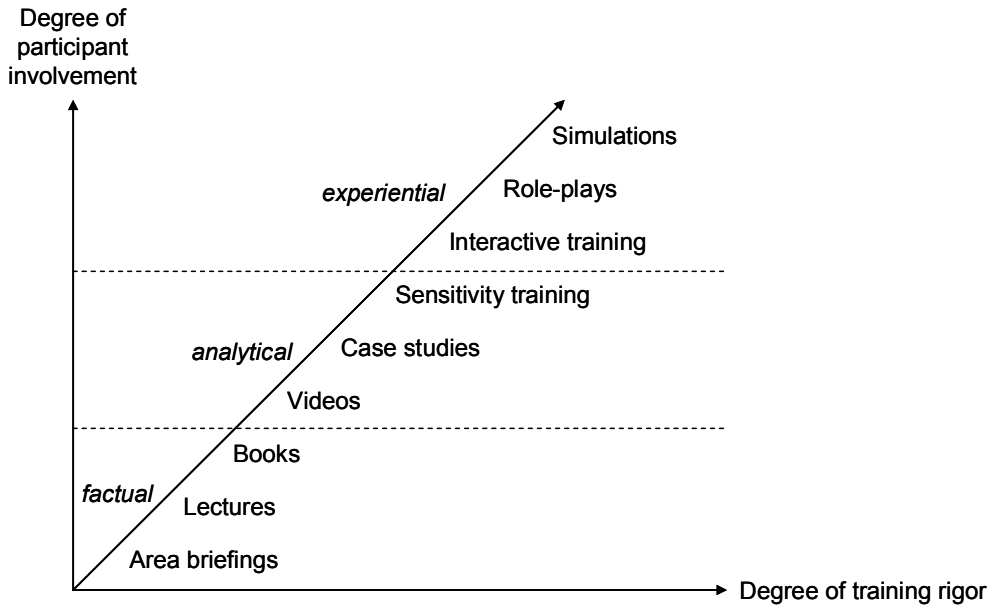


Figure 2-6: Framework for designing cultural training (Black & Mendenhall, 1989, 1990), applied to entrepreneurship development by Groen et al. (2006)

As shown in Figure 2-6 above, experiential learning techniques that have been successfully used in the context of cultural training include simulations, role-plays, and interactive trainings. Their effectiveness can be explained by a high degree of both participant involvement and training rigor (Black & Mendenhall, 1989, 1990). Both the trainer and the participants must expend a high degree of mental involvement and effort in order that the participants learn the required concepts. Especially simulation games have been successfully applied in the context of entrepreneurship teaching and training (Groen et al., 2006; Hindle, 2002; Low *et al.*, 1994; Ulijn *et al.*, 2004b).

Given this, the goal of this doctoral dissertation is to create increased understanding and applicable knowledge that helps to define, promote, and implement a culture that furthers intrapreneurship in industrial R&D. The research goal is not to change or implement a new culture, but to design a scenario-based simulation game that can be applied to create awareness of and provide insight into an intrapreneurship-conducive culture. Designing a tool or course of action to improve business practice by changing existing situations and systems

into desired ones falls within the paradigm of the design sciences. The underlying assumptions and the specific research strategy will be elaborated in the following chapter.

Chapter 3

Research approach

The previous two chapters have set the thematic context and, based on that, defined the goal of this doctoral dissertation: to design a scenario-based simulation game that can be applied to create awareness of and provide insight into an intrapreneurship-conducive culture in industrial R&D environments. This chapter presents the research approach. Designing a tool or course of action to improve business practice – that is, to change existing situations and systems into desired ones – falls within the paradigm of the design sciences. Section 3.1 briefly introduces the so-called design approach as the underlying research paradigm. Section 3.2 develops the design objectives (instead of research questions in the social sciences). Finally, Section 3.4 presents the specific research design to achieve the design objectives.

3.1 Design research theory

Researching and creating knowledge to design a tool or intervention to improve business practice is – in analogy to other design disciplines such as medicine, architecture, engineering or computer sciences – what van Aken (2004, 2005) calls the design approach. Literally, design means *"to invent and bring into being" or "the arrangement of the features of an artifact"* (Soanes & Stevenson, 2004). Design is about artifact construction – that is, it deals with creating something new that does not exist in nature or changing existing situations and systems into desired ones (Romme, 2003).

Design implies a clear emphasis on solution finding by creating so-called design knowledge. This is a body of knowledge about the design of artificial, man made objects and phenomena that includes knowledge both to (better) understand a given problem situation and to develop, implement and test specific artifacts and solutions to the given problem (Purao, 2002; Simon, 2001; van Aken, 2004). In this sense, design knowledge occupies the middle ground between theory and actual application in practice which is often ignored by both purely scientific research and purely use-oriented design and consulting.

With regard to organization and management science, the design approach can be understood as a research strategy that is complementary to both the positivist and the interpretive perspectives as the predominant research paradigms in the social sciences. Design

research does not aim at description, explanation and prediction only, but also at diagnosing, problemizing and improving real-world situations (Romme, 2003; Vaishnavi & Kuechler, 2005; van Aken, 2004). As Klabbers (2003a) has pointed out, design – broadly conceived – aims at implementing courses of action with the purpose to change existing (dysfunctional) situations into preferred ones, such as providing solutions for real-world management and business problems.

The design approach in organization and management science is founded on ontological and epistemological assumptions that differ from, as well as complement those of the positivist and interpretative schools in the social sciences. Design research and its results aim at altering the state-of-the-world – that is, at changing existing systems into desired ones. Hence, the design researcher accepts multiple, contextually situated alternative world-states that are socio-technologically enabled. In contrast, the positivist approach assumes one single, probabilistic reality. The interpretative approach, in contrast, assumes multiple, socially constructed realities (Easterby-Smith *et al.*, 2002).

Also, the assumptions about knowledge are different. Design research creates knowledge to solve context-specific problem situations with a pragmatic focus on actionable knowledge, ideal solutions, and systems thinking (Geurts *et al.*, 2000; van Aken, 2004, 2005). This is general knowledge that is valid for a specific class of cases. In contrast, in the positivist research paradigm the researcher is detached from the empirical objects to produce objective knowledge; and research belonging to the interpretative research paradigm produces subjective knowledge through researcher-participant interaction.

The typical output of design research is a so-called design proposition in the form of the so-called CIMO logic: context, intervention, mechanism, outcome (Denyer *et al.*, 2008) Thereby, the key questions is whether a particular design proposition ‘works’ in the specified context of application – that is, whether it produces satisfactory outcomes for a population of professionals (Romme, 2003; van Aken, 2004, 2005). In order to prove this, also under the influence of less-known factors, it must be field-tested in its intended context of use. The typical research design is the use of a developing multiple-case study that iterates phases of development and field-testing and results in a grounded and field-tested design proposition.

Thus, the design process is a cyclic-iterative research process (reflective cycle) that stepwise accumulates knowledge by doing and action with an emphasis on participation, interventions, and pragmatic experiments. It is clearly future-oriented and prescription-driven, but may also use and build upon descriptive and explanatory research to theoretically ground the design proposition. Design research is especially relevant for so-called ill-defined

organizational systems or problems, such as the given research problem of creating awareness of and providing insight into an intrapreneurship-conducive culture.

3.2 Design objectives

As outlined above, the overall goal of this doctoral dissertation is to design a scenario-based simulation game that can be used in the field to raise awareness of and provide insight into an intrapreneurship-conducive culture. Reformulated according to the terminology of the design science, the goal is to theoretically ground and field-test the following design proposition: *"In order to promote intrapreneurship in industrial R&D (C), one can use a scenario-based simulation game (I), which will through experiential learning (M) create awareness of and insight into an intrapreneurship-conducive culture (O)."* To define the design of the simulation game, the following four design parameters need to be further specified (adapted from Duke, 1974; Geurts et al., 2000; Greenblat, 1988): a) purpose, b) subject matter, c) target group of participants and d) context of use.

a) Purpose: Creating awareness of and providing insight into an intrapreneurship-conducive culture

The purpose of the scenario-based simulation game is to create awareness of and provide insight into an intrapreneurship-conducive culture in industrial R&D in order to influence the current culture into the desired direction; the aim is not to change behavior of people or effectuate fully-fledged cultural change. The technique of simulation games combines the strengths of both simulation and gaming: gaming elements are used to simulate a situation or scenario. This class of tools is used to increase motivation and interest in a specific topic, convey new or reinforce information already given in other formats, develop skills and change attitudes, as well as to evaluate self and others (see Table 3-1 below).

Table 3-1: Advantages of simulation games in the context of organizational/cultural change (adapted from Geurts et al., 2000)

• Provide a strong link to day-to-day practice
• Offer a safe environment in which participants can experiment with the future
• Underline the importance of learning from experience
• Invite participants to actively build on their own expertise
• Make problems with a long-term time horizon observable
• Are suited to develop a holistic view of complex situations
• Allow for direct results and feedback
• Are complementary to other learning and training techniques

Simulation games are consciously created experiential learning environments which are safe enough to develop, explore and test situations that reflect reality (Druckman, 1995; Geurts et al., 2000; Klabbers, 2003b; van Ments, 1999). They rely on the principle of collective learning involving simultaneous dialogue (multilogue) between different actors who are together in search of a wider conception of the subject that is at issue (Druckman, 1995; Duke, 1974; Geurts et al., 2000; Klabbers, 2003b). The awareness creation on the part of each individual participant is the result of interaction and communication and more specifically negotiation between members belonging to the individual and organizational level of intrapreneurship. The assumed advantage is that what is learned will transfer to the settings where the acquired knowledge and skills will be used later.

b) Subject matter: Intrapreneurship process and its underlying conflict

As outlined in Chapter 2, Section 2.1, intrapreneurship can be defined as the process of pursuing entrepreneurial opportunities within the boundaries of existing organizations. It plays a major role for organizational renewal and is the specific process towards radical innovation in industrial R&D based on the discovery and exploitation of new business opportunities that go beyond the current main stream activity of the company.

If successful, this process evolves in form of a dialogic interaction between the person of the intrapreneur (individual level) and the management (organizational level). In situations where both the intrapreneur's and the management's desire for intrapreneurship are simultaneously present or absent, no special problems appear. Paradoxical or conflictive situations arise, however, if intrapreneurial initiatives emerge but the management has no interest in pursuing them (the same holds true if top management's interest is not matched by significant number of entrepreneurial initiatives). The conflict between the individual and the organizational level of intrapreneurship is visualized in Figure 3-1 below.

This conflict of goals, interests, and positions – often antecedent to successful intrapreneurship – arises because, at its very roots, the logic of entrepreneurship is at odds with the administrative strategies of established organizations. Intrapreneurship implies that the conflict can only be solved, if the person of the intrapreneur and the management pursue a dialogical approach. Both process levels engage in an interaction and intra-organizational negotiation process to develop a common understanding of the business opportunity and the mode of exploitation. This requires a specific type of culture – an intrapreneurship-conducive culture – providing antecedent factors of successful intrapreneurship.

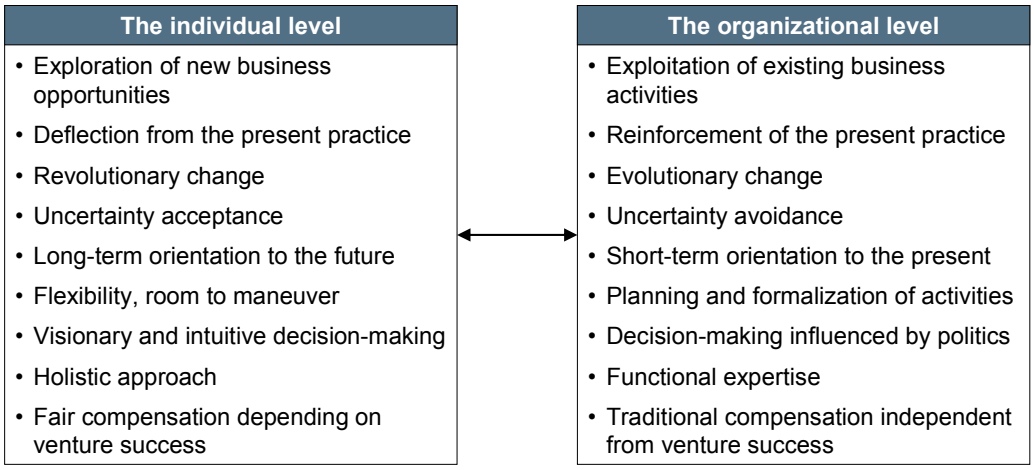


Figure 3-1: The underlying conflict of intrapreneurship: the individual vs. the organizational level (adapted from Figure 2-4)

Confronted with this conflict, the participants can pre-experience a realistic scenario of intrapreneurship, are enabled to actively develop solutions to resolve the conflict, as well as apply and test these solutions involving a diversity of stakeholders, such as financial, legal, technological and marketing experts. The learners do not get ready-made strategies, rules or organizational restructuring programs; rather they pre-experience the requirements of intrapreneurship and can, in turn, develop their own understanding of how to realize intrapreneurship in their day-to-day working environment.

Hence, the subject matter refers to intrapreneurship and its underlying conflict that the participants have to resolve by means of dialogic interaction. A new mindset can develop from experience, reflection, analysis to action, and the participants become aware of the cultural environment that is needed to support intrapreneurship. As a consequence, the following title was chosen: the *Intrapreneurship Game*.

c) Participants: Professional R&D engineers and scientists

The target group of participants includes professional R&D engineers and scientists. Worldwide, the engineer is a key driver of technological innovation and new venture creation (Fayolle et al., 2005; Ulijn & Fayolle, 2004). With their education and professional experience, they have the ability to think conceptually and in terms of systems, believe in the laws of physics, and have respect for technology, computations, materials and designs. This strong technically oriented professional culture builds both on a long tradition – as the oldest organized profession in the modern organization – and a long and hard education and training emphasizing problem solving, working for the right solution and attention to detail (Harris *et al.*, 2004; Shaw & Shaw, 1998; Ulijn & Fayolle, 2004).

Table 3-2: Characterizations of engineers that might impede intrapreneurship (sorted from explicit/shallow to implicit/deep)

- are inclined to place too much emphasis on facts and proof (Finniston, 1980; Souder, 1981a, 1988)
- make inappropriate use of their technical background to solve problems and apply their innovative abilities to engineering rather than to managerial issues (Beck, 1988)
- do not worry about or underestimate cost (Beck, 1988; Ulijn et al., 2001)
- have no sense of time (Beck, 1988; Ulijn et al., 2001)
- lack personal skills such as verbal and written communication, teamwork, management, and leadership skills (Beck, 1988; Blais, 1997; Fayolle, 2000; Paffen, 1998; Rochester, 2002; Ulijn & Strother, 1995)
- are too scientific, sophisticated, and technically oriented (Blais, 1997; Finniston, 1980; Kelley et al., 2002; Rochester, 2002; Souder, 1981a, 1988; Ulijn et al., 2001)
- are often uninterested in management issues that are seen as a diversion from real engineering (Beck, 1988; Paffen, 1998)
- lack understanding of the values of interdisciplinary and generalist approaches to problems solving (Finniston, 1980; Paffen, 1998; Sitzler *et al.*, 2002)
- put emphasis on tasks, but not enough on relationships and people issues (Beck, 1988)
- are not risk takers and do not like making decisions based on little information (Beck, 1988)
- are suspicious of people who do not think like engineers (Beck, 1988; Shaw & Shaw, 1998; Shaw et al., 2003; Souder, 1981a, 1988)
- are too timid or introvert and not impressive as people, that is, in respect of drive, impact, and weight (Beck, 1988; Rochester, 2002; Ulijn et al., 2001)
- are too unaware of real world problems (Souder, 1981a, 1988; Ulijn et al., 2001)
- have difficulty adapting to organizational change (Leonardi *et al.*, 2005)

Yet, as Table 3-2 above shows, engineers – most of which remain employed by a firm – seem to show characteristics that might impede intrapreneurship. This rather anecdotal or speculative evidence finds support from studies on UK (Shaw & Shaw, 1998) and German engineers (Shaw *et al.*, 2003) showing that engineers recognize, in strong agreement, that they themselves must learn, besides their technical knowledge, more about customers and their needs as well as the general the business environment. The specialist approach in education and training of engineers and scientists will only lead to limited training opportunities in other disciplines and skills that go beyond the scientific-technical set of knowledge, including managerial, communication and negotiation skills to improve the overall performance towards a less engineering-led view on the world.

Similarly, a study among engineering students in the US empirically supports the above listed evidence regarding the engineers' ability to engage in intrapreneurship. Leonardi et al.'s (2005) study finds that engineering is individual work, the quality of which depends on one's own expertise and on the confidence in his or her ability to perform task requirements. Engineering students see others not as potential resources but as potential liabilities. When it comes to the use of existing and the generation of new knowledge, engineers rather postpone and experiment than follow existing best practice approaches.

As most synergy will come through mutual appreciation of several disciplines, engineers need to be adoptable to an ever-changing environment and pursue a multidisciplinary

approach. In an era where technology and entrepreneurship have become key issues for organizational survival, the business world – and intrapreneurship in particular – demands engineers with a more generalist educational background including both the technical knowledge and sufficient market background to judge potential demand (Cohen, 2002). Capitalizing on their logic and problem-solving driven education and expertise, engineers should seek for personal preparation that is wider than the role they are currently enjoying (Bürgel *et al.*, 1996; Johnston, 1989).

Yet, focusing on engineers alone would ignore scientists as another profession that fulfils in many industries the R&D function. As outlined by Allen (1977), despite superficial similarities, engineers do actually differ from scientists in their professional activity, communication behavior, their attitudes, their orientations, and even their typical family backgrounds. They belong to different professional cultures. Nevertheless, both professions together represent the biggest workforce in R&D and, as a consequence, the R&D culture that is, besides the two professional cultures also influenced, by the given national and corporate culture context. Moreover, people that were originally educated and trained as scientists work in the context of industrial R&D not as scientists but play the role of engineers as described above.

Both engineers and scientists are part of the R&D workforce and, hence, highly relevant potential contributors to technical innovation. It applies for both professional groups that they need to be sensitized for more entrepreneurial approaches not only by starting up an independent high-tech venture, but also by being entrepreneurs within the boundaries of existing organizations. Participating in the simulation game, they are invited to experience and anticipate the various organizational roles, such as such as R&D, marketing, financial, legal or even external parties such venture capitalists, experts or consultants that could be involved in an intrapreneurship process.

d) Context of use: Independent intervention to be applied in industrial R&D

It has been outlined in Chapter 1 that large established companies often have difficulties developing innovations of a significantly higher degree of novelty. Especially, the R&D departments in those companies are rather meant for incremental than for radical innovation. Yet, almost all organizations should have potential or ‘would be’ intrapreneurs with good ideas that may form the basis of radical innovation. Purposeful intrapreneurship programs and training are, hence, considered to be an important facilitator of activating this potential

(Coulson-Thomas, 1999; Kuratko & Montagno, 1989; Pinchot & Pellman, 1999; Thornberry, 2003).

As industrial R&D is increasingly staffed multi-culturally, the intervention should generally be flexible in use and applicable in different, but similar R&D settings across both national, corporate and professional culture settings; it should not be a tailor-made solution for a particular change program or curriculum (as, for instance, suggested by Geurts et al., 2000). The intervention should involve between ten and 20 participants. As simulation games have more constraints on the number of participants than other conventional teaching, it becomes increasingly unsatisfactory once a number rises above 20 to 25 participants (van Ments, 1999). The time that is needed for entire the intervention should not exceed three to four hours. In the first place, there is the briefing – that is, the process of warming-up and getting the participants accustomed to the simulation and its topic. In the second place, the simulation itself needs time to develop, and in the third place it is essential to allow sufficient time for discussion after the simulation (van Ments, 1999).

Typically, simulation games belong to the class of low-input/high-output techniques resting upon the empiricist view of learning by induction: application, collective reflection and theory summary. Based on the presentation of a realistic scenario of intrapreneurship, only little theoretical introduction and guidance should be given. Rather, the participants are invited to use their personal knowledge and experiences from their day-to-day working environment. In this way, it is a well-rounded learning module not dependent on knowledge that the participants need to gain prior to the simulation game.

Table 3-3: Design parameters

Parameter	Value
a) Purpose	Creating awareness of and providing insight into an intrapreneurship-conducive culture
b) Subject matter	Intrapreneurship process and its underlying conflict
c) Participants	Professional R&D engineers and scientists
d) Context of use	Independent intervention to be applied in industrial R&D

This section has concretized the design proposition *"In order to promote intrapreneurship in industrial R&D (C), one can use a scenario-based simulation game (I), which will through experiential learning (M) create awareness of and insight into an intrapreneurship-conducive culture (O)"* by specifying four design parameters (see Table 3-3 above). The purpose of the simulation game is to create awareness of and provide insight into an intrapreneurship-conducive culture in industrial R&D (a). In order to accomplish this, the underlying conflict of intrapreneurship is simulated in the form of a realistic scenario of intrapreneurship and its

underlying conflict (b). The target audience includes professional R&D engineers and scientists (c). The simulation game can be used as a stand-alone intervention – consisting of briefing, the simulation game itself, and the debriefing – in the context of industrial R&D (d).

These four design parameters constitute a general framework of design requirements but do not represent a detailed instruction of the final design of the scenario-based simulation game. Those will emerge in the course of the cyclic-iterative design process which will be elaborated upon after the discipline of simulation and gaming is introduced in the following section.

3.3 Simulation and gaming

The previous sections defined the overall research goal and specified corresponding design objectives. This section introduces the discipline of simulation and gaming in order to provide an understanding as to what a scenario-based simulation game is about, how it is generally designed, and why it is suited to be used for the defined purpose. While Subsection 3.3.1 defines the simulation game as the class of tools that uses gaming elements to simulate a realistic scenario, Subsection 3.3.2 presents an overview of the various gaming techniques that can be used in simulation games.

3.3.1 Simulation games

Stemming from the Latin verb *simulare*, simulation is an attempt to abstract and reproduce (as closely as possible) central characteristics of a complex system with the aim of understanding, experimenting with and predicting the behavior of the system (Greenblat & Duke, 1981; Kaiser, 1973; van Ments, 1999). It refers to a dynamic model of essential characteristics or elements of a real or hypothetical system or environment that facilitates the description and analysis of that complex system (Geurts et al., 2000; Greenblat, 1988). Hence, in its most general sense it means to imitate, to do as if. Simulation is used in many contexts and disciplines, including the modeling of natural, human systems to gain insight into the operation of those systems, or in technology and safety engineering where the goal is to test some real-world practical scenarios.

A specific form of simulation is the simulation game referring to the class of tools in which gaming techniques are used to simulate a situation or scenario (Duke, 1974; Geurts et al., 2000; Greenblat, 1988; Peters & Vissers, 2004). Simulation games always involve groups of people whose aim is to learn. These people together bring some social activity to life that

serves as a model for the object of study. The simulation in the form of a scenario is based upon designed social systems with a particular attention to structural constraints and opportunities that are present in the real-world context. A scenario is an account or synopsis of a projected course of action, events or situations. Conflictive scenarios in the form of *as-if* situations usually provide the basis for the design of simulation games (Armstrong, 1995). The subjects are asked to act *as-if* they were engaged in a specified social context that is outside of the social context of the simulated situation (see Yardley-Matwiejczuk, 1997).

The gaming elements consist of players that make the scenario operate, bringing psychological responses and cultural values into the exercise. A game is an exercise that in whole or in part works on the basis of the players' decisions who act out roles, try to achieve certain objectives and experience restrictions (Duke, 1974; Geurts et al., 2000; Greenblat & Duke, 1981). The interaction of the model and the players' contributions allow system elements to be highlighted and analyzed in a post-game debriefing and permit identification and discussion of alternative strategies and of consequences of the decisions that were made or might have been made.

Simulation games as consciously created learning environments find widespread use of learning, training, assessment and research methods (Armstrong, 1995; Black *et al.*, 1999; Black & Mendenhall, 1990; Geurts et al., 2000; Greenblat, 1988; Greenblat & Duke, 1981; Klabbers, 2003b; Peters & Vissers, 2004; van Ments, 1999). They can be used to effectuate learning for either the actors themselves, others (such as non-participating observers, facilitators, or researchers) or both at the same time. Thereby, the learning objectives can be either well-defined (rule-driven game) or remain general to emerge in the course of the simulation (free-rule game). This leads to the following two-dimensional classification of simulation game (see Table 3-4 below).

Table 3-4: Applications of scenario-based simulation games (adapted from Armstrong, 1995; Peters & Vissers, 2004)

	Well-defined	Open-ended
Learning for the actors	Training and education	Development and exploration
Learning for others	Assessment	Research

Simulation games, the purpose of which is training or education, aim at teaching the players based on well-defined learning objectives. For instance, they are used to teach specific techniques and skills, convey new or reinforce existing knowledge already given in other formats. If the purpose is development and exploration among the actors, the learning

objectives remain rather general based on a free rule game design. For example, this type of simulation game can be used to increase motivation and interest in a topic, accustom to a new situation, try alternative ways of behavior, develop forms of cooperation or conflict management, create awareness of self and others, or sensitize participants for a change of attitude or culture (Geurts et al., 2000; Peters & Vissers, 2004; van Ments, 1999).

Furthermore, in the case of assessments (of the actors), simulation games effectuate learning for others, such as human resource managers, trainers or researchers, based on well-defined learning objectives. For example, the aim can be to learn more about the participants' performance, attitudes, or skills. Finally, simulation games can be utilized for experimental and explorative research (Nagler, 2005; Stahlke, 2001; Yardley-Matwiejczuk, 1997). In this case a third party, such as researchers or observers, benefits from the simulation game based upon open-ended learning objectives emerging in the course of the simulation. For instance, participants are asked to simulate a given scenario and the observers have the opportunity to better understand how people behave in response to the scenario.

3.3.2 Gaming techniques used in the context of simulation

Klabbers' (1999) classification of games is helpful to gain a better understanding of gaming and the various derivates that may be used in the scope of simulation. It represents games as a language with its particular syntax, semantics and pragmatics. As a language it conveys and produces meaning and context-dependent, situational knowledge; it also shapes the system of interactions and, as a consequence, the internal organization of the game. The syntax defines the grammatical arrangement of the game – that is, the set of elements and rules. The semantics give meaning to the game elements and rules. The pragmatics define the design and use of a game.

Each game, like real-world social systems, involves three building blocks: actors interact with one another while applying rules and material resources. The actors – that is, players in the context of gaming – adopt roles that have backgrounds, personalities, motivations, interests, goals, capacities, abilities, and competencies in order to perform a certain presumed behavior. The rules, described in the game manipulation set, create the game space by defining the goals and positions that the roles should take at a certain moment in time, as well as the relationships between the roles. Explicit material resources include, for instance, money, equipment (infrastructure), natural resources (raw material), and /or information (encoded in information systems, databases, etc.). Based on these three elements, games can be classified according to the following scheme (see Table 3-5 below).

Table 3-5: Classification of games (Klabbers, 1999)

	Rule-driven	Free-rule
Simulations with material resources and without actors	Feed-back models	Input/output models
Games with actors and without material resources	Theatre	Role-play
Fully-fledged games with material resources and actors	Rigid-rule game	Free-form game

Simulation games, which are applied in the context of cultural learning and training, rely on exploration and development among the players, rather than on training of specific techniques and skills or on conveying (theoretical) knowledge alone. The design of simulation game aims to enable the players to explore, try and test alternative ways of behavior, develop forms of cooperation or conflict management, create awareness of self and others, or sensitize participants for a change of attitude or culture. In this respect, Klabber's classification of games identifies role-play as an appropriate gaming technique.

The idea of role-play, in its simplest form, is that of asking people to play a role – that is, to imagine that they are either themselves or another person in a particular situation (van Ments, 1999). More precisely, the role-play simulates a scenario or an *as-if* situation in which people interact with one another naturally (van Ments, 1999; Yardley-Matwiejczuk, 1997). The design rests on interconnected actors, shaping a system of interactions, and therefore a social organization, and open rules that define the set of initial, but not intermediate or final game positions; explicit material resources are not defined. In this way, it effectuates learning among the participants (actors) based on open-ended learning objectives that emerge in the course of the simulation.

No overarching theoretical framework is given and learning objectives tend to be rather general in order to facilitate exploration and development among the learners. Participants are invited to use the opportunities provided by the simulation game, experiment and find out what they can do within the given boundaries and conditions that are set and even change these conditions, if necessary. The actors do not get ready-made strategies, rules or organizational restructuring programs; rather they pre-experience the requirements and can, in turn, develop their own understanding of how to make it happen according their understanding or day-to-day cultural environment both at work and university.

From an organization-psychological perspective, role-play is closely related to the importance of the role in organizations that can be defined as the interface between the

individual employees and the organization. More precisely, a role represents the sum of behavior expectations and appearances that are considered to be characteristic and predictable for a certain type of actor in specific situations (Bodenstein & Geise, 1987; Miles & Huberman, 1994; van Ments, 1999). The organization meets individuals in the adoption and execution of specific roles, whereas the individuals need to manage themselves in their roles (Nagler, 2005). This is exactly the interface at which an intrapreneur remains. He or she aims at the pursuit of individual interests but needs to take into account the interests and positions of the established organization. Most probably, this will lead to internal conflicts that the intrapreneur him- or herself needs to resolve.

Hence, role-play appears to be an appropriate gaming technique to simulate a scenario of intrapreneurship in industrial R&D thereby creating awareness of and providing insight into a culture that is conducive of intrapreneurship. It is defined as an open-rule simulation game, the purpose of which is exploration and development based on general learning objectives that will emerge the course of the simulation. In this way an experiential learning environment is created that invites the players to resolve the underlying conflict of intrapreneurship by means of interaction and negotiation and to pre-experience the culture that is supports intrapreneurship.

3.4 Research design

The design proposition and its four underlying design parameters – as specified in Section 3.2 – implicitly define the research design, the required components of knowledge and, as a consequence, the choice of methods. In order to prove whether the design proposition ‘works’ in its intended context of use, also under the influence of less well known factors, it needs to be grounded in relevant theory and field-tested within industrial R&D. Figure 3-2 below demonstrates the workflow of the design process including both the generation of design knowledge and cyclic-iterative process of field-testing.

The design-specific research strategy is the so-called developing multiple-case study (van Aken, 2004). Phases of development, field-testing, and improvement alternate until empirical evidence is gained that the design proposition effectively produces the intended effects in its intended context of use. The case study is a comprehensive research strategy that comprises an all-encompassing method – converging the logic of design, data collection techniques, and specific approaches to data analysis (Yin, 2003). A case is an individual in a setting, a small group, or a larger unit such as a department, organization or community (Miles & Huberman, 1994).

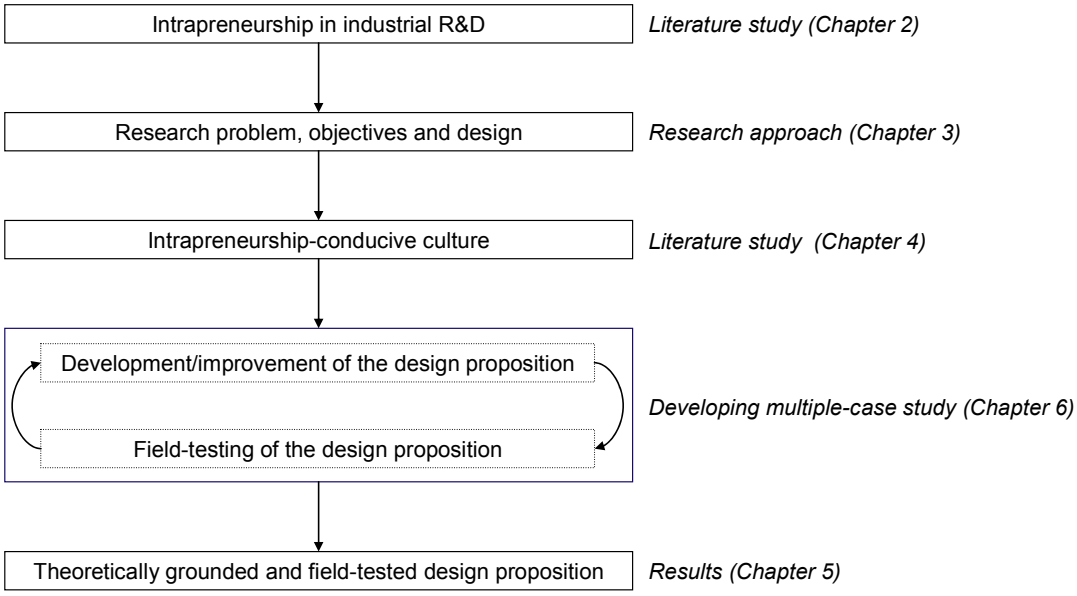


Figure 3-2: Cyclic-iterative design process

The multiple-case study involves the study of two and more cases permitting to investigate the same issue by means of different cases (Eisenhardt, 1989; Yin, 2003). Compared to single-case studies, the evidence from multiple cases is considered to be more compelling, and the overall study is regarded as being more robust (Herriott & Firestone, 1983). Thus, the multiple-case study enhances the generalizabilty of the resulting research model (Eisenhardt, 1989). The developing multiple-case study is based on the logic of iteration and replication – that is, on the reflective cycle in which development, testing and reflection on the results iteratively alternate, in order to produce design knowledge to be used in subsequent cases (Romme, 2003; van Aken, 2004, 2005).

The distinctive need of case studies arises out of the desire to understand complex phenomena and real-world events that have far more variables than data points (Yin, 2003). Simulation games convey complex systems that may not be understood at the time of the initial game design. A more complete understanding is only gained in the iterative course of the design process (Duke, 1974; Greenblat, 1988). In order to blend and integrate this great complexity, an integral approach to data collection is required. Ideally, the case study involves triangulation of different sources of evidence – that is, evidence from two or more sources, but converging on the same set of facts or findings.

As depicted in Figure 3-3 below, the applied developing multiple-case study framework consists of three cycles of field-testing. Departing from a theoretically-grounded initial concept version (adapted from Ulijn et al., 2004b), the design proposition was pre-tested with engineering students at technical universities in Germany and the Netherlands (cases A-1 – A-

11). Based on the results, five field-tests were conducted within industrial R&D organizations in France (case B-1), Germany (case B-2) and the Netherlands (cases C-1, C-2, and C-3).

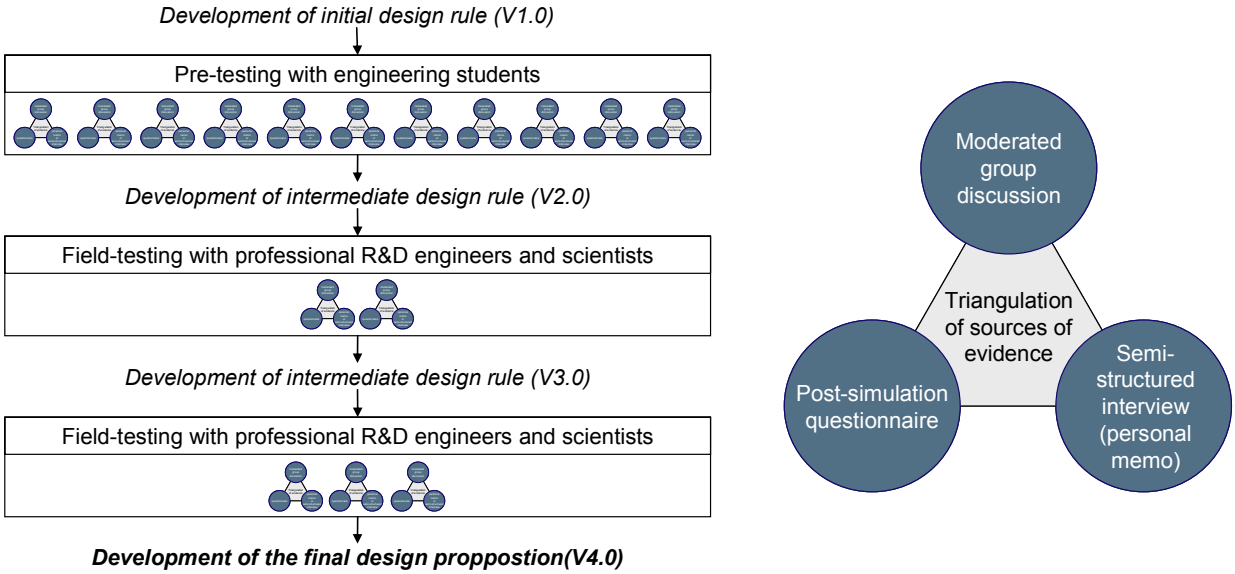


Figure 3-3: Developing multiple-case study using triangulation of sources of evidence

These three countries represent important European cultures and, at the same time, exhibit different approaches to entrepreneurship and innovation (Ulijn & Fayolle, 2004). France and Germany – typifying the Romanic and the Germanic cluster – are typical engineering nations that rather incorporate an R&D and technology driven approach to innovation. In contrast, the Netherlands, representing the Anglo-Nordic cluster, have a more market-oriented approach to innovation. This composition of cases offers an opportunity to develop a European perspective: take the best from each culture and learn from each other! This is important because R&D organizations and teams are increasingly staffed cross-culturally – not only with regard to national, but also to corporate and professional cultures.

Each case produced both in-depth qualitative as well as descriptive quantitative evidence by tapping into multiple data sources all converging on the same findings. Triangulation provides stronger substantiation of the research model. It helps to decrease the researcher's self-bias and increases, in turn, the objectivity of research findings (dos Santos *et al.*, 2004; Eisenhardt, 1989; Jick, 1979; Yin, 2003). Moreover, triangulation allows to link qualitative and quantitative data sources. This can be highly synergistic, on the one side, it may indicate relationships that may not be salient to the researcher (Eisenhardt, 1989; Jick, 1979; Miles & Huberman, 1994). On the other side, it can keep researchers from being carried away by vivid, but false, impressions in qualitative data, and it can bolster findings when it corroborates those findings from qualitative evidence.

Qualitative data in its verbal expression – that is, language in the form of extended text – came from three different sources: moderated group discussions, semi-structured interviews, as well as personal memos. One major feature of qualitative data sources is that they focus on naturally occurring or ordinary events in natural settings so that the researcher has a strong handle on what 'real life' is. Another one is their richness and holism, with strong potential for revealing complexity (Miles & Huberman, 1994). Qualitative data – with their emphasis on people's lived experience including their perceptions, assumptions, prejudgments, presuppositions – are fundamentally well-suited for locating the meanings that people place on events, processes and structures of their lives and for connecting these meanings to the social world around them.

In the moderated group discussions (debriefings) directly after the simulation the participants reflect upon the simulation experience in order to derive meaningful lessons (Geurts et al., 2000; Lederman, 1983; Lederman & Kato, 1995). Being a critical component of the experiential learning situation (Klabbers, 2003b; Lederman & Kato, 1995; Peters & Vissers, 2004), the debriefing gives the participants the possibility for an authentic and spontaneous communication and discussion. Key findings emerging in the discussion were noted and summarized in the form of flipchart notes. Furthermore, the debriefings were audio-recorded and transcribed afterwards. To structure the debriefing session a debriefing guide was used. It is enclosed in the *User Manual* (see Appendix B).

Interviews are an important source, if the investigation is about human affaires which should be reported and interpreted through the eyes of specific interviewees. However, the interviews should be considered as verbal reports only because they are subject to the common problem of biases, poor recall, and poor or inaccurate articulation (Miles & Huberman, 1994; Yin, 2003). The interviews appeared to be guided conversations rather than structured queries. Therefore, semi-structured interviews of approximately 30 minutes were conducted with four to five participants per case study. The interviews were audio-recorded and transcribed afterwards. To structure the interview an interview guide was used. It is enclosed in the *User Manual* (see Appendix B).

Quantitative data, by contrast, is usually less ambiguous and can be processed more economically. It persuades the reader by de-emphasizing individual judgments and by stressing the use of established procedures, leading to more precise and generalizable results (Miles & Huberman, 1994). Especially, in case studies of organizations, projects, and processes, in which groups of individuals are embedded or and play a major role, a survey becomes a relevant instrument (Yin, 2003). In connection with the debriefing a post-

simulation questionnaire was administered to all participants. It produced descriptive quantitative data as part of the multiple-case study evidence. It is enclosed in the *User Manual* (see Appendix B).

To recapitulate, the design process is cyclic-iterative in nature. Phases theoretical grounding, development and field-testing alternate until a working design proposition is available – that is, one that is theoretically grounded and field-tested in its intended context of use. Before the final design proposition (Chapter 5) and its underlying empirical evidence gained from the developing multiple-case study (Chapter 6) is presented, Chapter 4 describes the characteristics of an intrapreneurship-conducive culture representing the ideal target situation of the simulation game.

Chapter 4

Characteristics of an intrapreneurship-conducive culture

The previous chapter presented the research design and defined role-play as a specific gaming technique that can be used to create awareness of and provide insight into an intrapreneurship-conducive culture within industrial R&D. This chapter seeks to develop the characteristics of such a particular culture that will serve as the simulation game's ideal target situation. As outlined in Chapter 2, Section 2.3, in order to facilitate the process of intrapreneurship in industrial R&D both individual intrapreneurs and a supportive organizational setting must be present. Yet, is not fully clear how to define, build and measure a culture that supports intrapreneurship in its entirety. To identify the relevant culture-bound factors that can be used to comprehensively describe that particular culture this chapter presents the results of an extensive literature investigation.

Section 4.1 introduces the concept of culture and presents the building blocks of an intrapreneurship-conducive culture – namely, national, professional, and organizational cultures. Section 4.2 discusses how these three culture types may interact and influence intrapreneurship. Based on the results of the investigation of 97 relevant publications, Section 4.3 develops a comprehensive description of an intrapreneurship-conducive culture. Section 4.4 reflects on how this theoretically grounded description can be used as the simulation game's ideal target situation.

4.1 Building blocks of an intrapreneurship-conducive culture

An appreciation of the importance of culture and cultural differences has a high relevance for entrepreneurship and innovation. From an organization's point of view, innovation activities are basically built around interaction processes between individuals and the surrounding organization, including the interaction and transfer of people across national, professional and corporate cultural boundaries. The seminal research by Hofstede (1980) has inspired much of the cross-cultural research activity and has been one of the dominant research paradigms in cross-cultural studies.

Culture, as Hofstede suggests, is something like the *"software of the mind"*, the operating system that allows human individuals to share and make sense of experience. It refers to a set

of shared norms, values, beliefs and attitudes held by the members of a group, such as a nation or organization (Hofstede & Hofstede, 2005). Culture is the means by which people communicate, develop and perpetuate their attitudes towards life and work in order to interpret their experience and guide their actions (Trompenaars & Hampden-Turner, 2001). The essence of culture is not what is shallow, clearly visible on the surface; more important are the shared ways by which groups of people understand and interpret the world, which are much deeper and more integral. This essential core of culture consists of traditional, historically derived, selected and learned basic assumptions for a particular member group (Kroeber & Kluckhohn, 1952; Trompenaars & Hampden-Turner, 2001).

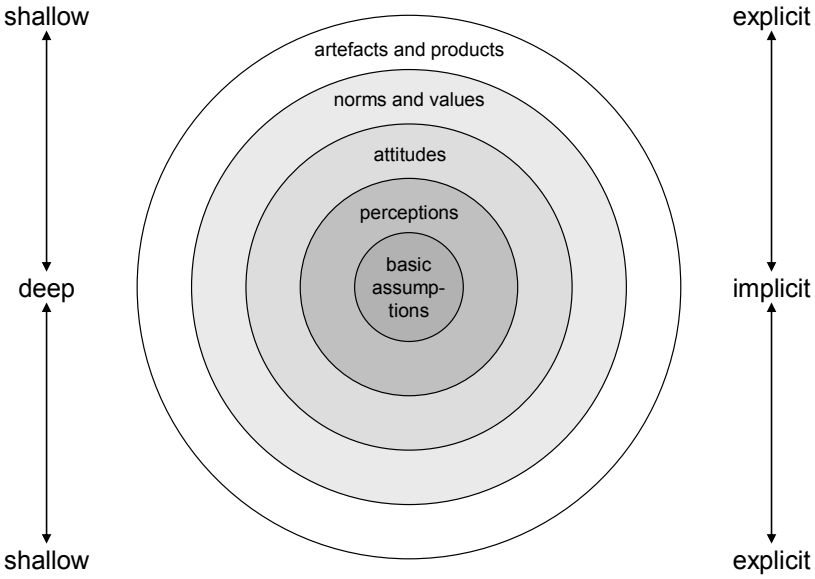


Figure 4-1: The onion metaphor of culture: from shallow to deep (adapted from Ulijn & Fayolle, 2004)

As depicted in Figure 4-1 above, culture comes in layers, like an onion, and to understand it you have to unpeel it layer by layer (Hofstede & Hofstede, 2005; Schein, 2004; Trompenaars & Hampden-Turner, 2001). The metaphor of the onion (see Hofstede & Hofstede, 2005; Schein, 2004), like the one of the iceberg (Selfridge & Sokolik, 1975), plainly illustrates the layered structure of culture from the explicit, clearly visible outside/top of artifacts and products to the implicit, invisible, inside/bottom layers and elements of culture.

On the outer layer of artifacts and products, explicit culture is the observable reality of the language, food, buildings, houses, monuments, agriculture, shrines, markets, fashions and art. The middle layers encompass norms, values, attitudes and perceptions; these factors are not directly visible. Hereby it is important to differentiate between norms and values. Norms are the mutual sense that a group has as to what is right and wrong; they can develop on a formal level (for instance, written laws) and on an informal level (such as social control). Values

determine the definition of good and bad, and are therefore closely related to the ideals shared by a group. While norms, consciously or subconsciously, give us a feeling of *"this is how I normally should behave"*, values give us a feeling of *"this is how I ought to aspire or desire to behave"*.

Even more implicit are the perceptions that the members have of themselves and others. Culture is not an absolute phenomenon but it is rather in the eyes of the beholder (Ulijn & St. Amant, 2000). The core of culture consists of basic assumptions about existence, referring to the basic question: why have different groups of people, consciously or subconsciously, chosen different definitions of good or bad, right or wrong? These assumptions are based on fundamental relationships of the human being with the (natural) environment. They signify the deepest meaning of life that has escaped from conscious questioning and has become self-evident because it is a result of routine responses to the environment.

Recognizing and understanding differences in cultural patterns, across all layers of the onion metaphor, provides individuals with a framework for interpreting the goals, motivations and behaviors of others. Along this line of thinking, an intrapreneurship-conducive culture refers to the set of shared norms, values, attitudes, perceptions and beliefs held by a group of individuals, such as those found in R&D departments, new product teams, new venture divisions, or other organizational groups. This shared set of culture-bound patterns is shaped, changed or maintained through the interaction between individuals of the group or organization.

These interaction processes are fed by each individual's learned cultural background. People are born in a national culture context, acquire a certain professional culture and are then exposed to a corporate culture when entering a company. Hence, the following subsections briefly sketch the concepts of national (4.1.1), professional (4.1.2), and corporate cultures (4.1.3) as constituents of an intrapreneurship-conducive culture.

4.1.1 National cultures (NC)

The most widely studied level of culture is national culture. Research relies on the belief that nations and their cultures differ in regard to their basic assumptions of human behavior and mutual perceptions, a theory that seriously challenges the universality assumptions that underlie many management theories (Thomas & Mueller, 2000). In the modern, globally oriented business world the confrontation with foreign cultures is constitutional, and the reports on the importance of cultural awareness in (international) business communication are numerous.

National cultures can be investigated under many different aspects, but most frequently Hofstede's (1980, 2001) typology is used. He defines culture as *"the collective programming of the mind which distinguishes the members of one group from an other"*. Hofstede's framework is based upon a study using an existing data base from *IBM* containing files of 116,000 survey questionnaires from employees who worked in *IBM*'s national subsidiaries in 64 countries worldwide. Hofstede's survey reveals four underlying dimensions of culture, later complemented with a fifth dimension (Hofstede & Bond, 1988), as introduced in Table 4-1 below.

Table 4-1: A typology of national cultures (Hofstede, 1980, 2001; Hofstede & Bond, 1988)

- Low vs. High Power Distance (PDI) refers to how individuals view power differentials within a society.
- Low vs. High Uncertainty Avoidance (UAI) refers to how upset people get about ambiguity and future doubt.
- Individualism vs. Collectivism (IND) refers to the degree to which people prefer to act as individuals rather than as members of groups.
- Masculinity vs. Femininity (MAS) reflects the dichotomy of assertiveness and altruism.
- Long-Term vs. Short-Term Orientation (LTO) – originally labeled Confucian Dynamism – opposes a long-term to a short-term time orientation in life and work.

But what is the impact that national culture has on intrapreneurship? As intrapreneurship requires common efforts of individuals and their interactions at work, a culture that is conducive of intrapreneurship must certainly be influenced, or even determined, by the national culture background of the individuals and the group. Indeed, it is often argued that Hofstede's five dimensions of national culture are expected to stimulate or hamper intrapreneurship and innovation in the context of organizations. But before discussing this relationship, it is necessary to fist look at two other cultural concepts that may have an influence on intrapreneurship – namely professional and corporate cultures.

4.1.2 Professional cultures (PC)

All major professional orientations and functions within organizations – such as marketing, research and development, or human resource management – can be identified regarding a wide scope of factors and, particularly in regard to cultural factors such as specialized knowledge, shared experience, ethical orientation and professional commitment that other professional groups do not necessarily have (Bloor & Dawson, 1994; Fayolle et al., 2005; Trompenaars & Hampden-Turner, 2001). A profession's culture grows out of the characteristics of the people who make up the profession and from the skills used in their

practice. Professional cultures are especially constituted through the work styles that individuals employ as they conduct routine work (Leonardi et al., 2005). For instance, some of the distinctive characteristics of the engineering culture were discussed in Chapter 3, Section 3.2.

Moreover, the important role that professional culture plays becomes even clearer as individuals tend to be less loyal to their company and rely instead upon other members of the same profession as their primary source of reference (Bloor & Dawson, 1994; Fayolle et al., 2005; Wever, 1992). The shared experiences and ethical orientations have a unifying impact on business relationships. They are reinforced by professional associations that serve as a source of information about technology, employers, education or job prospects, networking activities that are almost always conducted in a spirit of reciprocity. More broadly speaking, Sirmon and Lane (2004) identify the concept of professional culture that *"exists when a group of people that are employed in a functionally similar occupation share a set of norms, values and beliefs related to that occupation. Professional cultures develop through the socialization that individuals receive during their occupational education and training"*.

Professional cultures not only interact with national culture, but also with the corporate culture of the given work context, such as the organization or R&D project team. They filter personal experiences and influence interpretations and responses to the organizational practices (Leonardi et al., 2005). This is, for instance, relevant when an individual enters a new organization and is confronted with new cultural patterns due to the given corporate culture. Most probably, culturally learned behavior and experience does not correspond with the existing organizational practices and must be adjusted accordingly, or at times even learned the hard way. The following section, therefore, regards corporate culture as the third major cultural concept that may have a bearing upon an intrapreneurship-conducive culture.

4.1.3 Corporate cultures (CC)

Organizations, being social systems, are phenomena through people and are, thus, part of culture (von Rosenstiel, 2000). As Hofstede et al. (1990) put it, corporate culture – also labeled as organizational culture – refers to the question of what represents (and distinguishes) organizations from a cultural point of view. Hence, it can be defined as *"the personality of the organization that is comprised of the assumptions, values, norms and tangible signs (artifacts) of organizational members and their behaviors"* (Schein, 2004). It is the way that people in the organization accomplish their work, relate to one another, and resolve the problems that confront them on a daily basis (Fayolle et al., 2005). It is something

an organization has, but can also be seen as something an organization is. Table 4-2 below provides an overview of often cited and used typologies of corporate cultures.

Table 4-2: Four typologies of corporate cultures

Handy (1976)	**Deal and Kennedy (1982)**	**Hofstede et al. (1990)**	**Schneider and Barsoux (1997)**
• Power culture • Role culture • Task culture • Person culture	• Tough guy macho culture • Work hard/play hard culture • Bet your company culture • Process culture	• Process- vs. results-oriented • Employee- vs. job-oriented • Parochial vs. Professional • Open vs. closed system • Loose vs. tight control • Normative vs. pragmatic	• Village market, Anglo/Nordic cluster • Family or tribe, Asian cluster • Well-oiled Machine, Germanic cluster • Traditional bureaucracy, Latin cluster

Literature suggests that corporate culture is particularly relevant for how innovation processes run in organizations (Chandler *et al.*, 2000; Peters & Waterman, 1982; Sherwood, 2002). This brings about the question why certain types of organizations are considered to be more innovative than others, as well as the question of what type of organizational culture this refers to. Given the accumulated influence of culture on the individual's personality, one might wonder as to how heavily corporate culture actually weighs on the issue.

Hence, it is certainly not sufficient to study only the impact that organizational culture has on intrapreneurship. One must be aware that the intrapreneurship process involves both the individual recognizing opportunities and carrying out innovative activities and the organization in which these activities are embedded. Therefore, the following section tries to better understand how culture-bound factors of the individual and the organizational level – that is, national, professional, and organizational culture – interact and influence intrapreneurship.

4.2 Interaction of NC, PC, and CC and its implication for intrapreneurship

Determining the exact importance that national, professional and corporate culture may have for intrapreneurship remains to be difficult. Certainly, national culture plays an important role, but we can not neglect the other levels of culture as outlined above (Fayolle et al., 2005). All group members have individual cultural backgrounds regarding the national culture in which they grew up, the occupations in which they were trained, and the organizations in which they worked and work (Ulijn & Weggeman, 2001). Thereby, national and professional

culture types would represent more the individual-related values (more invisible, implicit, the inner heart of the cultural onion) and corporate culture would in turn refer to more organization-related norms and practices (more visible, explicit, the outer layers of the onion). Thus, it seems to be the logical conclusion to conceptualize an intrapreneurship-conducive culture as an integration of national, professional and organizational culture types.

As intrapreneurship requires common efforts by individuals and their interactions at work, a culture that is conducive of intrapreneurship is certainly influenced, or even determined, by national culture. Human behavior in companies is clearly influenced by the national culture context in which both the individuals and the companies are located. This is due to the learned cultural background that people have internalized independently from their professional and organizational affiliation. National culture is already 'programmed' into individuals' minds early in life, where the family and later school and friends are important cultural influences. Their behavior tends to be, on average, more or less consistent with this national culture (Hofstede, 2001; Wennekers *et al.*, 2002).

Regarding the context of intrapreneurship, this finds support from earlier work suggesting that national culture, or at least some of the five Hofstedian dimensions, has a significant impact on how entrepreneurship and innovation is achieved (Fayolle et al., 2005; Nakata & Sivakumar, 1996; Ulijn *et al.*, 2004a). Shane et al. (1995) and Shane (1997), for instance, pinpoint national culture as a leading principle for innovative output and performance of organizations. Also Jones and Davis (2000) study the link between dimensions of national culture and innovative activities and the implications for locating global R&D operations. They conclude that national culture affects innovation and is, therefore, relevant for locating R&D activities.

Not only national culture plays an important role for intrapreneurship, but also the influence of professional culture and its interaction with national culture. Professionals entering an organization bring in a large repertoire of cultural knowledge gained not only from the wider society, but also from their professional training and previous work experience (Bloor & Dawson, 1994). Professional culture orientations already find their roots in childhood and early years of education, and an interest shown for certain subjects might give an indication about a professional orientation in the future. A more important influence on professional culture is given later through the professional education or the course of studies chosen. Certainly, both professional training on the job and university studies determine and stabilize one's professional orientation or tendency.

The well-studied example of the contrasting professional cultures of engineers and marketers explicates that the individuals' education and subsequent professional career development may have a significant impact on the pursuit of innovation. These two occupations have completely different views about the relationship of the whole organization to the environment and, more specifically, about what innovation means and how it is to be achieved (Fayolle et al., 2005; Griffin & Hauser, 1996; Souder, 1981a, 1988; Ulich, 1990; Wiebecke, 1987).

From the perspective of the engineers, the provision of technically sophisticated products to the environment is the fundamental task of the organization. Thereby, the scientific and technical quality of the products justifies the existence of the company. Indeed, literature suggests that many engineers and engineering firms are too technically driven and have difficulties understanding market needs (Finniston, 1980; Rochester, 2002; Souder, 1981a, 1988; Ulijn et al., 2001). Engineering is generally perceived as a detail-oriented occupation with a focus on solving technical problems. This is related to somewhat longer time horizons in order to be able to anticipate the future.

Marketing, in contrast, regards the firm's role in the market to be the most important objective: the invested financial input and profit is obtained by supplying products that best suit the demand in the market. The organization survives through its commercial activities. Marketing also has a shorter time perspective than R&D, based on a today-orientation and a focus on the rapidly changing markets and customer needs. This admittedly superficial comparison of two occupations that are generally involved in innovation processes shows that it is essential to consider professional culture as a determinant of an intrapreneurship-conducive culture and as a design parameter of the simulation game and its underlying conflict scenario (see Chapter 3, Section 3.2).

To complicate matters even further, there are preliminary indications that professional cultures may vary across national cultures, and they may interact in unexpected ways. For instance, Ulijn et al. (2001) report a study among German and Dutch engineers that suggests that not only the professional background as such, but also its interaction with national culture is decisive for the transition process form technology to market orientation. The study found that Dutch and German engineers, in principle, do not differ in their technology versus market orientation but the transition from technology towards market orientation occurred earlier for the Dutch than for the German engineers.

Besides national and professional cultures, corporate culture is considered to have a strong impact on the innovation process, its outcome, and, in turn, the performance of the

organization (Chandler et al., 2000; Peters & Waterman, 1982; Sherwood, 2002). Referring back to the overview of corporate cultures given in Table 4-2 above, Hofstede et al.'s (1990) typology includes dimensions of organizational culture that appear to be crucial for innovation, such as the open system, loose control or pragmatism. Ulijn and Weggeman (2001) stress that an innovation cultures would prosper in an organization setting that is founded in a combination of the clan/Anglo-Nordic and the guided missile/Germanic cultures that are described in Schneider and Barsoux' (1997) typology.

Nevertheless, as the influence of corporate culture on the individuals' personalities occurs rather lately in their careers, its impact on an intrapreneurship-conducive culture might be weaker than often assumed. Research indicates that even in companies that are known for their strong corporate culture, national culture remains of paramount importance in explaining its employees' business-related behavior (Hofstede, 1994; Hofstede et al., 1990). In those companies national culture differences are reflected, for instance, in the way how organizations solve problems in different countries, as well as in the validity of management theories in the countries. Different national cultures have different preferred ways of structuring organizations and different patterns of employee motivation.

Corporate culture is nothing more than the way in which organizations have organized themselves over the years to solve the problems and challenges they face. Corporate culture is the result of a multitude of factors that are located at the societal level, as well as at the level of individual organizational member. It is due to these individual-based influences that especially large, established organizations are unlikely to exhibit a homogenous corporate culture across the entire organization and its subsidiaries worldwide; rather individuals and groups, enforced through high turnover of employees, all mitigate against a unitary organizational culture (Bloor & Dawson, 1994).

This can be clearly visualized by the onion metaphor of culture. Corporate culture is both the determinant and the result of organizational structures, processes and routines and provides, therefore, the organizational context for practices that encourage innovation. Those practices are embedded in the outer layers of the onion model and are not as deeply rooted as national and professional culture elements are. This finds support from Hofstede et al. (1990) who empirically show that shared perceptions of daily practices are the determinants of an organization's culture implying that corporate culture might be less deeply rooted and perhaps easier to change than national or professional cultures.

To recapitulate this discussion, an intrapreneurship-conducive culture seems to be located at the intersection of national, professional, and corporate culture types. People are born into a

certain national culture context, acquire a certain professional culture, and then they are exposed to the corporate culture of the organization they enter. In this way, it refers to both the individual level (nexus of national and professional culture) and the organizational level (nexus of national and organizational culture) of intrapreneurship (see Chapter 2, Section 2.2). The onion metaphor of culture helps to explain that values acquired first remain to be the strongest towards the end of one's professional life, including one's professional culture. This is the picture that provides the basic understanding and framework in order to guide the development of a holistic description of an intrapreneurship-conducive culture.

4.3 Towards a description of an intrapreneurship-conducive culture

As outlined above, a culture that is conducive of intrapreneurship appears to be an integration of national, professional and corporate cultures and refers explicitly to the intrapreneurship process: while national and professional cultures seem to be bound to the individual level, corporate culture is rather linked with the organizational level of intrapreneurship. In order to comprehensively describe this particular culture, an extensive literature study was conducted. Articles in scientific journals and books of the following research fields were taken into account: innovation, entrepreneurship or intrapreneurship, marketing, change management, national, professional, and organizational/corporate cultures. The study was conducted in two steps.

In the first step, constituents and factors that are deemed to be conducive of intrapreneurship have been identified through an inductively conducted context analysis. The review of 97 publications resulted in an unstructured list of 329 quotations. It became apparent that, regarding the validity of the factors, roughly two categories of contributions exist. The first provides mainly qualitative descriptions, anecdotal evidence and case studies of how an intrapreneurship and, more broadly speaking, an innovation-friendly organizational climate can be implemented in (established) organizations.

It was striking that these contributions are clearly practitioner-oriented with limited scientific rigor regarding conceptualizing, empirical testing, and modeling. The other category emphasizes the impact that national culture has on the innovation output and performance of companies; here, the findings are mainly based on empirical testing and validation, but lack the link to applicable knowledge that would allow organizations to shape and implement an intrapreneurship- and innovation-conducive culture.

In the second step, all 329 quotations taken from the literature have been clustered and aggregated to 24 factors that seem to foster intrapreneurship. Ulijn & Weggeman's (2001)

conceptualization of innovation culture served as an auxiliary framework to assign these factors to the following six cultural dimensions: high vs. low power distance, high vs. low uncertainty avoidance, individualism vs. collectivism, masculinity vs. femininity, long-term vs. short-term orientation, and open vs. closed system orientation. While the first five dimensions are known from Hofstede's (1980) terminology of national culture, the sixth dimension open vs. closed system orientation was elaborated from Ulijn & Weggeman's (2001) dimension innovation drive and Hofstede & Bond's (1988) dimension open vs. closed system.

The result of this stepwise research process is presented in the following subsections. In the following, each of the six dimensions is described in detail by linking and summarizing the reasoning that was retrieved from the original publications: high versus low power distance (Subsection 4.3.1), high versus low uncertainty avoidance (Subsection 4.3.2), individualism versus collectivism (Subsection 4.3.3), masculinity versus femininity (Subsection 4.3.4), long-term versus short-term orientation (Subsection 4.3.5), and open versus closed system orientation (Subsection 4.3.6).

4.3.1 High versus low power distance

Power is an integral part of innovation activities. It is needed to facilitate, orchestrate and shape innovation (Dougherty & Hardy, 1996; Kanter, 1983) but often organizations resist innovative ideas because of the way how power is allocated in organizations (Shane et al., 1995). The distribution of power and how individuals regard power differences is embedded in a society's or organization's culture (Hofstede, 1980). In cultures that value low power differences and egalitarian values people prefer democratic leadership, cooperative strategies and striving for consensus; authority is distributed equally and power is a matter of facts rather than positions. In contrast, cultures with high power distance accept and expect that power is not distributed equally. These cultures tend to adhere more rigidly to organizational hierarchies, prefer centralized decision making, and accept authoritarian leadership and obedience to superiors.

Innovation depends strongly on interaction, information sharing, and debates between people across disciplines and hierarchies (Anfuso, 1999; Ekvall, 1996; Nicholson, 1998; Rice, 2003). An intrapreneurship-conducive culture would build on policies and practices – supported by organizational structures – that maximize the likelihood that people meet (also by chance), communicate openly, share ideas and information, listen to and learn from each other, and develop a culture of mutual trust and support (Anfuso, 1999; Bingham, 2003;

Eesley & Longenecker, 2006; Ekvall, 1996; Fishman, 2000; Frohman, 1998; Russell & Russell, 1992; Sherwood, 2002; Thwaites, 1992; Ulijn & Weggeman, 2001). For instance, Damanpour (1991) found a positive association between internal communication and organizational innovativeness. And organizations have to create these situations where interaction and communication are possible (Ahmet, 1998; Bretani & Kleinschmidt, 2004; Haskins & Williams, 1987; Hisrich, 1990; Martins & Terblanche, 2003; McGinnis & Verney, 1987; Ottum & Moore, 1997; Russell, 1999).

Innovation efforts will undoubtedly fail when goals and directions are made only by a few people at the top of an organization and then their implementation is forced top-down. Rather, they should be discussed, deliberated and changed, based on feedback from and communication between people at all levels: top down, bottom up, and all across functions and disciplines. Innovators and R&D teams need to be encouraged to adopt participative approaches and aim at widespread support for innovative projects before formal attention is paid by those in authority. This support enables (would-be) intrapreneurs to convince the decision makers that innovative project necessitate broad-based support within the organization (Ahmet, 1998; Cooper & Kleinschmidt, 1995; Frishammar & Hörte, 2005; Hisrich, 1990; Kahn, 1996; Kanter, 1985; Kumpe & Bolwijn, 1994; Luchsinger & Bagby, 1987; Martins & Terblanche, 2003; McGinnis & Verney, 1987; Ottum & Moore, 1997; Pinchot, 1985; Rodriguez-Pomeda *et al.*, 2003; Russell, 1999).

Accordingly, the management and decision making structures should be flat and decentralized including multiple informal networks to mobilize people, enable direct access to resources, as well as to allow entrepreneurial behavior to emerge (Ahmet, 1998; Dougherty & Hardy, 1996; Eesley & Longenecker, 2006; Fry, 1987; Haskins & Williams, 1987; Howell & Higgins, 1990a, 1990b; Kanter, 1985; McGinnis & Verney, 1987; Nakata & Sivakumar, 1996; Rodriguez-Pomeda et al., 2003; Stevenson & Gumpert, 1985). Creating a true feeling of empowerment – that is, delegating managers' power and responsibility towards the employees – is vital to foster a culture of innovation (Fayolle, 1999; Higgins, 1995a, 1995b; Kanter, 2000; Kotter & Heskett, 1992; Kumpe & Bolwijn, 1994).

Especially the employees on the individual level need to feel that management is willing to support intrapreneurship because it is managements' trust that enables people to take risks without fear or undue penalty of failing (Ahmet, 1998; Bitzer, 1991; Chandler et al., 2000; Chisholm, 1987; Cooper & Kleinschmidt, 1995; Fry, 1987; Haskins & Williams, 1987; Hisrich, 1990; Kuratko & Montagno, 1989; Kuratko et al., 1990; Rule & Irwin, 1988; Süssmuth-Dyckerhoff, 1995). To show support the leaders should walk around listening and

asking questions in order to find out the unexpected and then help the employees in pursuing their innovative ideas (Eesley & Longenecker, 2006; Ekvall, 1996; Frohman, 1998; Nicholson, 1998). This helps to signal confidence, triggers individual active participation and encourages personal responsibility for outcomes.

Hence, to foster intrapreneurship, organizational hierarchies that are to a certain extent necessary in organizations should not imply that there is too much of a power distance between the organizational and the individual level of intrapreneurship. To avoid the intrapreneurship conflict emerging and remaining unsolved, intrapreneurs must get the opportunity to openly discuss and deliberate their ideas and initiatives across all hierarchies and positions. This requires that management is accessible and actively establishes direct links to the individual level. Given this, an intrapreneurship-conducive culture clearly builds on flat hierarchies, decentralized power structures, and egalitarian values in order to foster communication and interaction in all directions, and encourage employees to engage in intrapreneurial venture.

4.3.2 High versus low uncertainty avoidance

Uncertainty is implicitly inherent in innovation and in radical innovation in particular (see Chapter 2, Section 2.1). The way how uncertainty is dealt with has strong implications for the nature of innovations that re being pursued, that means exploration versus exploitation, high risk versus low risk, radical versus incremental. The cultural dimension of uncertainty avoidance refers to how upset people get about ambiguity and future doubt (Hofstede, 1980; Hofstede & Hofstede, 2005). In uncertainty avoiding cultures people have a concern for security, prefer established rules, formalization and planning of activities in order to reduce perceived risk. In contrast, in a culture more accepting uncertainty individuals are more flexible, rules are loose, and decision making is pragmatic and situational.

The process of developing radically new ideas into successful products and businesses is about discovery, exploration and pursuing new paths. It is a risk-intensive process that requires significant capital outlays and a long time-horizon where predictable resource needs and environmental controls are lacking. It is commonly accepted that a willingness to accept risk and face uncertainty is a fundamental element of an innovation-supportive culture (Ahmet, 1998; Bitzer, 1991; Brazeal, 1996; Chisholm, 1987; Czernich, 2004; Draeger-Ernst, 2003; Duncan *et al.*, 1988; Eesley & Longenecker, 2006; Ekvall, 1996; Fayolle, 2003; Kuratko & Montagno, 1989; Kuratko et al., 1990; Martins & Terblanche, 2003; Mokyr, 1990; Pinchot, 1985; Rothwell & Wissema, 1986; Stevenson & Gumpert, 1985; Thornberry, 2001).

Related with risk is failure, and the acceptance of failure is essential for promoting entrepreneurial behavior within an organization. Not all new ideas lead to successful innovation in the end; only a minor fraction of new ideas will in the end yield sustainable profits (Rosenberg, 1996). Also, the pathways from opportunity to innovation are very are unclear and varied. They still have to be identified and developed through exploration, experimentation and iteration which, by definition, include mistakes and failure. In this respect, it is common understanding that failures need to be regarded as opportunities and lessons to learn from and not as reasons for punishment (Ahmet, 1998; Bitzer, 1991; Bretani & Kleinschmidt, 2004; Chisholm, 1987; Collins & Porras, 1994; Cooper & Kleinschmidt, 1995; Draeger-Ernst, 2003; Eesley & Longenecker, 2006; Frohman, 1998; Fry, 1987; Haskins & Williams, 1987; Higgins, 1995a, 1995b; Hisrich, 1990; Kuratko & Montagno, 1989; Kuratko et al., 1990; Nicholson, 1998; Pinchot, 1985; Russell & Russell, 1992; Russell, 1999; Sherwood, 2002; Smith, 1998; Süssmuth-Dyckerhoff, 1995).

To support exploration and experimentation, the emphasis should be on norms and values that reduce rules, structured activities, and routines. This leads to more informality, which is crucial for allowing innovators and R&D teams to act without waiting for the normal multilevel decision making and approval process (Kumpe & Bolwijn, 1994; Nicholson, 1998; Pinchot & Pellman, 1999). Formal, bureaucratic methods of control associated with organizational structures are ineffective in managing innovative activities given the uncertainties inherent in innovation (Ahmet, 1998; Draeger-Ernst, 2003; Kanter, 1985; Russell, 1999). Moreover, this includes the acceptance of conflict and competition as stimulating elements to trigger and encourage debate as well as divergent thinking and to voice sensitive issues. Dissent needs to be encouraged because it is an important means for sharing and discussing opposing viewpoints, expressing differing opinions, and creating a diversity of perspectives (Ekvall, 1996; Frohman, 1998; Kanter, 1985).

Hence, to support intrapreneurship it is suggested that the degree of uncertainty avoidance is low. A willingness to accept and take risk must be simultaneously present on the individual and the organizational level of intrapreneurship. Evidently, an intrapreneur initiates risk-intensive new venture process, but without top management's willingness to support highly risky R&D and new venture projects large scale innovation can not reach fruition (Quinn, 1979; Stevenson & Gumpert, 1985). Moreover, intrapreneurship will only emerge, if rules and formalization are reduced and people are fault-tolerant. In this way, continuous learning is established encouraging employees to engage again and again in new intrapreneurial ventures.

4.3.3 Individualism versus collectivism

Individualism (in contrast to collectivism) refers to the relationship that individuals have with the society that surrounds them, that is, whether people are rather concerned about themselves or about others (Hofstede, 1980; Hofstede & Hofstede, 2005). In individualistic cultures, ties between individuals are loose, and self-reliance, autonomy, independence and leadership are considered to be highly respected and valued. Individualistic people seek to differentiate themselves from others, emphasize personal outcomes over relationships and value individual needs, interests and goals over those of the group (Triandis, 1995; Trompenaars & Hampden-Turner, 2001).

In contrast, collectivistic cultures are characterized by a tight social framework in which people distinguish between their own groups (so-called in-groups) and other groups (out-groups). The in-group is built and maintained through harmonious relationships, rules of behavior, membership and loyalty (Hofstede & Hofstede, 2005; Triandis, 1995). Collectivistic people value group interests, goals and outcomes over those of the individual. They rather pursue cooperative strategies, show more concern about attaining the other party's goals than about attaining their own goals, and are more willing to make sacrifices for their in-group than individualistic cultures (Lewicki *et al.*, 1994; Triandis, 1995).

By definition, a necessary condition for intrapreneurship is the presence of the intrapreneur (see Chapter 2, Section 2.2). As a consequence, a high degree of individual freedom and autonomy is considered to be crucial in order to stimulate initiative and personal responsibility (Ahmet, 1998; Draeger-Ernst, 2003; Eesley & Longenecker, 2006; Ekvall, 1996; Fayolle, 2003; Fry, 1987; Haskins & Williams, 1987; Kanter, 1985; Krieger, 2005; Luchsinger & Bagby, 1987; Lumpkin & Dess, 1996; Martins & Terblanche, 2003; McGinnis & Verney, 1987; Morris *et al.*, 1994; Nicholson, 1998; Peters & Waterman, 1982; Pinchot, 1985; Rodriguez-Pomeda et al., 2003; Russell, 1999; Schmid, 1987; Ulijn & Weggeman, 2001). This stimulates people to think, be creative, take initiative and show responsibility, attributes that are important for innovation.

However, it is questionable whether a purely individualistic culture is the right context to help intrapreneurship emerge. It may encourage people to focus too strongly on their personal interests and goals. This creates a sphere of high competition among the employees and, as a result, may force people to keep their ideas for themselves instead of sharing them across different departments, groups or disciplines (Eesley & Longenecker, 2006; Ulijn & Weggeman, 2001). For instance, Wagner and Moch (1986) suggest that an overly individualistic corporate culture may be inappropriate to contemporary organizations in which

highly interdependent methods are used and processes run. Certainly, the generation of ideas can be carried out by individuals but the follow-up of ideas requires cooperation across the organization (Specht *et al.*, 2002; Weule, 2002). No single individual has the skills, let alone the resources, to take an idea from thought to implementation. Even small groups can find this very difficult (Sherwood, 2002). Combining ideas, exchanging information, and verifying each other's ideas are crucial for innovation.

Hence, it seems to be crucial to have collective forces building on 'we' consciousness, group spirit, sense of belonging, loyalty, obligation to contribute and strong cohesion between all members of the group or organization (Ekvall, 1996; Frohman, 1998; Kanter, 1985; Kumpe & Bolwijn, 1994; Nakata & Sivakumar, 1996; Robbins, 1998; Shane et al., 1995; Ulijn & Weggeman, 2001). Collectivistic people are more likely to value behaviors that are beneficial to the organization as a whole and to have a stronger interpersonal orientation on the job in general. People must recognize that helping others to be innovative is part of their job (Frohman, 1998). Successful collectivistic approaches to new product development in the Japanese electronics and automotive industries, such as *Quality Function Deployment* and *Quality Circle* programs, help to illustrate this point. They are basically well supported, managed by consensus, guided by a broad scope and committed to going the distance for the sake of an idea (Nakata & Sivakumar, 1996).

This means that utilitarian decision making and cooperative strategies are essential for intrapreneurship. Both the individual and the organizational process level need to build a common understanding of the entrepreneurial opportunity considering the needs and choices of all involved stakeholders and, based on that, commit to an action that is satisfying to a majority of those stakeholders (Kotter & Heskett, 1992). As a consequence, potential intrapreneurs need to commit themselves to the organization and greater goals that go beyond their self-interest (Ahmet, 1998; Kahn, 1996; Kanter, 1985; Kuratko & Montagno, 1989; Martins & Terblanche, 2003; McGinnis & Verney, 1987; Pinchot, 1985; Russell, 1999). Otherwise, intrapreneurial initiatives are likely to fail.

Given this, a combination of individualistic and collectivistic orientations appears to be essential for intrapreneurship (Morris et al., 1993; Morris et al., 1994; Ulijn & Weggeman, 2001). The intrapreneur, who certainly needs to be individualistic to some extent, must not forget the interests of the organization and its stakeholders. Pursuing entrepreneurial opportunities individually may be successful in the case of independent entrepreneurship but will most likely fail when it comes to intrapreneurship.

4.3.4 Masculinity versus femininity

The masculinity (versus femininity) dimension of culture reflects the dichotomy of assertiveness and altruism (Hofstede, 1980; Hofstede & Hofstede, 2005). In masculine cultures emphasis is placed on success and achievement: people live to work, are goal oriented, ambitious and like to excel. On the contrary, in feminine cultures quality of life and a harmonious, playful atmosphere are important: people work to live and put emphasis on interdependency and caring for others. Unfortunately, literature provides only limited (empirical) evidence about whether intrapreneurship would be better supported by a masculine or a feminine culture.

On the one hand, there are indications that femininity would be part of an intrapreneurship-conducive culture. To foster creativity, idea development and opportunity recognition, a playful atmosphere, good relationships and interaction among the participants seem to be crucial (Ekvall, 1996; Thwaites, 1992). As innovation is a cooperative effort, it would be constraining if people talk behind each other's back or steal each other's ideas. Also, the level of constructive, affiliation-related conflict should be low, and personal tension, prestige differences and power struggles should be avoided. Thus, low degrees of masculinity, through a focus on people and the establishment of warm and caring surroundings, positively affect the initiation stages of new product development (Nakata & Sivakumar, 1996; Ulijn et al., 2004a). As Ulijn et al. (2001) suggest, the high femininity values of the Netherlands and also Scandinavian countries appear to foster technical innovation in the initial stages of the innovation process.

On the other hand, it is questionable as to if a dominantly feminine culture would be an appropriate breeding ground for intrapreneurship. Creativity and the discovery of a business opportunity is one step in innovation, but the other is pursuing and pushing the idea towards implementation in the market. Therefore, purposefulness, clear goal setting, and an orientation towards achieving these goals are considered to be elementary for intrapreneurship (Barczak & Wilemon, 1992; Bitzer, 1991; Chisholm, 1987; Collins & Porras, 1994; Draeger-Ernst, 2003; Eesley & Longenecker, 2006; Frohman, 1998; Luchsinger & Bagby, 1987; McGinnis & Verney, 1987; Nakata & Sivakumar, 1996; Pinchot & Pellman, 1999; Quinn, 1979; Rodriguez-Pomeda et al., 2003; Stevenson & Gumpert, 1985; Thamhain, 1990). Successful major innovations require that clear objectives are established at the outset of the innovation project because challenging goals stimulate and commit people to look beyond the feasible to the possible.

In order to encourage potential intrapreneurs, goals should not only be formulated in terms of money and technical objectives, but also be supported by appropriate control, motivation and reward systems (Ahmet, 1998; Anfuso, 1999; Bretani & Kleinschmidt, 2004; Chandler et al., 2000; Duncan et al., 1988; Fry, 1987; Haskins & Williams, 1987; Higgins, 1995b; Hisrich, 1990; Kanter, 1985; Kuratko & Montagno, 1989; Kuratko et al., 1990; Luchsinger & Bagby, 1987; Martins & Terblanche, 2003; McGinnis & Verney, 1987; Nicholson, 1998; Pinchot, 1985; Rule & Irwin, 1988; Schmid, 1987; Sherwood, 2002; Süssmuth-Dyckerhoff, 1995). Furthermore, in order to maintain high levels of expertise and research discipline, it is necessary to recruit first-rate people, conduct peer reviews of the researchers' performance, and remove non-performers from the projects.

Given this, an intrapreneurship-conducive culture seems to have both masculine and feminine elements, with an emphasis of the former. Interestingly, countries like France, Germany, Japan and the United States, that are known for being highly innovative, score high on the masculinity dimension (Hofstede, 1980; Hofstede & Hofstede, 2005). A part of the reason can be found in their strength in engineering (Fayolle, 1999; Fayolle et al., 2005; Johnston, 1989; Nakata & Sivakumar, 1996; Nilsson, 2005; Shaw et al., 2003) that typically builds on masculine orientations, such as goals and achievement orientation, problem solving, and implementation. Hence, the person of the intrapreneur appears to feature typically masculine elements but he or she must not forget the lager organizational context where a good atmosphere and relationships between people need to be maintained which may be particularly relevant for the early stages of the intrapreneurship process.

4.3.5 Long-term versus short-term orientation

The dichotomy of long-term versus short-term orientation has particular relevance for the pursuit of innovative activities. It refers to people's time horizons, attitude to tradition and change as well as preferences of static or dynamic environments (Hofstede & Bond, 1988). Long-term oriented cultures put an emphasis on a dynamic, future-oriented mentality, including an openness to the new, persistence and hard work. In contrast, short-term oriented cultures have a concern for rather static environments combined with a focus on the past and the present, on tradition and on keeping within well-known and well-accepted boundaries.

Innovation, implying change and addressing the future, requires people and organizations with longer time horizons (Bingham, 2003; Nakata & Sivakumar, 1996; Quinn, 1979; Ulijn & Weggeman, 2001). Especially major innovations usually take a long time – up to five, ten or even fifteen years such as in the pharmaceutical industry – to develop, absorb in the market

and yield profit (Rosenberg, 1996). This includes both the establishment of long-term business objectives (Brazeal, 1996; Fry, 1987; Hisrich, 1990; Pinchot, 1985; Rothwell & Wissema, 1986), as well as a challenging vision and imagination of the future technological and market environment that will be present when a new product is planned to be launched (Bitzer, 1991; Kanter, 1985; Pinchot, 1985; Schmid, 1987).

Moreover, proactiveness and opportunity focus are essential for intrapreneurship (Stevenson & Jarillo, 1990; Thornberry, 2001). To facilitate the discovery of new, innovative business opportunities, people should go into new directions and pursue innovative ideas (Bingham, 2003; Cooper & Kleinschmidt, 1995; Eesley & Longenecker, 2006; Ekvall, 1996; Mokyr, 1990; Özsomer *et al.*, 1997; Russell & Russell, 1992). Since the exact pathway from opportunity to market is rarely known in its entirety, exploration of alternative, possibly competing approaches is elementary to success. People must be able to draw up multiple scenarios and be willing to accept many truths in order to be ready to take advantage of changes in the technological and market environment (Ahmet, 1998; Bingham, 2003; Damanpour, 1991; Eesley & Longenecker, 2006; Fayolle, 2003; Rothwell & Wissema, 1986; Stevenson & Gumpert, 1985; Ulijn & Weggeman, 2001; Utterback, 1994a, 1994b).

A static perspective of technology and market may be impedimental in an environment where new, uncommon ideas and solutions, experimentation and iterative testing are demanded. It is important that people are flexible and can quickly adapt to a changing environment (Ahmet, 1998; Cooper & Kleinschmidt, 1995; Draeger-Ernst, 2003; Haskins & Williams, 1987; Kanter, 1985; Martins & Terblanche, 2003; Özsomer et al., 1997; Pinchot, 1985; Rule & Irwin, 1988). Innovation is not only a long, but especially an iterative process including unforeseen delays and setbacks and, probably, the more radical the idea the longer the process and the more iterations will occur in the process. This calls for perseverance to endure the pain, frustration, and effort of overcoming the technical and market obstacles that always confront a new idea, and the discipline and willingness to apply many hours toward completing a project (Nakata & Sivakumar, 1996; Peters & Waterman, 1982).

Taken together, this means that both the individual and the organizational level of intrapreneurship need to understand that intrapreneurship requires a general openness to explore the new and unknown, long-term orientation and vision of the future, acceptance of change, and persistence to engage in an iterative and long development process. Still, renewal and stability need to be balanced. Typically a task of R&D management is to keep a balance between the short-term demands of the daily business, while, at the same time, leaving enough room to work on long-term research (Funke & Andonian, 2005; Kumpe & Bolwijn,

1994). This allows for courageous and future-oriented management decisions and prevents the company from loosing financial robustness.

4.3.6 Open versus closed system orientation

The dimension open (versus closed) system orientation refers to the degree to which the organization and its members monitor and respond to changes in the external environment, as well as the ability to be in exchange-relations with other communities and organizations (Chesbrough, 2003; Hofstede et al., 1990; Robbins, 1998). An open organizational system puts emphasis on issues such as cooperation, networking, sharing of knowledge as well as search and curiosity across the boundaries of the firm. In contrast, a closed system would rely very much on their internal (re)sources and capabilities; exchange with external groups would be minimized or even avoided.

Literature suggests that companies, and especially the large ones, need to overcome their natural tendency to focus inward and open up their system to the outside world. This means that initiating, handling and using a portfolio of inter-organizational relationships is highly important for innovation (Bingham, 2003; Chesbrough, 2003; Ritter & Gemünden, 2003; Tushman, 2004). The origin of innovation is the individuals' ability discover new, innovative business opportunities (Kirzner, 1997; Klevorick *et al.*, 1995) which are not necessarily found within the boundaries of the organization. Discovery can arise from internally focused laboratory research, as well as from hunting outside the company for promising ideas and opportunities. In order to discover external sources and resources of innovation, organizational members should continuously monitor and respond to changes in the external environment, such as being in contact with customers, users, suppliers and venture partners, as well as placing equity investments in small and innovative firms (Chesbrough, 2003; Kanter, 2000; O'Connor & Ayers, 2005; Russell & Russell, 1992; von Hippel, 2005).

In particular, it is suggested that market orientation – that is, a clear orientation towards the customer and the value added for the customer – is a crucial element of successful innovation (Bitzer, 1991; Draeger-Ernst, 2003; Eesley & Longenecker, 2006; Frishammar & Hörte, 2005; Fry, 1987; Haskins & Williams, 1987; Hisrich, 1990; Kohli & Jaworski, 1990; Martins & Terblanche, 2003; McGinnis & Verney, 1987; Pinchot, 1985; Rice, 2003; Rodriguez-Pomeda et al., 2003; Russell, 1999; Salomo *et al.*, 2003; Souder, 1981b). Empirical evidence underscores that market orientation is antecedent to innovativeness and, as a consequence, to the firm's capacity to successfully introduce new products to the market (Atuahene-Gima, 1995; Hurley & Hult, 1998; Salomo et al., 2003). Market orientation is not only increasing the

direct contact to the customer, but also facilitating physical proximity to research, production, and marketing so that future users virtually *"have a hand in research and development"* (Quinn, 1979).

Open system orientation not only refers to the sourcing of innovative ideas and new business opportunities, but also to the way how innovation is financed, created and brought to the market. The funding of innovations should not only come from internal R&D budgets, but also from external sources such as venture capital, angel investors, corporate venture capital entities, private equity, etc. in order to push R&D to be more inter-organizational (Chesbrough, 2003; Quinn, 1979; Tushman, 2004). Related with this, much of the value in product innovation is increasingly created outside of a particular firm's boundaries. As not all smart people work internally, the company must find and tap into the knowledge and expertise of bright individuals outside the company (Chesbrough, 2003). This means that external orientation is not only relevant on the level of knowledge (as resources), but also on the level of human resources.

Given this, the open organization is recommended for promoting intrapreneurship which, however, does not imply to open up the system entirely. Rather, open system orientation refers to what Chesbrough (2003) calls open innovation: it is neither a fully closed nor a fully open system, but the boundaries of the organization are permeable, both from the inside to the outside and the other way around to make best use of both internal and external factors and sources of innovation. An rather open organizational system provides the intrapreneur with a larger variety of options than a closed system would do, affecting the entire intrapreneurship process from opportunity recognition and idea generation, sourcing and sharing of knowledge, joint development and funding to marketing and distribution the new product.

4.4 Summary and implications for designing the simulation game

The result of the literature study is a six-dimensional description building on 24 culturally-bound factors that seem to support the occurrence of intrapreneurship in the context of large, established organizations. It can be understood as a holistic description of an intrapreneurship-conducive culture that was deductively developed by means of an investigation of relevant literature. As depicted in Figure 4-2 below, the radar plotting technique can be used to summarize and visualize the description. Thereby, the score of each dimension was determined by qualitatively estimating the impact that each dimension may have on intrapreneurship. A five-point scale was used to evaluate if the dimensions' impact appears to be very low (0 points) or very high (100 points).

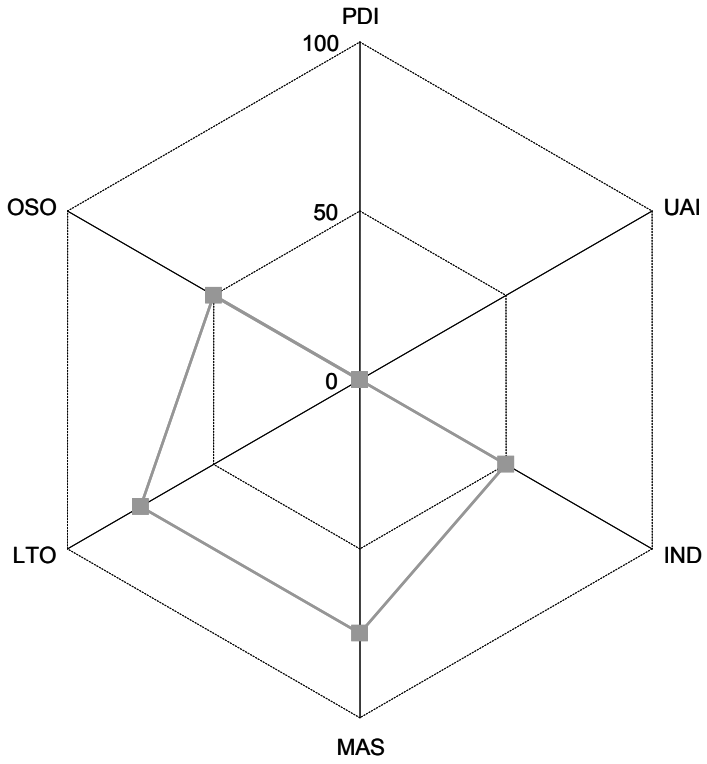


Figure 4-2: A deductively developed description of an intrapreneurship-conducive culture

Low power distance (PDI = 0 points): Despite organizational hierarchies that are given in large organizations the power distance between the organizational and the individual level of intrapreneurship should low. To avoid that the intrapreneurship conflict will emerge and remain unsolved, intrapreneurs must be encouraged to openly deliberate their ideas and initiatives across all hierarchies. This requires that management is accessible and actively establishing direct links to the individual level. Hence, a culture that is conducive of intrapreneurship clearly builds on flat hierarchies, decentralized power structures, and egalitarian values.

Low uncertainty avoidance (UAI = 0 points): Intrapreneurship presupposes that that the individual and the organizational level are simultaneously willing to accept and take risks. Evidently, the intrapreneur is the one who initiates the risk-intensive new venture process, but without top management's willingness to support the process large scale innovation can not reach fruition. Moreover, intrapreneurship will only emerge, if rules and formalization are reduced and people are fault-tolerant. In this way, continuous learning is established encouraging employees to engage again and again in new intrapreneurial venture.

Medium individualism (IND = 50 points): A balanced combination of individualistic and collectivistic orientations is essential for intrapreneurship. The intrapreneur, who certainly needs to be individualistic to some extent, must not forget the interests of the organization and

its stakeholders. Pursuing entrepreneurial opportunities individually may be successful in the case of independent entrepreneurship but will probably fail when it comes to intrapreneurship. Both the intrapreneur and the management have to pursue cooperative strategies in order to achieve a greater, common goal.

Rather high masculinity (MAS = 75 points): An intrapreneurship-conducive culture seems to have both masculine and feminine elements, with an emphasis of the former. For radical innovation the person of the intrapreneur appears to feature typical masculine orientations, such as goals and achievement orientation, problem solving, and implementation. Yet, he or she must not forget the lager organizational context where a good atmosphere and relationships between people need to be maintained which may be particularly relevant for the early stages of the intrapreneurship process.

Rather long-term orientation (LTO = 75 points): Intrapreneurship requires a general openness to explore the new and unknown, long-term orientation and vision of the future, acceptance of change, and persistence to engage in an iterative and long venturing process. Still, the organization must not disregard that renewal and stability should be balanced, a typical task of R&D management that needs to keep a balance between the short-term demands of the daily business, while, at the same time, leaving enough room to work on long-term research.

Medium open system orientation (OSO = 50 points): The open organization is recommended for promoting intrapreneurship which, however, does not imply to open up the system entirely. It is neither a fully closed nor a fully open system, but the boundaries of the organization are permeable, both from the inside to the outside and the other way around in order to make best use of both internal and external factors and sources of innovation. Such an organizational setting provides the intrapreneur with a larger variety of options than a closed system would do, affecting the entire intrapreneurship process from opportunity recognition and idea generation, sourcing and sharing of knowledge, joint development and funding to marketing and distribution of the new product.

To recapitulate, this extensive literature investigation of 97 publications resulted in a deductively developed six-dimensional description of an intrapreneurship-conducive culture. It can be understood as a preliminary description of the ideal target situation that the design proposition aims at. In other words, by participating in the *Intrapreneurship Game* the players should gain a better understanding of the norms and values, their attitudes towards and their perceptions of intrapreneurship and how it can be implemented in their daily work environment.

Chapter 5

The final design

The goal of this doctoral dissertation is to develop – that is, to theoretically ground and field-test – the following design proposition: *"In order to promote intrapreneurship in industrial R&D (C), one can use a scenario-based simulation game (I), which will through experiential learning (M) create awareness of and insight into an intrapreneurship-conducive culture (O)"*. So far, the previous chapters developed the design knowledge that is required to theoretically ground the design proposition and describe the ideal target situation.

This chapter presents, as the central element of the design proposition, the final design of the scenario-based simulation game which is the result of the cyclic iterative design process (including both the stages of theoretical grounding and field-testing); it is structured as follows: Section 5.1 presents the scenario of the simulation game; Section 5.2 describes the procedural format for making the scenario available for the players; and Section 5.3 derives indications and the contraindications for usage. The final version of the *Intrapreneurship Game* and the corresponding *User Manual* are enclosed in the appendices A and B.

5.1 The scenario of the simulation game

As elaborated in Chapter 3, Section 3.3, the simulation game, in the form of a scenario, represents a purposefully designed social system. A scenario is an account or synopsis of a projected course of action, events or situations. Usually, the basis is a conflictive scenario in the form of an *as-if* situation with a particular attention given to structural constraints and opportunities that are present in the real-world context. In reference to the design parameters that were specified in Chapter 3, Section 3.2, the scenario of the *Intrapreneurship Game* is built around the intrapreneurship process. While the underlying conflict scenario is described in Subsection 5.1.1, the players that represent and shape the social system of the simulation game, are described in Subsection 5.1.2.

5.1.1 The conflict

The scenario that is simulated in the *Intrapreneurship Game* deals with an intrapreneurship process starting to evolve within a large, established company named *HAIDO*. A nascent engineer-intrapreneur has discovered the new technology *Light Emitting Organic Fiber (LEO Fiber)* that he or she considers to be a unique opportunity of radical innovation to develop a completely new business activity for *HAIDO*. To simulate the intrapreneurship process and its underlying conflict, the scenario is based upon an event that typically occurs in the course of this process. As outlined in Chapter 2, Section 2.2, it is the crucial moment of decision-making on opportunity exploitation (as visualized in Figure 5-1 below).

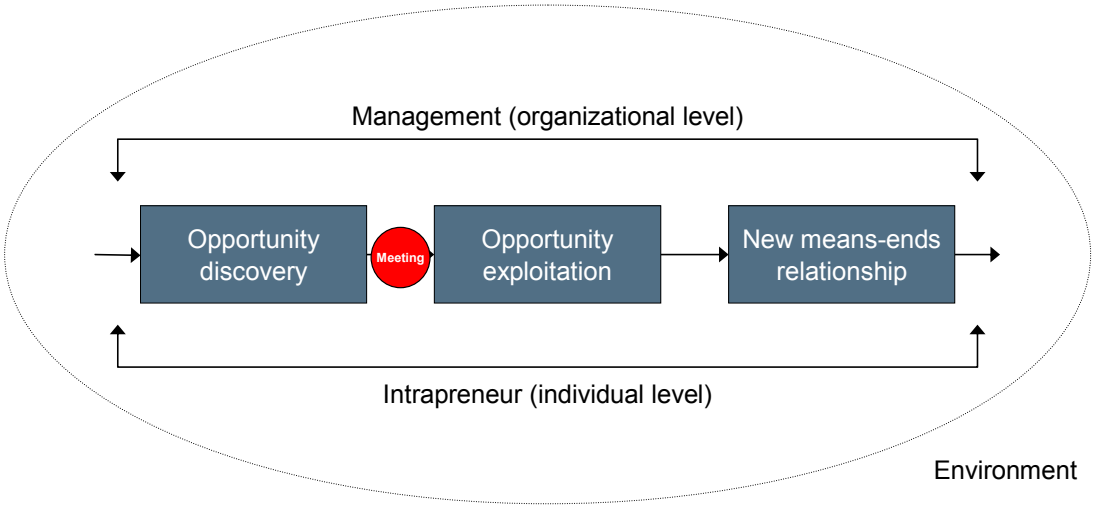


Figure 5-1: Decision-making on opportunity exploitation (adapted from Figure 2-3)

The decision on opportunity exploitation is to be made in a meeting involving the intrapreneur (individual level) and the management (organizational level), during the course of which the underlying conflict of intrapreneurship clearly emerges. The intrapreneur and the management have an entirely diverging reading of the opportunity. While the former is fully convinced that *LEO Fiber* represents a highly promising new business opportunity that should be exploited within the boundaries and to the benefit of *HAIDO*, the latter shows, *a priori*, no or only limited interest in pursuing *LEO Fiber*: it does not fit into the current mainstream business; there is no clear market for it; it will take too long until results can be expected; and the current products are selling well.

To make the decision, the intrapreneur and the management need to develop a common understanding of the opportunity and resolve the conflict. Admittedly, in reality the decision on opportunity exploitation would not be made in one single meeting (see Chapter 6, Section 6.2). Nevertheless, such meetings are common events or environments to make this sort of decisions, like in the case of intra-organizational negotiations (Mastenbroek, 1989) and

conflict resolution (Blum & Wall Jr, 1997; Mastenbroek, 1989; Wall Jr & Callister, 1995), entrepreneurial business plan negotiations (Ulijn et al., 2004b), or other commercial negotiations (Jolibert & Velazquez, 1989). In this type of encounters the negotiation parties discuss different interests and objectives in order to reach an agreement or a compromise in mutual dependence because they see benefits in doing so (Ulijn & Strother, 1995).

5.1.2 The players

To operationalize the intrapreneurship conflict by means of a role-play (as defined in Chapter 3, Section 3.3), the *Intrapreneurship Game* involves players of so-called key, supporting, and minor roles. Players of key and supporting roles are the protagonists who actively perform the simulation game. They shape the social system of the role-play by defining the problem areas, exchanging information and working towards the outcome. While the key roles operationalize and implement the conflict, the supporting role is not part of the conflict area; it has the objective to facilitate the simulation process.

In addition, so-called minor roles are involved as coaches and observers of the protagonists. They have a semi-active but responsible part in the simulation and contribute indirectly to the simulation process and outcomes by having two main tasks. First, they assist the protagonists both during the preparation time and the intermediate debriefings (constructive time-outs), the latter of which aim at facilitating the negotiation process and occur twice in the course of the simulation. Secondly, their observations are an essential ingredient for the final debriefing subsequent to the simulation. Moreover, by representing the constituency of the protagonists the involvement of the minor roles helps to increase the ecological validity of the simulation.

Table 5-1: Players involved in the *Intrapreneurship Game*

Level of syntax	Level of semantics	Max. no of players
Key role (protagonist)	Business Unit Manager Churchland	1
Key role (protagonist)	Marketing Manager Marthiensen	1
Key role (protagonist)	R&D Manager Rudolph	1
Key role (protagonist)	R&D Engineer Ingham	1
Supporting role (protagonist)	Market Expert Barney	1
Minor role (observer)	Business Unit Manager Churchland	3
Minor role (observer)	Marketing Manager Marthiensen	3
Minor role (observer)	R&D Manager Rudolph	3
Minor role (observer)	R&D Engineer Ingham	3
Minor role (observer)	Market Expert Barney	3

As outlined in Table 5-1 above, in this way the *Intrapreneurship Game* can accommodate groups of at least 10 and at most 20 players – that is, five protagonists and five groups of up to three corresponding observers. All players need to adopt one of the following roles that have backgrounds, personalities, motivations, interests, goals, capacities, abilities and competencies in order to perform a certain presumed behavior.

The role of the *R&D Engineer Ingham* represents the individual level of the intrapreneurship process. Having discovered *LEO Fiber*, Ingham is a nascent intrapreneur, who has already invested considerable effort into exploring the opportunity. Intrapreneurs champion new ideas from discovery to complete profitable reality inside of existing companies. They are demanding, passionate, persistent and willing to fight for their project. The role of *Ingham* is an organizational role – or even a role-model – that is essential for fostering radical innovation within the corporate environment. Therefore, it is *Ingham*'s desire and goal for the meeting to get the management's full commitment to the exploitation of the opportunity. To become a successful intrapreneur in the end, *Ingham* needs to win allies, supporters and promoters.

The organizational level of intrapreneurship is represented by three managerial roles that assume positions and goals that contravene those of the engineer-intrapreneur. Following Mintzberg's (1971) and Busenitz and Barney's (1997) descriptions, they can be specified as follows. Managers have to deal with both a great quantity and variety of work, and they need to concentrate on issues that are current, specific, and *ad hoc*. Managers are described as planners and organizers and they adhere to rules and broadly accepted norms of behavior. They are quota and budget watchers, look forward to a predictable pay check and, in many instances, a fairly predictable bonus and are rewarded for minimizing risks. Managers are professional and predictable in their decision-making requiring empirical evidence to be able to make decisions.

Churchland, who is the manager of the *Business Unit Performance Materials,* is at senior management level. Top management is essential for intrapreneurship and should make a firm commitment to support intrapreneurship on a continuous basis, independent of variations in sales volume in relation to the business cycle (Burgelman, 1983a). In order to encourage engineers to take initiative as intrapreneurs, it is the top management's task to communicate and fill with life the organization's vision, goals and strategy and shape a culture that promotes radical innovation (Higgins, 1995a; Leifer et al., 2000; McAdam & McClelland, 2002; Nicholson, 1998). However, usually management focuses on the short-term and addresses existing markets with enhanced products that are developed on the basis of well-

identified customer needs. Therefore, *Churchland* regards the potential of *LEO Fiber* skeptically in order to cause problems for the engineer.

Both the *Marketing Manager Marthiensen* and the *R&D Manager Rudolph* are at middle management level that plays a central role in the intrapreneurship process (see Hornsby et al., 2002; Mair, 2005). For instance, they select and support entrepreneurial actors and their projects (Burgelman, 1983a); they do not only seek and pursue opportunities, but also bring them to life (Kanter, 1983, 1985) and translate them into organizational outcomes (Burgelman, 1983a); they actively promote ideas, build support, overcome resistance and ensure that innovative ideas are implemented and followed upon (Howell & Higgins, 1990a, 1990b). However, many of their actions are also constrained by the policies and operating procedures of the organization (Shrode & Brown, 1970). Under these circumstances, most of the middle-level managers either consciously or unconsciously follow a comfortable routine in their regular activities.

In large, established companies with mainly incremental product developments marketing's focus lies on the current business, avoiding and reducing high risk inherent in radical innovation. Marketing's task is to analyze and provide believable market information, analyze and reduce risk, and monitor competitors. As outlined in Chapter 4, Section 4.2, new product initiatives originating from R&D are generally seen skeptically. Hence, the *Marketing Manager* does *a priori* not support *Ingham*'s new product proposal, an attitude that helps to make the latent conflict arise: *LEO Fiber* does not fit into the company's range of products; there is no market it can be sold to; and there is a time conflict with existing projects. Only limited resources can be dedicated to long-term research, such as six months for a market study.

Being responsible for R&D, the *R&D Manager* generally favors technological advancement and would not be opposed to any long-term research. Indeed, *Rudolph* is expected to be open but at the same time reserved towards *Ingham*'s new product proposal since he or she has to guarantee the success of his current projects, while at the same time the research on a new project costs extra money. *Rudolph* is pushed by top management to focus on current business and incremental product innovations that lead to quick and safe returns. Therefore, the room for radically new developments is limited, and there will not be any free budget during the current fiscal year. As outlined in Chapter 4, Section 4.2, this internal conflict is reinforced by an external conflict with marking. As a consequence, *Rudolph* has to decide between supporting *LEO Fiber* and guaranteeing for the ongoing and planned R&D projects.

The supporting role of the independent *Market Expert Barney* is not part of the underlying conflict scenario and, as a consequence, the game space. It is a consulting role that has the objective to support or advise the four key roles by giving moral support and providing critical information that could influence, facilitate or even change the course of the simulation (van Ments, 1999). Supporting or consultant roles may be most helpful in role-plays that have a high degree of complexity and when it is difficult to decide on a variety of alternatives. Hence, *Barney*'s objective is to trigger the simulations process towards the desired outcome (that is, a commonly made decision on *LEO Fiber*) by providing information that underscores the prospects of the business opportunity and, thereby strengthens indirectly the position of the engineer. The face validity of this role consists of the analogy to real life situation (van Ments, 1999).

5.2 The procedure for playing the simulation game

Having described the scenario that is simulated in the *Intrapreneurship Game*, this section presents the procedural format for playing the simulation game – that is, for making the scenario available for the participants.

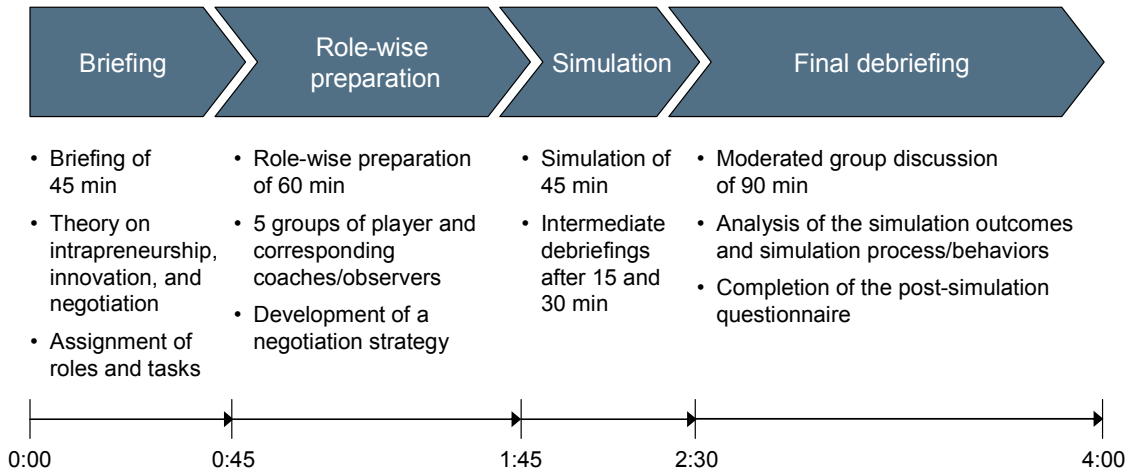


Figure 5-2: Procedural format of the *Intrapreneurship Game*

As depicted in Figure 5-2 above, the procedural format comprises three main phases that are described in the following subsections: briefing and role-wise preparation phase (Section 5.2.1), the execution of the simulation game itself including intermediate debriefings (Subsection 5.2.2), and the final debriefing including the evaluation of the simulation experience (Subsection 5.2.3).

5.2.1 The briefing and role-wise preparation phase

The *Intrapreneurship Game* starts with a briefing session of 30 minutes, the purpose of which is to introduce the simulation game to the participants by addressing the objectives and the procedure, the technique itself, the scenario's background situation and the tasks to be accomplished by the players of the key, supporting and minor roles. It is important that the briefing is well designed because the manner in which information is given to the players is readily assumed to have significance over and above what may be intended by instructors (Yardley-Matwiejczuk, 1997). Therefore, the design of the briefing session is rather straight forward. It is important to give a manageable dose of information to the participants in order to prevent information overload.

The briefing starts with positioning the simulation game within the larger, day-to-day context of the players. Often the players have to be motivated first to take an active part in the simulation (van Ments, 1999). The facilitator may use the subject itself, including presentations, group assignments, mini-exercises or case studies and/or discussions in order to motivate the players. Alternatively, smaller scale warming-up role-plays different to the main simulation may be used to generate a playful atmosphere and familiarize the players with the simulation and gaming technique. Next, the key, supporting and minor roles that the players will assume in the simulation are allocated. Finally, the set of gaming materials are administered to the players (see Appendix A).

After the briefing, the players have 60 minutes to develop role-specific negotiation strategies. Preparing in groups of key, supporting and minor roles, they are encouraged to use both the information given in the materials as well as their personal expertise and experience. In this way, the players interpret the given information and act in the simulation accordingly to what they would most likely do on reality. Role-wise preparation in groups is especially powerful when the game scenario is based upon rival teams; Ladousse (1992) sees practical and psychological reasons for this approach. During the preparation phase, the facilitator should frequent each single group to help and clarify any questions. It is important that all players are briefed and consulted in the same way.

The briefing usually ends with a short summary discussion intending to clarify open issues. Here, the facilitator should listen carefully as to whether all the players have fully understood the scenario of the simulation game as well as the roles and tasks they have to perform in the simulation (van Ments, 1999). The underlying conflict of intrapreneurship must be clearly recognized by all players because it represents the point of departure and the basic framework

that the players can refer to when developing individual strategies towards a shared understanding, cooperation and conflict resolution.

5.2.2 The simulation including intermediate debriefings

Preferably, the negotiation takes place in a room with a round negotiation table providing equal power conditions for the four key players, as well as comfortable position for the supporting role and the minor roles who act as observers. The players of the four key roles are asked to take a seat at the negotiation table. The player of the supporting role attends the meeting by sitting aside of the main negotiation actors, ready to intervene. The players with the minor roles are placed *vis-à-vis* their corresponding key and supporting roles, but stay within a reasonable distance to the negotiation table in order not to disturb the meeting. This setting is illustrated in Figure 5-3 below.

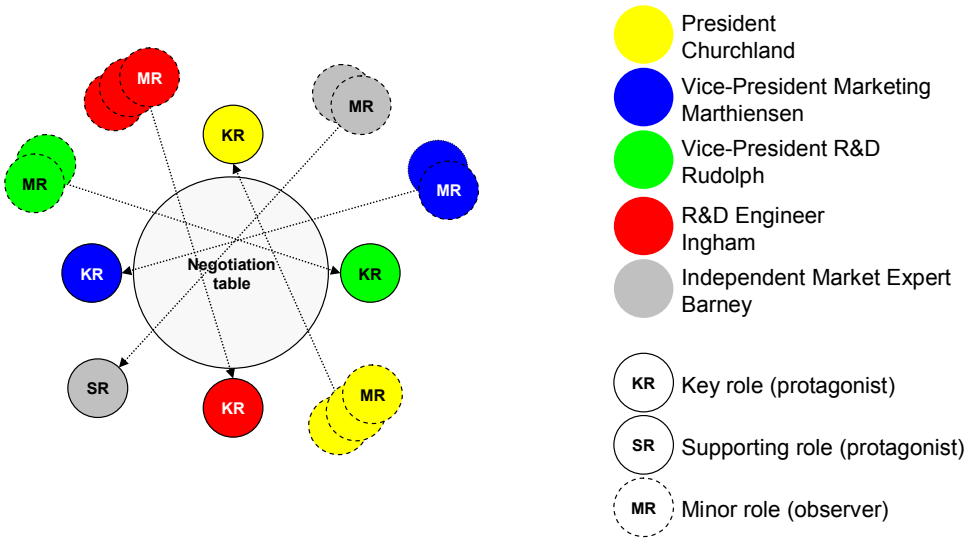


Figure 5-3: Physical arrangement of the simulation (fish-bowl technique)

This setting is also referred to as the fish-bowl technique as opposed to the multiple technique that builds on parallel simulations with smaller groups of protagonists (van Ments, 1999). This means, that one central simulation is run by the protagonists who are coached and observed by the rest of the group of players. It is one of the advantages that this technique allows for a detailed way of observation. Thanks to the involvement of the observers almost nothing remains unseen. On top of that, the whole group shares the same experiences. A more artificial atmosphere might be disadvantageous to the simulation process and outcomes.

Before the simulation can start, the rules of the simulation need to be set. Rules shape the game space – that is, they correlate the roles, define the set of game positions, and determine how these positions are or can be manipulated during the course of the simulation game

(Klabbers, 1999). As specified in Chapter 3, Section 3.3 , the *Intrapreneurship Game* is a role-play in the form of an exploratory simulation game that is based on open-ended learning objectives (free-rule game). Therefore, it is important that the initial game positions, including the correlation of the roles, are clearly defined upfront and that intermediate and final game positions are not pre-determined. The latter emerge during the course of the simulation as the result of the interaction between the players.

To define the game space and the roles' initial game positions, it is necessary to draw on negotiation theory. As outlined in Section 5.1, the intrapreneurship process and its underlying conflict are simulated by means of an intra-organizational negotiation encounter, during the course of which a decision is to be made in regard to opportunity exploitation. Thereby, the latent conflict of intrapreneurship, as modeled in Chapter 2, Section 2.2, is emerging from the extremely antagonistic positions of the individual and the organizational level of intrapreneurship. The negotiation parties have the objective to discuss their diverging interests and to resolve the conflict by reach a compromise because they see benefits in doing so (Mastenbroek, 1989; Ulijn & Strother, 1995).

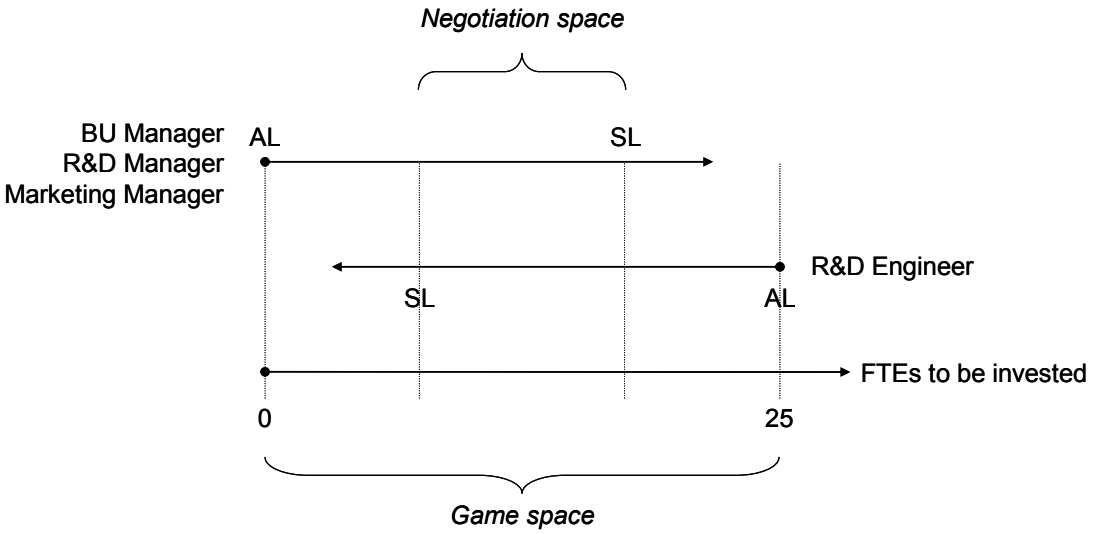


Figure 5-4: Game and negotiation space of the *Intrapreneurship Game* (adapted from Lincke, 2003)

As visualized in Figure 5-4 above these extreme positions represent the roles' aspiration level (AL) referring to the level of achievement that each role desires to take on during the negotiation (Lincke, 2003; Ulijn & Strother, 1995). Together, the ALs of all roles constitute the *game space* – that is, the entirety of all possible game positions that can be taken in the course of the simulation. The ALs are defined in terms of *full-time employees (FTE)* that the negotiation parties desire to invest into the exploitation of the opportunity. While the three

managers have a given AL of 0 FTE, the engineer's initial gaming position refers to an AL of 25 FTE. Hence, at the outset of the simulation the managers are not willing to support *LEO Fiber*, whereas the engineer aims at getting a commitment to 25 FTE to be invested in the development of *LEO Fiber*.

The *negotiation space* represents the entirety of all possible, commonly acceptable decisions. It can be created, if the negotiation parties depart during the course of the negotiation from their initial ALs towards individually defined satisfaction levels (SL). The SL refers to the lowest level of achievement that each negotiation party can accept to finish the negotiation successfully (Lincke, 2003; Ulijn & Strother, 1995). If the roles keep their initial gaming positions – that is, if they do not depart from their ALs towards a lower or higher SL – the negotiation space will not open up and, as a consequence, a mutual agreement is not possible. For instance, a decision is possible if the R&D engineer's SL 10 FTE and the managers ' SLs together sum up to 20 FTE.

The simulation takes 45 minutes during which intermediate time-outs are planned after 15 and 30 minutes. These intermediate or in-session debriefings of approximately 3-5 minutes are particularly important in long simulation games that last for more than 15-20 minutes (Crookall, 1995). These constructive time-outs literally interrupt the simulation process and force the players to delay the negotiation in order to recapitulate on what has been achieved so far and to get a clearer picture of each party's negotiation situation and position. Intermediate debriefings are essential in order to turn closed and deadlocked negotiation situations into constructive time-outs, a strategy that helps to widen the negotiation space and facilitate, in turn, the entire negotiation process (Ulijn & Strother, 1995). After the intermediate debriefings the simulation continues at the point where it had interrupted.

Ideally, the simulation ends as soon as the players conclude the negotiation meeting with a collectively made decision. Only if the meeting's result is a mutual agreement that definitively aims at a win-win-situation, the intrapreneurship process will continue to be beneficial for both the intrapreneur and the management. If a collectively accepted decision can not be made within the given timeframe of 45 minutes, the facilitator should intervene and stop the simulation. This helps to avoid the so-called end-effect that typically arises when players are forced (by the facilitator) to make a decision or to properly close the simulation. Still, it is fact of real-life that people are forced to make a decision because of critical incidents, external factors or the environment.

Negotiation should imply to get in the end a clear decision on opportunity exploitation that is based upon a mutual agreement. In this case, however, the simulated negotiation can be

seen as the beginning of a longer, iterative negotiation process. One can not expect that a single negotiation encounter will necessarily end with a clear decision. A clear decision is certainly a sort of ideal target outcome, but it is not the objective of the *Intrapreneurship Game*. As specified in Chapter 3, Section 3.2, the purpose of the simulation game is to create awareness of and provide insight into a culture that is conducive of intrapreneurship in industrial R&D.

5.2.3 The final debriefing

The simulation ends with the final debriefing. Being the reversal of the briefing process, it is the deliberate and facilitated discussion by which the players reflect upon the experiences gained in the simulation in order to enable positive, long-lasting learning for real situations in the future (Crookall, 1992; Geurts et al., 2000; Lederman & Kato, 1995; Thatcher, 1990). It gives the participants the possibility for an authentic and spontaneous communication and discussion (Klabbers, 2003b; Lederman & Kato, 1995; Peters & Vissers, 2004). There is a clear connection between the information put into the role-play and the information extracted from it because by deliberately taking a step back, the meaning of the enactment is clarified, awareness and insight are created, and learning objectives are manifested (van Ments, 1999).

Moreover, the debriefing helps to build a comprehensive picture of what did happen in the simulation and enables learning on a collective level. Since the players see only these parts that their positions allow them to, they have a limited picture of what happened on a collective level. However, learning should not be individual-oriented – that is, based on introspection alone – but rather collective in the form of mutual perception, joint analysis and reconstruction of what has happened during the simulation game (Peters & Vissers, 2004). Hence, the comprehensive view is based on insights of all players of key, supporting and minor roles as well as the facilitator and observing experts. In this way – which is in analogy to reality – a reference is made to the environment and the constituency of the key players.

The debriefing process builds upon two underlying assumptions: first, that the simulation experience has affected the participants; and second, that a discussion of the experience will enhance the participants' ability to learn from that experience (Lederman & Kato, 1995). In this sense, it should assist the participants in making an analysis of events and processes, of their own and others' contributions, and help them to draw conclusions and lessons for future real situations. Although the debriefing should be conducted in an atmosphere of comfort and openness, it requires a systematic design to contribute to the effective design and implementation of simulation (Lederman & Kato, 1995).

Both French and Bell's (1999) model of the iceberg and Gill's (2000) framework of the cognitivity dimensions of learning and knowing suggest to distinguish between a discussion of the explicit knowing referring to facts and outcomes and the implicit knowing referring to the deep and instinctive feelings and emotions that participants encountered during the simulation (Klabbers, 2003b; Ulijn & St. Amant, 2000). Accordingly, the debriefing process should include the following three stages (see Table 5-2 below).

Table 5-2: The three stages of the debriefing process (Lederman, 1992; Lederman & Kato, 1995; van Ments, 1999)

1. Referring to the visible top of the iceberg, the debriefing starts with a systematic inventory of facts and outcomes referring to the explicit clearly the visible top of the iceberg (what did happen?).
2. Next, the simulation process is analyzed and personalized referring to the invisible bottom of the iceberg (how and why did it happen?). From a learning viewpoint it is worthwhile to share emotions such as human relations and unconscious rules of behavior experienced in the simulation (Klabbers, 2003b).
3. To link the participants' immediate simulation experience with the broader context of day-to-day reality, the debriefing ends with conclusions regarding the generalization and application of the simulation experience.

The debriefing can take place immediately after the simulation or sometime later, but in order to have a maximum effect, it is recommended that it follows soon after the enactment itself; it should last at least as long as the actual simulation, ideally two to three times as long (van Ments, 1999). This provides room to address the group-level simulation outcomes and process as well as the individual level achievements and behaviors. To support an in-depth analysis, the entire debriefing session is audio-recorded, as well as flip-chart notes are made to summarize and visualize the analysis and compile minutes of the debriefing. Finally, a post-simulation questionnaire is administered to the participants (see Appendix B).

5.3 Indications and contra-indications for usage

The final design of the *Intrapreneurship Game*, as presented in the previous sections, is the result of the cyclic-iterative design process during which it has been theoretically grounded and field-tested. Given this, this section derives – in analogy to the packaging insert of pharmaceuticals – indications and contraindications for applying the simulation game. Whilst indications are valid reasons, contraindications refer to conditions or factors that increase the risks or ineffectiveness of application. In other words, the indications and contraindications refer to the question as to under which conditions the simulation game should be used or not.

Obviously, the risk of applying the *Intrapreneurship Game* in industrial R&D is certainly not comparable to the risk of the wrong use of pharmaceuticals. The simulation game can be regarded as a mental exercise rather than a sort of medication so that it is more a question of

how much does the host organization and players gain from the intervention than loose or even risk something. In the following, these conditions are discussed in regard to the four design parameters that have been specified in Chapter 3, Section 3.2: a) purpose, b) subject matter, c) participants, and d) context of use.

5.3.1 Indications

Regarding the *purpose* of the *Intrapreneurship Game*, it is indicated for usage, if the host organization aims at shaping an intrapreneurship-conducive culture or influencing the current culture into the desired direction, because it seems to be lacking. Moreover, it can be used if, besides the organization itself, each individual player features a learning attitude and a general openness towards cultural change. People can only gain awareness of and insight into this new culture, if the participants are empathetic and willing to learn.

In respect of the *subject matter*, the simulation is indicated for application, if innovation and intrapreneurship are considered to be important and the underlying conflict – as described in Chapter 2, Section 2.2 – looms to emerge within the host organization. The simulation game offers an opportunity to interactively develop solutions to the potential real-life conflict and to apply and test these solutions in a safe but realistic environment involving a diversity of stakeholders that are typically involved in intrapreneurship processes.

On the level of the target group of *participants*, the *Intrapreneurship Game* is suited, if the group is composed of professional R&D engineers and scientists. By their education and professional experience, they have the ability and knowledge to push for radical innovations. Yet, many engineers and scientists – most of which remain employed by a firm – seem to show characteristics that might impede intrapreneurship.

In regard to the *context of use*, the simulation is indicated for use, if it is applied in the form of an independent or stand-alone intervention within the context of industrial R&D. Purposeful intrapreneurship programs and trainings became over the past years an increasingly relevant element of organizational training programs. They can be effective facilitators to activate the intrapreneurship potential that might be hidden in industrial R&D.

5.3.2 Contraindications

The *Intrapreneurship Game* is contraindicated for usage, if the simulation would not effectively serve its *purpose* – that is, if an intrapreneurship-conducive culture is already present and/or if the host organization does see any need and value-added to promote such a

culture. Thus, there must be a general willingness to create room for intrapreneurship and, more importantly, to shape a cultural environment that is conducive of intrapreneurship in industrial R&D. This includes that players need to participate voluntarily. Moreover, it is not suggested for use, if the host organization's objective is to change the behavior of people or effectuate a fully-fledged cultural change towards an intrapreneurship-friendly organizational setting. Referring to the onion metaphor of culture presented in Chapter 4, Section 4.1, the *Intrapreneurship Game* can sensitize people with respect to the layers of norms, values, attitudes and perceptions, but it is not powerful enough to change the inner, very implicit heart of culture.

Regarding the *subject matter*, the simulation is contraindicated for application, if innovation and especially radical innovation are not part of the corporate agenda. For an effective use of the simulation game, the players need to be able to recognize from reality the intrapreneurship conflict. For instance, organizations that pursue in respect of innovation a fast-follower or imitator strategy might not take advantage of an intrapreneurship-conducive culture because intrapreneurship processes are less likely to occur in reality. Furthermore, the simulation would not have any effect, if the host organization currently encounters a major change process, restructuring program or crisis that require full attention and focus of all managers and employees. In such cases a short-term perspective prevails most probably over a long-term perspective into the future and the need to stimulate awareness of an intrapreneurship- and innovation-friendly culture.

With reference to the group of *participants*, it is not advised to apply the simulation, if the players are too familiar with the simulation's technological scenario. The field-testing clearly revealed that the players should have a certain distance to the technology that is simulated. Otherwise the gaming aspects of the simulation tend to disappear and the simulation process becomes subject to a number of constraints that limit the room for exploration and development of cultural knowledge, such as fixed goals, stable negotiation positions or a detail-focused negotiation style on the part of the participants. Moreover, the simulation is expected to be not or less effective, if the target group involves professional cultures other than those of R&D engineers and scientists. The simulation is conceived, tested, and optimized for the use with professional R&D engineers and scientists. There is no evidence as to whether it will likewise work with other professions, such as production engineers, accountants, human resource employees, and the like.

As far as the *context of use* is concerned, the *Intrapreneurship Game* is contraindicated for usage, if it is used in corporate cultures that are not typical for large, established industrial

firms. The simulation proved its effectiveness in four corporate cultures that were different but typical for large, established industrial firms. Service, finance, or trade companies were not part of the developing multiple-case study.

Chapter 6

Development and testing

Having presented the final design of the *Intrapreneurship Game* in Chapter 5, this chapter presents the underlying empirical evidence that was gained from a developing multiple-case study that was based upon 16 consecutively conducted cases studies involving 270 participants. The following detailed case analysis provides in-depth insight into how the design of the simulation game was stepwise developed and improved, resulting in a final theoretically grounded and field-tested design proposition: *"In order to promote intrapreneurship in industrial R&D (C), one can use a scenario-based simulation game (I), which will through experiential learning (M) create awareness of and insight into an intrapreneurship-conducive culture (O)"*.

The cyclic-iterative nature of the design process implies that the design of the simulation game and its contextual conditions of application changed from case to case or vary from version to version. Hence, results and effects achieved in earlier cases do not necessarily correspond to and can not be compared with results and effects realized in later applications. Therefore, to gradually construct and substantiate the empirical evidence, the mainly qualitative data is analyzed according to the logic of analytic progression from *what* to *how* to *why* (Miles & Huberman, 1994). Given this, the chapter is structured as follows.

Section 6.1 gives an overview of the eleven pre-tests that were conducted at technical universities in Germany and the Netherlands involving 219 international engineering students. Based on the results of the pre-testing, Section 6.2 analyzes the five applications that were conducted in the scope of the field-testing within industrial R&D organizations in France, Germany and the Netherlands involving 51 industrial professional engineers and scientists. Each of the latter five cases is analyzed in regard to both the observable simulation outcomes and the rather implicit simulation process.

Based on that, Section 6.3 develops and evaluates prerequisite design conditions by means of an aggregated cross-case analysis. This includes a reflection upon the scenario and its closeness to reality (referring to ecological validity or game fidelity), as well as an analysis of the procedure that is applied to make the scenario available for the players (referring to reliability). Section 6.4 attempts to prove that the simulation game is an effective intervention

to create awareness of and provide insight into an intrapreneurship-conducive culture. Finally, Section 6.5 summarizes the findings and derives implications for applying the game within the context of industrial R&D.

6.1 Pre-testing with engineering students

Departing from the initial concept design (V1.0) that was adapted from Ulijn et al.'s (2004b) entrepreneurial business plan negotiation simulation, the *Intrapreneurship Game* was pre-tested at technical universities in Germany (four applications) and the Netherlands (seven applications) involving a total of 219 engineering students. As summarized in Table 6-1 below, the eleven cases studies (cases A-1 to A-11) were conducted between October 2004 and July 2006.

Table 6-1: Pre-testing with engineering students

Case	Institution	Participants
A-1	TU Eindhoven, Department of Technology Management (NL)	23
A-2	TU Darmstadt, Institute of Business Administration (DE)	18
A-3	TU Eindhoven, Department of Technology Management (NL)	20
A-4	TU Eindhoven, Department of Technology Management (NL)	12
A-5	TU Darmstadt, Institute of Business Administration (DE)	9
A-6	TU Darmstadt, Institute of Business Administration (DE)	11
A-7	TU Eindhoven, Department of Technology Management (NL)	22
A-8	TU Delft, Faculty of Aerospace Engineering (NL)	11
A-9	TU Eindhoven, Department of Technology Management (NL)	71
A-10	TU München, Department UnternehmerTUM (DE)	9
A-11	TU Eindhoven, Junior Enterprises World Conference 2006 (NL)	13
Sum		**219**

All applications were embedded in courses or seminars on innovation management, (technical) entrepreneurship, international business negotiation, or research methodology. Empirical evidence could be gained by using three different data collection methods: moderated group discussions, post-simulation questionnaires and personal memos. The following eleven case tables provide the main information about each case, including a brief description of the scenario that was used in the simulation and the major conclusions that could be drawn from each case to improve the scenario and the procedure. In this early phase of pre-testing, a standard procedure for evaluating, analyzing and improving the simulation game was not yet available. This was developed in the course of the cyclic-iterative design process resulting in the *User Manual* that is enclosed in Appendix B.

Table 6-2: Case A-1 (TU Eindhoven, NL)

Underlying scenario	• Case: DigPrint (new digital photo printer) • Roles: The CEO of R&D, The CEO of Marketing, The Intrapreneur, The Marketer
Lessons learned to improve the scenario	• Not enough conflict in the simulation. • The technology was not radical enough. • The business plan, especially the numbers were inconsistent. • The payback period of 8 years was perceived as too long. • The role-briefs were lacking clear objectives as well as norms, values, behaviors and attitudes that are deemed to be characteristic for the roles.
Lessons learned to improve the procedure	• A well structured briefing to the simulation was missing. • The participants missed an introduction to the technique of simulation. • The preparation time was too short to process the amount of given information. • The participants missed room for informal talks before the simulation. • The observers did not feel involved in simulation. • Complementary role-briefs were not distributed at the end of the simulation.

Table 6-3: Case A-2 (TU Darmstadt, DE)

Underlying scenario	• Case: CamTechnologies (Optical-Tape-Based Mass Storage (OTB-MS)) • Roles: The Chairman, The Director of Marketing, The Director of R&D, The Intrapreneur
Lessons learned to improve the scenario	• The description of the background situation was too complex. • The new technology was too complex and difficult to understand. • The advantages of the new product were not evident to compensate the inherent risks. • The role of the intrapreneur was not convincing enough.
Lessons learned to improve the procedure	• The role-briefs were too detailed and difficult to understand. • The preparation time was too short to process the given information. • The debriefing was not sufficient to reflect on simulation comprehensively. • The observers had difficulties observing their corresponding players. • Video recording could be used to facilitate the observation.

Table 6-4: Case A-3 (TU Eindhoven, NL)

Underlying scenario	• Case: WMB Automobiles (Air-Engine for busses, trucks and cars) • Roles: The Chairman (Mr. Churchland), The Marketing Director (Mr. Marthiensen), The Director of R&D (Mr. Rudolph), The Intrapreneur (Mr. Ingham)
Lessons learned to improve the scenario	• The general background situation was partly not understood. • The technology was not realistic: the idea of the air engine is far-fetched. • The individual goals were not specific and clear enough. • Marketing Director: the role was too weak. • Director of R&D: the role was not clear. • The role briefs did not contain sufficient information about “feelings”.
Lessons learned to improve the procedure	• The briefing and the preparation time were not sufficient. • In preparation phase the groups (role-wise) were in ear-shot distance. • The role-briefs could not be distinguished by color. • The observers did not feel involved both in the simulation and the debriefing. • A checklist or guide for observers was missing.

Table 6-5: Case A-4 (TU Eindhoven, NL)

Underlying scenario	• Case: HAIDO (Electron Emitting Organic Fibers (EEOF)) • Roles: The Chief Executive Officer (C. Churchland), The director of the R&D department (R. Rudolph), The Intrapreneur (I. Ingham), The R&D manager of OPTIVISION (M. Marthiensen)
Lessons learned to improve the scenario	• The scenario was not conflictive enough to force the emergence of intrapreneurship. • The Intrapreneur: the role was not realistic enough. • CEO Churchland: the role was too positive and did not cause enough conflict. • R&D Manager of OPTIVISION: the role was not realistic at all. • The individual aspiration and satisfaction levels were not well-defined. • The relationships between the roles were not clear to the players. • The players missed facts, numbers and targets in terms of costs and/or benefits.
Lessons learned to improve the procedure	• Both the briefing and preparation time were too short. • The time-out occurred too late in the simulation. • The observers did not feel involved in the simulation. • The observers missed a questionnaire to evaluate the simulation.

Table 6-6: Case A-5 (TU Darmstadt, DE)

Underlying scenario	• Case: HAIDO (Electron Emitting Organic Fibers (EEOF)) • Roles: The Chief Executive Officer (C. Churchland), The director of the R&D department (R. Rudolph), The Intrapreneur (I. Ingham), The R&D manager of OPTIVISION (M. Marthiensen)
Lessons learned to improve the scenario	• The scenario was not realistic because the decision on LCD vs. OLED is already made. • The description of the background situation was lacking business relevant data. • R&D manager of OPTIVISION: the role was not realistic. • CEO Churchland: the role was not realistic; a business line manager would suit better.
Lessons learned to improve the procedure	• The briefing was not sufficient. • The players did not understand the concept behind aspiration/satisfaction level. • An agenda of the meeting was missing. • It was not clear that the players themselves have to make a decision in the end. • A debriefing guide was missing.

Table 6-7: Case A-6 (TU Darmstadt, DE)

Underlying scenario	• Case: HAIDO (Electron Emitting Organic Fibers (EEOF)) • Roles: The Chief Executive Officer (C. Churchland), The director of the R&D department (R. Rudolph), The Intrapreneur (I. Ingham), The R&D manager of OPTIVISION (M. Marthiensen)
Lessons learned to improve the scenario	• The scenario was not conflictive enough. • CEO Churchland: the role did not chair the negotiation. • R&D director Rudolph: the role was lacking internal and external conflict. • R&D manager of OPTIVISION: the role would not be involved in a first meeting. • The roles did not provide enough room to develop the role and the situation. • The relationships between the roles were not clear to the players. • Instead of “emotions” and “feelings” more facts should be given in the role-briefs.
Lessons learned to improve the procedure	• The briefing should better respect the experience and skill level of the participants. • The players missed an introduction to negotiation theory and skills. • The preparation time was too short to process the given information. • The observers did not feel involved in the simulation. • Periodic time-out to trigger the simulation through critical incidents were missing. • A scale to evaluate the achievement of the aspiration/satisfaction levels was missing.

Table 6-8: Case A-7 (TU Eindhoven, NL)

Underlying scenario	• Case: HAIDO (Light Emitting Organic Fiber (LEO Fiber)) • Roles: C. Churchland – Business Unit Manager, M. Marthiensen – Marketing Manager, R. Rudolph – R&D Manager, I. Ingham – R&D Engineer, B. Barney – Business Consultant
Lessons learned to improve the scenario	• Instead of a new technology, a clear radical product innovation should be given. • The lack of conflict calls for more antagonistic aspiration levels. • The negotiation space (defined by the satisfaction levels) should be extended to provide more room to maneuver. • Business Unit Manager Churchland: the role needs to be strengthened. • R&D Manager Rudolph: the role must be improved. • R&D Engineer Ingham: the role must be strengthened by both stronger in personal skills and more supporters in the simulation. • Business Consultant Barney: the role and objectives must be clearer beforehand, and the role should intervene earlier the negotiation earlier. • More financial figures should be given.
Lessons learned to improve the procedure	• More information about the other roles should be given in the briefing or the game instructions. • The preparation time should be extended. • The gaming/negotiation time should be extended.

Table 6-9: Case A-8 (TU Delft, NL)

Underlying scenario	• Case: HAIDO (Light Emitting Organic Fiber (LEO Fiber)) • Roles: C. Churchland – Business Unit Manager, M. Marthiensen – Marketing Manager, R. Rudolph – R&D Manager, I. Ingham – R&D Engineer, B. Barney – Business Consultant
Lessons learned to improve the scenario	• The description of the background situation was overloaded • To shape a negotiation space the roles' satisfaction levels need to overlap. • Business Unit Manager Churchland: the role needs to be strengthened to act more as a Business Unit Manager and chair of the meeting.
Lessons learned to improve the procedure	• More information of the others roles should be given in the briefing/materials. • The preparation time of 45 min should be extended. • The students should be coached more intensively and get help by the facilitator/business professionals to define realistic satisfaction levels. • The post-simulation questionnaire needs to be shortened.

Table 6-10: Case A-9 (TU Eindhoven, NL)

Underlying scenario	• Case: HAIDO (Light Emitting Organic Fiber (LEO Fiber)) • Roles: Business Unit Manager Churchland, Marketing Manager Marthiensen, R&D Manager Rudolph, R&D Engineer Ingham, Business Consultant Barney
Lessons learned to improve the scenario	• Business Consultant Barney: the role was not effective enough
Lessons learned to improve the procedure	• The number of observers needs to be reduced.

Table 6-11: Case A-10 (TU München, DE)

Underlying scenario	• Case: HAIDO (Light Emitting Organic Fiber (LEO Fiber)) • Roles: Business Unit Manager Churchland, Marketing Manager Marthiensen, R&D Manager Rudolph, R&D Engineer Ingham, Business Consultant Barney
Lessons learned to improve the scenario	• One single meeting to make the decision on the pursuit of LEO Fiber was perceived as unrealistic. • Business Unit Manager Churchland: the role requires good leading and moderating skills. • R&D Manager Rudolph: the role had only minor parts in the beginning of the negotiation. • Marketing Manager Marthiensen: the role needs to stress more the market requirements.
Lessons learned to improve the procedure	• Not applicable.

Table 6-12: Case A-11 (TU Eindhoven, NL)

Underlying scenario	• Case: HAIDO (Light Emitting Organic Fiber (LEO Fiber)) • Roles: Business Unit Manager Churchland, Marketing Manager Marthiensen, R&D Manager Rudolph, R&D Engineer Ingham, Business Consultant Barney
Lessons learned to improve the scenario	• Marketing Manager Marthiensen: the role was a bit off the area of conflict and achieved the goals too easily. • Business Consultant Barney: the role was not clear and could, as a consequence, not effectively influence the simulation process. • The amount of information, especially in the form of numbers, should be reduced.
Lessons learned to improve the procedure	• Not applicable.

The main objective of the pre-testing with engineering students was to substantiate the underlying conflict scenario, prove the simulation game's general effectiveness and learn what procedural format would be most suited to make the scenario available for the players. In the course of the pre-testing various designs have been applied and tested, including major changes in respect of both the scenario and the procedure. For instance, the technological scenario has been changed several times, roles have been added and/or replaced, and the procedural format has been altered and complemented.

Although engineering students, as possible future R&D engineers and managers, may represent a pertinent target group, the findings of the pre-testing phase have their limitations.. The context of pre-testing differs strongly from the intended context of use and, more importantly, students most probably lack business experience. Hence, it is likely that both the simulation process and outcomes do correspond to the reality in industrial R&D. Valid and robust conclusions can not be drawn for applying the *Intrapreneurship Game* in the context of industrial R&D. Nonetheless, the evidence gained from the pre-testing can be seen as a major

step towards the following field-testing in industrial R&D; approaching the field without a series of pre-tests would have been an enormous risk.

6.2 Field-testing with professional R&D engineers and scientists

Based on the results of the pre-testing with international engineering students, the *Intrapreneurship Game* was further field-tested and improved within the context of industrial R&D. To prove whether it works its intended context of use, five cases studies involving a total of 51 professional R&D engineers and scientists were carried out between July 2005 and April 2006 consecutively in France, Germany, and the Netherlands (see Table 6-13 below).

Table 6-13: Testing with professional R&D engineers and scientists

Case	Industry, institution	Participants
B-1	Electrical/Electronic Industry, Research & Development (FR)	9
B-2	Special materials industry, New Business Division (DE)	9
C-1	Telecommunications Industry, Research & Development (NL)	14
C-2	Electrical/Electronic Industry, Corporate Research (NL)	10
C-3	Electrical/Electronic Industry, Corporate Research (NL)	9
Sum		**51**

In-depth qualitative evidence could be gained from both moderated group discussions (the so-called debriefings with 51 players) and semi-structured, follow-up interviews (with 24 players). As enclosed in the *User Manual* (see Appendix B), a guide was used to structure both the debriefings and the interviews that were tape-recorded, transcribed, then analyzed by coding (Miles & Huberman, 1994). Besides in-depth qualitative data also quantitative-descriptive data was collected. A post-simulation questionnaire was administered to the 51 players of the key, supporting and minor roles.

Table 6-14: Triangulation of sources of evidence and number of participants (number of players of key, supporting and minor roles)

	Moderated group discussion with			Post-simulation questionnaire filled-in by			Semi-structured interviews with		
	KR	**SR**	**MR**	**KR**	**SR**	**MR**	**KR**	**SR**	**MR**
Case B-1	4	1	4	4	1	4	4	0	2
Case B-2	4	1	4	4	1	4	2	0	2
Case C-1	4	1	9	4	1	9	3	1	0
Case C-2	4	1	5	4	1	5	3	1	1
Case C-3	4	1	4	4	1	4	4	1	0
All cases	**20**	**5**	**26**	**20**	**5**	**26**	**16**	**3**	**5**

Key: KR = key role, SR = supporting role, MR = minor role

Table 6-14 above gives an overview of the sources of evidence that were used. It lists for each case study and source of evidence the number of players that were debriefed, surveyed and/or interviewed. A detailed case description and analysis is presented in the following subsections, addressing two levels of analysis: the explicit and observable simulation outcomes (a) and the more implicit simulation process that produced the outcomes (b).

6.2.1 Case B-1: Electrical/electronic industry, R&D (FR)

Case B-1 was hosted by a large, multinational company that has its headquarters in France. In 2005, the company had annual sales of EUR 10,000 million and employed about 58,000 people worldwide. The product portfolio includes technological solutions for nuclear power generation as well as electricity transmission and distribution. The case study was conducted in the R&D unit of the business division *Power Transmission and Distribution*.

Table 6-15: Players of key, supporting and minor roles in case B-1

Role	National.	Education	Job
BU Manager Churchland (KR)	FR	Engineering	VP marketing
BU Manager Churchland (MR)	FR	Electrical engineering	R&D manager
Marketing Manager Marthiensen (KR)	FR	Engineering	R&D manager
Marketing Manager Marthiensen (MR)	FR	Engineering	R&D engineer
Plant Manager Peters (KR)	FR	Materials engineering	R&D engineer
Plant Manager Peters (MR)	FR	Engineering	R&D manager
R&D Engineer Ingham (KR)	DE/FR	Physics	R&D engineer
R&D Engineer Ingham (MR)	MA	Electrical engineering	R&D engineer
Business Consultant McKinzie (SR)	AT	Electrical engineering	VP R&D

Key: KR=key role, SR=supporting role, MR=minor role; FR=French, DE=German, AT=Austrian, MA=Moroccan; VP=Vice-President

As Table 6-15 above shows, the group of players included nine R&D and marketing professionals who mainly have an engineering background. In this first field-test, the intermediate version V2.0 of the *Intrapreneurship Game* was used, a version that was developed on the basis of the results of the pre-testing. In addition, it was modified by using a scenario that was provided by the host organization. The case of *ENGERGY* builds upon the given, underlying conflict scenario of intrapreneurship, but the technological scenario and the roles have been adapted to the specific situation of the company. The radically new product idea was a so-called *Dead Tank Vacuum Interrupter*, a real R&D project that was recently started. Also, the set of roles differed from the standard set-up and included the key roles of the *Business Unit Manager Churchland*, *Marketing Manager Marthiensen*, *Plant Manager Peters, R&D Engineer Ingham* and the supporting role of the independent *Business*

Consultant McKinzie. In the following, the negotiation outcomes (a) and process (b) are analyzed.

a) Negotiation outcomes

The outcome of the simulation is the commitment of the negotiation parties to start a pilot project. The decision that contains elements of intrapreneurship covers the creation of an internal start-up company to be spun off later, staffed with five to six people and funded by corporate money to produce five to ten new *Dead Tank Vacuum Interrupters* in the first year. In this way the customers can familiarize with the new product and, in addition, the US plant that has currently no capacities could be relieved. Nevertheless, more market research is needed, but it has not been clarified where the resources for the market study will come from. Given this overall result, the degree of achievement of both the aspiration level (AL) and the satisfaction level (SL) is evaluated for each role in the following.

The *R&D Engineer Ingham* did not achieve his AL. In the end, he could not convince the mangers that, besides championing the new product and being the first in the market, *ENERGY* should operate as a systems' integrator that develops and manufactures the new product in close cooperation with suppliers. Still, he reached a low SL – that is, to be the first in the market with the new product. The *Business Unit Manager Churchland* did not achieve his AL. His aim was to integrate suppliers in the R&D process, in order to create a *"competitive climate"* and to *"exploit their knowledge"*, but at the same time all components should be developed and manufactured internally. After all, he achieved his SL by making sure that a marketable product will be developed based upon a competitive technology.

The *Marketing Manager Marthiensen* achieved his AL to some extend. It was his predefined goal that the technology and all the product components should be developed and manufactured internally. As a consequence, he also achieved his pre-defined SL – namely, that ENGERGY should develop and market the vacuum technology for high voltage applications. In contrast, the *Plant Manager Peters* did not reach his AL because he disbelieved that the *Dead Tank Plant* has the capacity to develop and industrialize the new product within the expected time horizon of two years. However, he achieved his SL by ensuring that the ongoing restructuring and turn-around processes will not be affected by any new product development project.

The analysis of the players' achievement levels shows that the negotiation resulted in a mutual agreement. Since the AL and SL of the three managers and the engineer overlapped, a negotiation space emerged during the course of the meeting. This served as the basis to make

a commonly accepted decision in the end. The following analysis of the negotiation process provides further insights to explain the simulation outcomes.

b) Negotiation process

In the case of *ENERGY* a real scenario that all the participants were familiar with was used. Hence, the simulation game was perceived to be realistic, perhaps to be too close to reality, a point that some of the participants claimed afterwards. As a consequence, the players were rather acting according to reality and missed to some extent the playing element that they had expected. So, the negotiation was very much affected by the players' day-to-day patterns of behavior and decision making. This could be observed with regard to all role-players. After the time-out after approximately 15 minutes, the players were acting more according to their characters described in the role-briefs and were less affected by their daily patterns of behavior.

The *R&D Engineer Ingham* started into the meeting with a presentation of a technological roadmap to the market. He underscored the relevance and radical newness and listed the shortcomings of the new technology. Being an R&D engineer in real life, he was obviously more concerned with technical issues than with financial or market-related aspects. In the first half, he did not feel comfortable about playing his role. After the time-out, *Ingham* was much more intrapreneurial in his approach, such as clearly stating his AL, being persistent, opportunity-focused and creative, and open towards the others.

The *Business Unit Manager Churchland* opened the meeting with a well-structured introduction, moderated the entire negotiation and concluded the meeting professionally. Basically, he felt comfortable about playing his role, but found that the discussion was lacking structure. He was supposed to promote the technology but – being the head of marketing in real life – he was rather skeptical and focused on market data and cost. To reduce the risk for *ENGERGY*, it was important to him that a reliable and marketable product will be sold and not an immature technology. He signaled already early in the second half of the simulation that he would prefer to postpone the decision.

Having an R&D background, the *Marketing Manager Marthiensen* approached the case from a clearly technical perspective and was, as a consequence, focusing on technical aspects. He did not feel comfortable about playing his role and was rather reserved during the entire negotiation meeting. He complained that not enough facts were given in the game instructions and role briefs. Also, *Marthiensen's* function and position in the simulation was weakened due to the very marketing-like behavior of *Churchland's* role.

The *Plant Manager Peters*, an R&D engineer in reality, felt comfortable about playing his role. Although he stated his AL only in the second half of the simulation, he achieved his SL quite easily. In principle, he was not really challenged to have a more active part in the negotiation. Also, he understood the simulation as a discussion of the technology that would be needed to develop a new product, but not as a meeting to decide on the product strategy and organizational arrangements. Actually, he could not really identify himself with the role.

The external *Business Consultant McKinzie*, who is the *Vice-President R&D* in reality, had a very active part in the discussion. He intervened on his own initiative already very early (within the first 10 minutes), and then again and again throughout the entire simulation. In this way he could open new doors and create room for decision making, such as his proposal of developing a pilot for the Japanese market. He substantiated the information and data indicated in the game instructions by providing personal knowledge and expertise. He definitively could influence the negotiation, helped to re-centre the discussion and facilitated the decision-making process by indirectly shaping the negotiation space.

Altogether, the players came rather quickly to a sort of agreement or consensus. In the simulation, *Ingham* and *Rudolph* achieved quite easily what they were aiming at. Certainly, one reason is that the intrapreneurship conflict did not emerge distinctly enough, a trend that has to be considered for the redesign, or to put it with the words of a participant: *"An intrapreneur can only show his true qualities, if he has to fight for something."* Moreover, the intermediate debriefing was an important step towards a positive outcome. Because of the scenario's closeness to reality, it was a critical design element to sensitize the participants to keep more distance to their day-to-day operational problems. It seems that a very realistic scenario that the players recognize well from their day-to-day work affects too much both the simulation process and outcomes.

6.2.2 Case B-2: Special materials industry, new business division (DE)

Case B-2 was hosted by a large, multinational company that has its headquarters in Germany. The company presents itself as a dynamic technology-based group that has global sales of approximately EUR 2,000 million and employs 17,000 people worldwide. While supplying specialty materials, components and systems, the company aims at reaching a sustainable improvement as to how people live and work. The main markets are household appliances, optics, electronics and pharmaceutical industries as well as the solar energy sector. As shown in Table 6-16 below, nine new business developers and R&D scientists with different

backgrounds in engineering, material science, chemistry and business administration participated in this second field-test.

Table 6-16: Players of key, supporting and minor roles in case B-2

Role	National.	Education	Job
BU Manager Churchland (KR)	US	Material science	R&D scientist
BU Manager Churchland (MR)	DE	Business administration	New business trainee
Marketing Manager Marthiensen (KR)	DE	Engineering	New business manager
Marketing Manager Marthiensen (MR)	DE	Engineering	New business manager
R&D Manager Rudolph (KR)	DE	Industrial engineering	New business manager
R&D Manager Rudolph (MR)	DE	Chemistry	Scientific referent
R&D Engineer Ingham (KR)	US	Engineering	R&D scientist
R&D Engineer Ingham (MR)	DE	Chemistry	R&D scientist
Business Consultant McKinzie (SR)	DE	Business administration	New business manager

Key: KR=key role, SR=supporting role, MR=minor role; DE=German, US=American

The simulation was based upon the *HAIDO* case, design version V2.1 that involves four key roles (*Business Unit Manager Churchland*, *Marketing Manager Marthiensen*, *R&D Manager Rudolph* and *R&D Engineer Ingham*) and one supporting role (*Business Consultant McKinzie*). The negotiation topic was the *Light Emitting Organic Fiber (LEO Fiber)* technology that is also used in the final design of the *Intrapreneurship Game* (see Appendix A). As the host company offers, among other products, glass substrates for the production of flat displays, the players were on a general level familiar with *LEO Fiber*. The simulation outcomes (a) and process (b) that were realized in case B-2 are described in the following.

a) Negotiation outcomes

The overall result of the simulation is the (commonly made) decision to start a three-month trial period to develop a solid project framework including the elaboration of a business plan, application for a patent, and conduct of a market study. It was mutual consent that it is important to keep the innovation process running that was only recently started by the R&D engineer. However, from the perspective of the management, more than the commitment to a trail period would have been unrealistic for this very first meeting, especially if radical changes for the company are the consequence; it definitively makes sense to build up knowledge step by step. On the level of the individual roles, the players achieved the following aspiration (AL) and satisfaction (SL) levels.

The R&*D Engineer Ingham* did not reach her predefined AL because the final decision does not give an answer as to who will be the manager of the R&D project. Still, she achieved her SL because she was satisfied that the project will be taken to the next level. Ultimately,

Ingham could have left the company, but since the intellectual property of the idea belongs to *HAIDO*, it would not make sense to leave the company at that time. If *HAIDO* would decide in three months time to stop the project, *Ingham* might consider buying the intellectual property to realize the project on her own. But the held meeting was too early for this sort of decision.

The *Business Unit Manager Churchland* achieved his AL to a large extent. *LEO Fiber* will be continued within *HAIDO* and, most importantly, the topic will be re-discussed and decided upon in three months time. He agreed on providing a budget of EUR 50,000 to protect and further explore the potentials of the technology and to conduct a market study. Given this, *Churchland* also attained his SL because the enhancement of the current product range will not be affected.

Also, the *Marketing Manager Marthiensen* achieved his AL. *LEO Fiber* will be continued – at least for a three-month trial period – and will be backed with a budget of EUR 50,000 funded by the business unit. Also, the intended application for a patent ensures that the intellectual property will be kept within *HAIDO*. Given this, *Marthiensen* also achieved his SL because the decision covers a market study that will be conducted to identify the market potential and risks as well as possible products and applications based on the *LEO Fiber* technology. Moreover, during the in three-month trial period the project will be managed by the marketing department.

The *R&D Manager Rudolph* clearly achieved his AL. From an R&D perspective, it was most important to ensure that the project will have a future, including the commitment to additional funding of EUR 50,000. On top of that, a patent will be filed to protect the intellectual property. Given this, he also achieved his SL because the ongoing R&D projects will not be affected by the *LEO Fiber* trial project.

As a supporting role, the external *Business Consultant Barney* was not part of the conflict scenario and negotiation space. In the simulation, his objective was to provide the negotiation parties with critical information about the technology and the market prospects. Since the simulation process evolved in a rather converging way, there was no real need for *Barney* to intervene.

The analysis of the achievement levels shows that the R&D engineer's and the managers' SLs overlapped so that a negotiation space could be created during the course of the simulation. This was the basis for a mutual agreement. To gain further insight into the simulation, the negotiation process is analyzed in the following.

b) Negotiation process

On a general level, the entire negotiation process evolved very harmonically, and the negotiation parties were obviously striving for a common decision, which was implicitly made after approximately 15 minutes already. Although this seems to be a desirable goal and positive simulation outcome, the players reached too easily a mutual agreement. Since the overall design and conflict scenario were rather positive, the players did not face the challenge of resolving an intrapreneurial conflict. Certainly, a more conflictive scenario had been a greater hurdle to reach a compromise. Another reason seems to be culturally-bound. From the perspective of the players, stressing the boundaries was not considered to be a promising approach towards decision-making in radical innovation processes. On the contrary, they were convinced that it would result in a growing resistance against the new technology.

The *R&D Engineer Ingham* strongly believed that the project will have a future. It was her personal commitment that pushed the idea forward but also the low level of conflict between *Ingham* and the three managers, and especially with *Churchland* and *Marthiensen*, facilitated the process. None of the managers had a problem to allocate a budget for the project. Still, in order to claim the management of the project, she could have been more persistent, have a stronger focus and a clearer negotiation strategy. However, she believed that being too ambitious would build up hurdles that she cannot overcome anyway. In general, she felt very comfortable about playing her role, and from her perspective the role was realistic.

The player of the *Business Unit Manager Churchland* acted as a moderator between the parties. After listening to all opinions, he tried to find a compromise respecting all interests. His reserved character was another reason for this behavior. Basically, he preferred to listen first to the others and then to form his own opinion on the topic. Also, it was easy for *Churchland* to archive his goals because he favored the project right way from the start and had no real opposition to face. The budget of the business unit could afford EUR 50,000 to back the trial phase of three months. Overall, he felt comfortable about playing the role.

Also the *Marketing Manager Marthiensen* could easily achieve his AL. He did not face any protest against his claim that further market research has to be done first. Thanks to the budget of EUR 50,000, offered by the business unit, the daily marketing business would not be affected by the *LEO Fiber* trial project. Yet, he expected to face a stronger conflict with both *Ingham*, who normally would have to convince the marketing department to provide more time and budget, and also with *Rudolph*. Given this, the role appeared to him to some extent fictitious.

The *R&D Manager Rudolph* promoted *Ingham*, and from the R&D management perspective his goals could be easily reached: a prototype of *LEO Fiber* was already available and the application for a patent will be covered by the current R&D budget anyway. Still, *Rudolph* was missing a clear commitment of both marketing and the business unit so that he persistently asked *Churchland* to provide the budget to start the pilot study. In general, he perceived the role to be realistic and could easily identify himself with the role. Yet, he expected more conflict especially with *Churchland* who supported the *LEO Fiber* right from the start.

Thanks to a negotiation process that evolved rather harmoniously, the external *Business Consultant Barney* intervened only a few times during the course of the discussion. His advice was not needed because the negotiators themselves came to a commonly made decision. All relevant issues, such as responsibilities, funding, scope of the project, have all been solved without the need to consult *Barney*. A deadlock did not occur.

In sum, both the three managers and the engineer made the commitment to continue *LEO Fiber*. A market study will be carried out in the coming three months. As soon as the results from the market study are available, LEO Fiber will be re-negotiated and the decision about the future of the project will be made. In the meantime *Ingham* continues to work on the project which will be managed by the marketing department. If then the company does not want to continue the project, the *Ingham* can still think about leaving *HAIDO* and starting up her own company.

6.2.3 Case C-1: Telecommunications industry, R&D (NL)

Case C-1 was conducted within the Dutch subsidiary of a large, multinational corporation that has its headquarters in Sweden. The company presents itself as a world-leading provider of telecommunications equipment and related services to mobile and fixed network operators. In 2006, the company had global sales of SEK 151,800 million and employed 63,460 people in 140 countries worldwide, thereof 19,400 in Sweden and 1,300 in the Netherlands. The activities carried out by the Dutch subsidiary include marketing and sales, customer services and support, R&D, as well as various support and corporate functions.

As shown in Table 6-17 below, fourteen R&D professionals with different backgrounds in engineering, mathematics, computer science and chemistry participated in this field-test. The simulation used the case of *HAIDO*, design version V3.0. Based on the evidence that resulted from the cases B-1 and B-2, the scenario and the role descriptions have been redesigned in order to sharpen the underlying conflict and increase the scenario's closeness to reality.

Moreover, a quantitative evaluation framework has been developed, a tool that will be used to evaluate the negotiation outcomes on both a general and a individual role level.

Table 6-17: Players of key, supporting and minor roles in case C-1

Role	National.	Education	Job
BU Manager Churchland (KR)	NL	Computer science	Software engineer
BU Manager Churchland (MR)	NL	Computer science	Technical coordinator
BU Manager Churchland (MR)	NL	Applied mathematics	Systems engineer
Marketing Manager Marthiensen (KR)	NL	Computer science	Manager
Marketing Manager Marthiensen (MR)	NL	Electrical engineering	Technical coordinator
Marketing Manager Marthiensen (MR)	HR	Electrical engineering	Software engineer
R&D Manager Rudolph (KR)	NL	Electrical engineering	Technical coordinator
R&D Manager Rudolph (MR)	NL	Electrical engineering	Project manager
R&D Manager Rudolph (MR)	NL	Electrical engineering	Software designer
R&D Engineer Ingham (KR)	NL	Chemistry	Systems engineer
R&D Engineer Ingham (MR)	NL	Computer science	Software engineer
R&D Engineer Ingham (MR)	NL	Computer science	Software engineer
Business Consultant McKinzie (SR)	NL	Electrical engineering	Software engineer
Business Consultant McKinzie (MR)	NL	Electrical engineering	Systems engineer

Key: KR=key role, SR=supporting role, MR=minor role; NL=Dutch, HR=Croatian

The simulation that was conducted in case C-1 involved the following roles: the *Business Unit Manager Churchland*, the *Marketing Manager Marthiensen*, the *R&D Manager Rudolph*, the *R&D Engineer Ingham*, and the independent *Business Consultant Barney*. The negotiation topic was the *Light Emitting Organic Fiber (LEO Fiber)* technology that is also used in the final design (see Appendix A). A detailed case analysis in regard to both the negotiation outcomes (a) and process (b) is presented in the following.

a) Negotiation outcomes

The simulation could not be concluded with a collectively made decision. The result of the meeting is that the decision of the pursuit of *LEO Fiber* will be postponed to gather more information on both the technological potentials and the market prospects of *LEO Fiber*. At least, the management made the commitment to invest a total of 2.5 FTE into the *LEO Fiber* project. After 6 months, when the results of the investigations are available, the future of *LEO Fiber* will be renegotiated and decided upon.

As the analytical representation of the overall simulation outcomes demonstrates in Figure 6-2Figure 6-1 below (see also Chapter 5, Section 5.2), the players of case C-1 could not create a negotiation space because their SLs did not overlap. While the *R&D Engineer Ingham* gave up his AL of 25 FTE and accepted a SL of 9 FTE, the managers defined SLs that were very close to their initial ALs. As a consequence, they kept their initial gaming positions until the

very end of the simulation. The managers' maximal concession was to invest a total of only 2.5 FTE into *LEO Fiber*. In other words, the three managers scored all very high on their AL, whereas the engineer was not even able to achieve his SL.

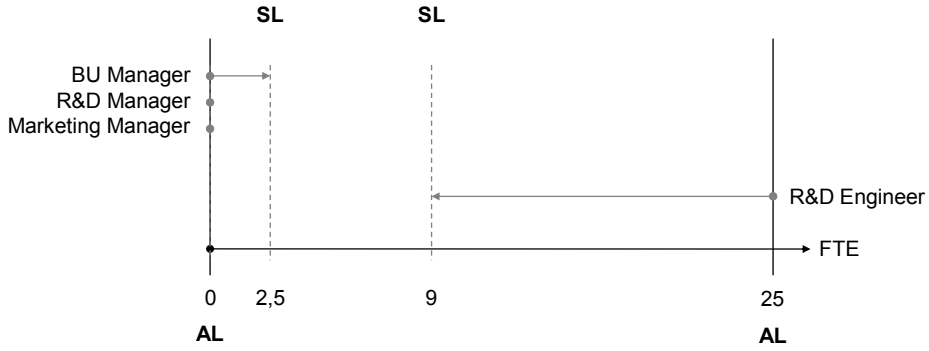


Figure 6-1: Game/negotiation space of the *Intrapreneurship Game* (case C-1)

The *R&D Engineer Ingham* neither achieved his AL of 25 FTE nor his SL of 9 FTE. In the end he got only 2.5 FTE to continue and the decision to develop *LEO Fiber* towards a fully fledged commercial application will be made in six months. The *Business Unit Manager Churchland* achieved his AL to a large extent. A patent will be filed so that quick returns will be guaranteed. He did not consider 2.5 FTE as an extra budget.

The *Marketing Manager Marthiensen* achieved both his AL and SL almost to their full extent; both were almost congruent. He could ensure that market research will be carried out. Yet, he did not ask for extra budget, since he expected to see that as part of marketing's daily work. Also, the *R&D Manager* achieved a very high AL. Similarly, his SL did not differ much from his AL. While he allowed *Ingham* to work during the six-month pilot project for 50% of his time on *LEO Fiber*, the extra budget will be covered by the business unit. The external *Business Consultant Barney* was not part of the game space.

The analysis of the achievement levels shows that a negotiation space could not be created during the course of the simulation. Hence, it was impossible to make a commonly accepted decision. In the end, the *Business Unit Manager Churchland* has decided – backed by the managers *Marthiensen* and *Rudolph*, but certainly not by *Ingham* – to postpone the decision and invest 2.5 FTE to explore the prospects of this technology. The following analysis of the negotiation process will provide further insights to better understand the negotiation outcome.

b) Negotiation process

The whole meeting was a struggle of four totally diverging interests: no common ground, no cooperative strategies, but everybody was covering his own interests. Especially before the

first time-out the discussion was very divergent, almost chaotic, a pattern that that the participants considered to be normal in regard to innovation and novelty. Yet, the role-players were too strongly concerned with their own positions and goals that were given in the role-briefs in form of the predefined ALs. During the negotiation, a common goal was not pursued, and none of the players did try to gain a mutual understanding in regard to the others' interests and positions.

After the time-out (after approximately 15 minutes) the negotiation went more fluently. The common goal became (marginally) more important. Most important, the time-out forced the negotiators to stop talking and invited them, at the same time, to recapitulate the information that was available so far and to re-adjust their goals and negotiation strategies. In addition, it increased the pressure to make a decision because all players recognized that they were going in circles and should come to a decision soon. It was clearly observable that the players returned from the break in a different mode: *"we have to make a decision now"*.

Still, the negotiation could not be concluded with a mutual agreement. The players did not pursue cooperative strategies and did not aim at developing a common understanding of the opportunity. Gathering and getting information was maybe less important than it should have been. Also, more scenarios could have been on the table enabling the managers to objectively look at the advantages and disadvantages of *LEO Fiber*. Although the players raised quite a number of propositions, such as filing a patent and selling it, buying another company, etc., but they were not considered in the final decision.

In sum, a radically innovative approach truly supporting intrapreneurship was not observable in case C-1. The final decision to invest 2.5 FTE in order to carry out further research on the *LEO Fiber* technology and its market prospects can be described – with the words of the players – as a *"conventional"*, *"moderate"*, or *"no-risk and nothing-to-loose"* decision. It is a decision that was made according to the paradigm of incremental innovation: going on, not stopping the idea, but in reasonably small steps to avoid a risky decision.

6.2.4 Case C-2: Electrical/electronic industry, R&D (NL)

Case C-2 was conducted within the corporate research division of a large, multinational corporation that has its headquarters in the Netherlands. In 2006, the company had global sales of EUR 27,000 million and employed approximately 121,700 people in more than 60 countries worldwide. The company presents itself as a market leader in medical diagnostic imaging and patient monitoring systems, energy efficient lighting solutions, personal care and home appliances, as well as consumer electronics.

Table 6-18: Players of key, supporting and minor roles in case C-2

Role	National.	Education	Job
BU Manager Churchland (KR)	NL	Psychometrics	Sr. research scientist
BU Manager Churchland (MR)	NL	Computer science	Research scientist
Marketing Manager Marthiensen (KR)	NL	Economic psychology	Research scientist
Marketing Manager Marthiensen (MR)	NL	Computer science	Research scientist
R&D Manager Rudolph (KR)	NL	Computer science	Sr. research scientist
R&D Manager Rudolph (MR)	NL	Informatics	Research scientist
R&D Engineer Ingham (KR)	BE	Civil engineering	Research engineer
R&D Engineer Ingham (MR)	NL	Industrial design	Sr. research scientist
Business Consultant Barney (SR)	NL	Electrical engineering	Research engineer
Business Consultant Barney (MR)	NL	Physics	Research manager

Key: KR=key role, SR=supporting role, MR=minor role; NL=Dutch, BE=Belgian

As shown in Table 6-18 above, the group of players that participated in this field-test, was composed of nine R&D engineers and scientists as well as one R&D manager. They have different educational backgrounds, such as in engineering, computer science, physics, industrial design, psychometrics as well as economic psychology. The applied scenario was based upon the case of *HAIDO*, design version V3.1. As in the previous two case studies, it involved the following roles: the *Business Unit Manager Churchland*, the *Marketing Manager Marthiensen*, the *R&D Manager Rudolph*, the *R&D Engineer Ingham*, and the independent *Business Consultant Barney*. The *Light Emitting Organic Fiber (LEO Fiber)* technology served as the negotiation topic. The detailed negotiation outcomes (a) and process (b) are analyzed in the following.

a) Negotiation outcomes

In case C-2, the players could not close the negotiation with an intrapreneurship and radical innovation friendly decision. Although it was common understanding that it is worthwhile to continue *LEO Fiber*, a commonly accepted decision could not be made. The final outcome can be reduced to the decision to postpone the true decision and continue the project with 0.7 FTE until funding is provided. However, this result was only based upon a consensus amongst the managers, not respecting the interests of the engineer. It can be interpreted as the management's principal commitment to the idea and technology, but it is no commitment to material resources to be invested in the project. Basically, the result was indecision.

As the analytical representation of the overall simulation outcomes visualizes in Figure 6-2 below (see also Chapter 5, Section 5.2), in case C-2 the required overlap of the players' SLs could not be accomplished. While the engineer was obviously ready to compromise and accepted in the end a very low SL of 4 FTE, the three managers were not willing to lower

their SLs to an extent so that the negotiation space opened up. Together, they committed themselves to invest a total of 0.7 FTE only. In other words, the three managers scored all very high on their AL, whereas the engineer was not even able to achieve his predefined SL; he went even below that level.

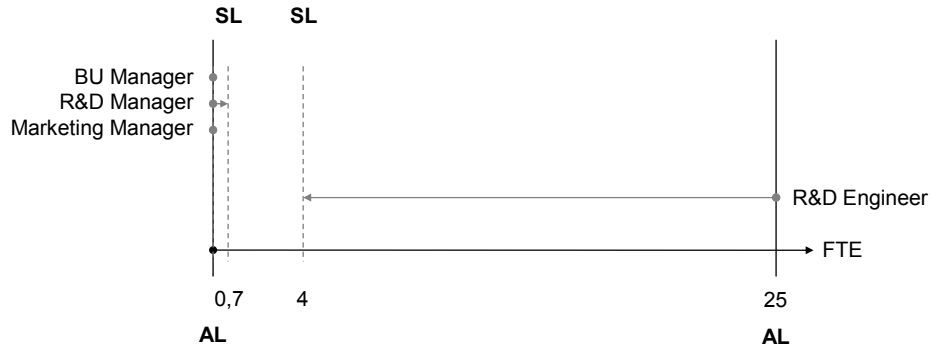


Figure 6-2: Game/Negotiation space of the *Intrapreneurship Game* in case C-2

In respect to the final decision of 0.7 FTE, the *R&D Engineer Ingham* achieved neither his AL nor his SL of 4 FTE referring to 2 full-time marketers and 2 full-time R&D scientists. At least, the idea was not stopped, a fact that gives him at least the chance to improve the *LEO Fiber* technology until the next round of decision-making. However, this was not explicitly stated by the decision makers.

The *Business Unit Manager Churchland* achieved his AL to very large extent. His SL, almost congruent with his AL, was to pursue *LEO fiber* but with a lower risk for the business unit. His only concession was to promise that he will take the *LEO Fiber* proposal to the corporate board meeting to discuss other possible options for funding. Yet, this concession was even made on the premise that both the R&D and marketing manager would back him in the board meeting.

The *Marketing Manager Marthiensen* achieved her AL nearly to its full extent. She could convince all negotiation parties, including the engineer, that *LEO Fiber* is a high-risk-project because of the lack of a known market and customer base. She made clear that *LEO Fiber* requires dedicated market research (besides the current research projects) and needs to be integrated into existing range of products.

Also, the *R&D Manager Rudolph* achieved a very high AL that differed only marginally from his SL of 0.7 FTE. Since he did not intend to stop *LEO Fiber*, he wanted *Ingham* to dedicate one day a week (that is, 0.2 FTE) to the *LEO Fiber* project and, in addition, to back him with 0.5 FTE of technical support to create a demonstrator and prove of concept. Still, *Ingham* should continue working in his spare time combined with an extra bonus, if the

project will be a success. In the end, however, *Rudolph* did not even go down to this level. His final commitment was to continue the project as soon as additional budget is provided.

The independent *Business Consultant Barney* was designed as a supporting role and, therefore, not part of the conflict scenario and the game space. His objective was to provide critical information about the technology and the market that the protagonists might miss. Unfortunately, he could not support the key roles and trigger the simulation process towards an intrapreneurship-friendly decision. The players did to seize the opportunities that the business consultant offered in the course of the meeting.

In sum, this application resulted in indecision – that is, a commonly accepted decision to exploit the opportunity of *LEO Fiber* could not be made. In order to gain a better understanding as to how the decision has been made, the simulation process is analyzed in the following.

b) Negotiation process

The negotiation process can be described as fair and harmonious but at the same time as very divergent. The negotiators did not try to build a common understanding and develop cooperative strategies to reach a greater, common goal – namely, that *LEO Fiber* offers a unique business opportunity that may serve as the basis for growth and profit in the long-term. Although the discussion offered quite some opportunities for cooperation, none of the players was willing to seize them. In contrast, the players mainly covered their own interests and focused on their own role performance in order to achieve high levels of aspiration. It seems that the participants had difficulties applying a holistic approach to problem solving.

All players were very much sticking to their roles and did not go beyond their initial gaming positions that were predefined in the role-briefs. In particular, the three managers did not make any effort to come to a commonly accepted decision; rather their understanding was to achieve high levels of aspiration and to *"win the game"* individually. It seemed that they did not understand that giving up their ALs – at least to some extent – is a necessary step to come to a decision. As a consequence, the negotiation space could not open up and it was impossible to resolve the underlying conflict of intrapreneurship.

The managers' tendency to keep their initial gaming positions was certainly reinforced by the two other factors. First, the *R&D Engineer Ingham* was not intrapreneurial enough, especially not goal oriented and not persistent enough. Although he started with a very good presentation on the *LEO Fiber* technology and its markets prospects, he was not able to convince the managers. Second, the three managers met before the meeting to harmonize their

positions and discuss what opportunities can be given to the intrapreneur, a fact that certainly built a coalition among the managers. In the simulation the engineer was now opposed to one strong negotiation party that represented a common standpoint.

Individually, the players did not risk anything in the game. Especially, the managers were reluctant to make clear decisions that refer to a higher level of risk as known from their day-to-day work. It could be observed in the simulation that the managers tended to avoid making decisions that they did not feel comfortable about. Basically, the players tended to stay within their comfort zone. Within this zone all is known, all is safe, whereas going beyond means facing greater uncertainty and risk.

Moreover, the players were obviously lacking an opportunity orientation. Nobody developed a vision as to how the new technology could be developed, managed and sold in an innovative way, other than the known and existing pathways to the market. The participants were not able to draw multiple scenarios and had difficulties dealing with information asymmetries. Rather they believed in one single, given truth. Hence, the entire discussion was driven by the search for market evidence in order to reduce the risk. As a consequence, there was much resistance towards the idea although the business consultant expected an enormous market potential.

In sum, the overall result of the case study C-2 was indecision in the sense that the true decision was postponed but without defining a follow-up meeting. Although the engineer lowered his SL down to 4 FTE, a commonly accepted decision was unachievable. The managers, who committed themselves to invest a total of 0.7 FTE only, were not willing to depart from their predefined AL. Hence, the negotiation space could not be established which in turn shows that an intrapreneurial approach was not pursued.

6.2.5 Case C-3: Electrical/electronic industry, R&D (NL)

As the previous field-test, the final Case C-3 was conducted within corporate research of a large, multinational corporation that has its headquarters in the Netherlands. In 2006, the company had global sales of EUR 27,000 million and employed approximately 121,700 people in more than 60 countries worldwide. The company presents itself as a market leader in medical diagnostic imaging and patient monitoring systems, energy efficient lighting solutions, personal care and home appliances, as well as consumer electronics.

Table 6-19: Players of key, supporting and minor roles in case C-3

Role	National.	Education	Job
BU Manager Churchland (KR)	NL	Physics	Sr. research scientist
BU Manager Churchland (MR)	NL	Electrical engineering	Research engineer
Marketing Manager Marthiensen (KR)	NL	Physics	Sr. research scientist
Marketing Manager Marthiensen (MR)	NL	Chemistry	Process engineer
R&D Manager Rudolph (KR)	NL	Physics	Sr. research scientist
R&D Manager Rudolph (MR)	TR	Electrical engineering	Sr. research scientist
R&D Engineer Ingham (KR)	NL	Chemistry	Sr. research scientist
R&D Engineer Ingham (MR)	NL	Physics	Sr. research scientist
Business Consultant Barney (SR)	DE	Physics	Sr. research scientist

Key: KR=key role, SR=supporting role, MR=minor role; NL=Dutch, TR=Turkish, DE=German

As shown Table 6-19 above, the group of players – a pre-selected group of employees that had earlier followed a corporate entrepreneurial training program - was composed of R&D engineers and scientist with backgrounds in engineering, physics and chemistry. The scenario was based on the *HAIDO* case, design version V3.2. Compared to the version that was used in the previous case, only minor refinements were to be made. The protagonists were the four key roles of the *Business Unit Manager Churchland*, *Marketing Manager Marthiensen*, *R&D Manager Rudolph* and *R&D Engineer Ingham* and the supporting role of the independent *Business Consultant Barney*. The *Light Emitting Organic Fiber (LEO Fiber)* technology served as the negotiation topic. The negotiation outcomes (a) and process (b) are analyzed in the following.

a) Negotiation outcomes

The overall simulation result was a decision to invest 2 FTE in order to further investigate *LEO Fiber*: 1 FTE is paid by the business unit and 1 FTE by the marketing department. The decision implies that the *R&D Engineer Ingham* continues working on the project and gets support from the marketing department to elaborate a business plan. After half a year, the *LEO Fiber* project will be renegotiated. However, the decision was not based upon a mutual agreement to support intrapreneurship.

As visualized in Figure 6-3 below (see also Chapter 5, Section 5.2), the analytical representation of the overall simulation outcomes shows that in case C-3 the required overlap of the players' SLs could not be accomplished. Neither the engineer nor the three managers were ready to lower their SLs to a considerable extent. The negotiation space could not be established and, as a consequence, the players were not able to reach a mutual agreement in regard to the pursuit of *LEO Fiber*.

Figure 6-3: Game/negotiation space of the *Intrapreneurship Game* (case C-3)

The *R&D Engineer Ingham* achieved neither his AL nor his SL. Departing from his predefined AL of 25 FTE, he initially defined a SL of 21 FTE (that is, 7 employees over 3 years). As he recognized during the course of the simulation that this level was not low enough, he lowered it further down to 2.5 FTE (that is, 5 employees over 0.5 years). Still, this SL was not sufficiently low to come to a commonly accepted decision. In the end, he got 1 FTE from the business unit and 1 FTE from the marketing department to elaborate a business plan that will be discussed six months later.

The *Business Unit Manager Churchland* did not fully achieve his AL of 0 FTE, but in the end he got quite close at it. He reached his SL of 1 FTE to be invested in *LEO Fiber*. Also, he was satisfied that a six months study will be conducted in order to collect more market data and work on a business plan. Similarly, the *Marketing Manager Marthiensen* did not achieve his AL, but in the end he got at his SL of 1 FTE. He claimed that a stepwise approach is required to reduce the risk that is inherent in *LEO Fiber* and that *Ingham* needs to be backed by the marketing group in order to elaborate a business plan.

The *R&D Manager Rudolph* achieved his AL, which was almost corresponding to his SL. His only concession was that he is willing to free *Ingham* from his day-to-day operations in order to work on the project. However, he did not commit himself to invest additional FTE. The *Business Consultant Barney* had a supporting role and was, therefore, not part of the game space. His objective was to provide critical information about the technology and the market, but he could not help the four key roles to come to a positive simulation outcome.

In sum, the simulation resulted again in indecision. The negotiators could not make a commonly accepted decision to exploit the opportunity of *LEO Fiber*. The final decision refers to the management's commitment to invest 2 FTE in order to carry out a market study and elaborate a business plan that will be renegotiated after half a year. Obviously, this result does not encourage intrapreneurship.

b) Negotiation process

The discussion started very friendly and harmoniously. As the negotiation parties did not clearly state their positions and goals, it was difficult to get a comprehensive picture of the conflict situation. Triggered through the first time-out after approximately 15 minutes, the discussion became more goals oriented; it was more a negotiation now. Nevertheless, the discussion was still going in circles without making the point. A second time-out after approximately 40 minutes was required to push the participants towards decision-making.

The *R&D Engineer Ingham* started the meeting with a short presentation about *LEO Fiber*. From his point of view, solving the technical issues was most important, but he did not address market-related as well financial issues. *Ingham* started out to convey enthusiasm, was arguing rather emotionally, stressing the notion of risk taking, and even overacting his role in some parts. However, a clearly focused negotiation strategy, pushing the discussion into a specific direction, and a solid business case were missing to convince the managers. His agenda remained partly hidden during the entire negotiation. Moreover, he was lacking an empathetic approach to better understand the managers' positions and goals.

The *Business Unit Manager Churchland* opened and chaired the meeting professionally. He asked a lot of questions to gain an understanding of all positions and interests. He was obviously willing to strive for a solution that respects all interests and does not create discomfort for one or the other. *Churchland* considered *LEO Fiber* to be an opportunity that may help to reach the 2010 objective of double digit profit margins. In the end, however, not enough facts were on the table to support *LEO Fiber* in this way. Still, he was satisfied that a half year market study will be conducted in order to gain more information and elaborate on a business plan.

From the perspective of the *Marketing Manager Marthiensen*, the meeting was too much R&D focused. He did not state his AL for a long time, and only later in the simulation it became clear that marketing's focus lies on the current business activity. In contrast, *LEO Fiber* implies an enormous risk for *HAIDO*, and the only way to reduce it is a stepwise approach and a product that is an add-on to the current products offered in current markets. From there, it can be taken to a higher level. Given this premise, it was realistic to provide 1 FTE for market research.

The *R&D Manager Rudolph* had to resolve an internal conflict: long-term research versus existing business activity. On the one hand, he did not want to kill the idea, but on the other he was not willing to take any responsibility with regard to both the decision and required budget. The decision on *LEO Fiber* should be made by *Churchland* or even at a higher

hierarchical level. Hence, he preferred a small scale R&D project to study possible risks and rewards and get more information on the issues to be resolved. In the beginning he was absolutely not clear about his objectives, which he only stated after the first time-out. He kept this position until the very end of the negotiation.

The external *Business Consultant Barney* had a very reserved start. Before the first time-out he was almost not, afterwards a little more involved in the discussion. Since the information that he provided in the course of the discussion was not seized by the other players, he could not help to facilitate the negotiation. Part of the reason is that he did not present the market evidence in a convincing way. Moreover, his role in the simulation was not fully clear to him as well as the other players. As a result, he did not feel comfortable about playing the role.

In this final simulation the players had difficulties understanding their roles and the related positions and goal. During the entire negotiation, they talked about their own needs and were mainly concerned with performing their roles according to tangible facts and well-established rules. In the end, the final decision was made on the limited information that was available. Hidden agendas and the lack of believable information were seen as the main reason as to why the negotiation resulted in indecision; too many questions remained unanswered until the very end.

6.2.6 Overview of key outcomes and processes characteristics

So far, each individual case has been described in regard to the explicit simulation outcomes (*what* has been achieved?) and the rather implicit simulation process (*how* have they been achieved). The overview of key outcomes and process characteristics in Table 6-20 below reveals that, although each simulation evolved differently and produced different outcomes, two general patterns were observable across all five applications in industrial R&D.

While in the first two case studies B-1 and B-2 the underlying scenario was not conflictive enough and the intrapreneurship conflict did not emerge, in the final three cases C-1, C-2 and C-3 the conflict emerged in distinct way, but the players were not able to resolve it. They did not pursue cooperative strategies towards a common goal, but maintained their initial, conflict producing positions almost throughout the entire negotiation. Nevertheless, the final decisions that players made to close the negotiation meeting did in each case not reflect intrapreneurship-conducive decisions. On the contrary, the decisions represent incremental to moderate approaches to innovation.

Table 6-20: Overview of key outcomes and processes characteristics

Case	Negotiation outcomes (*what?*)	Negotiation process (*how?*)
B-1	• Overall result: commonly made decision. The decision of the *Dead Tank Vacuum Interrupter* has been postponed to gather more market data, but commitment has been made to a pilot project. • Individual level: AL not achieved, SL achieved but very low • Organizational level: between AL and SL	• All players were familiar with the simulated scenario because a real case was discussed. • After the time-out, they were less affected by their daily behavior patterns. • The intrapreneurship conflict was not distinct enough; it was easy to find a mutual agreement. • The meeting was driven by the need of more information and risk-reduction.
B-2	• Overall result: commonly made decision. The decision on *LEO Fiber* has been postponed, but commitment to a trail period of three month has been made. Ingham continues working on the project which will be controlled by marketing. • Individual level: AL not achieved; SL achieved but very low • Organizational level: AL almost fully achieved.	• Very harmonic discussion, players were obviously striving for a common decision. • The intrapreneurship conflict was not distinct, a pattern that facilitated a common decision. • The final decision was implicitly made after half of the simulation already. • The discussion was driven by the player desire to reduce the inherent risk.
C-1	• Overall result: no commonly made decision. The management decided to invest 2.5 FTE to further investigate the technology and its market potential; renegotiation after six months. • Individual level: AL not achieved, SL nearly achieved. • Organizational level: AL partly to fully achieved	• Very divergent negotiation; the players were covering their own interests and positions. • A mutual understanding could not be built; a greater, common goal was not pursued. • The time-out facilitated the negotiation and the common goal became more important. • Incremental approach to innovation to avoid a revolutionary decision.
C-2	• Overall result: no commonly made decision. The management decided to invest 0.7 FTE to develop a prototype, apply for a patent and carry out market research; the decision on *LEO Fiber* has been postponed. • Individual level: AL not achieved, very low on the SL. • Organizational level: AL almost to its full extent achieved.	• Fair and harmonious negotiation process, but at the same time very divergent. • The players aimed to 'win' individually and did not go beyond their personal interests and positions. • They did not seize the existing opportunities for cooperation to reach a common decision. • Individually, they did not risk anything but stayed within their comfort zone.
C-3 (NL)	• Overall result: no commonly made decision. The management decided to invest 2 FTE for market research and the development of a business plan, renegotiation of *LEO Fiber* after six months. • Individual level: AL not achieved; very low on the SL. • Organizational level: AL almost achieved.	• After a friendly and harmonious start, it was rather a discussion than a true negotiation • Everybody was talking about his own needs; a common, overall goal was not pursued. • Two time-outs were required to push the negotiators towards the final decision. • Hidden agendas and the lack of believable information were seen as the main reasons why the negotiation resulted in indecision.

This finds support from quantitative-descriptive data that were only collected in the final three cases C-1, C-2, and C-3 (this item was not par of the version of the post-simulation questionnaire that was used in cases B-1 and B-2). In these simulations, the players of the four key roles did not pursue cooperative strategies and were, as a consequence, not able to resolve the underlying conflict of intrapreneurship. While the managers almost kept their initial gaming positions until the very end of the simulations, the engineer had to accept very low

AL and SL. Thus, the former achieved both their SL and even their AL, whereas the latter achieved neither the SL nor the AL. In other words, a dialogic approach between the individual and the organizational process level – as postulated in Chapter 2, Section 2.3 – could not be observed in any of the simulations.

As shown in Table 6-21 below, the simulation outcomes of the final three cases are evaluated in regard to the players' achievement of the predefined ALs and individually defined SLs. The players of the three managerial roles *Churchland*, *Marthiensen* and *Rudolph* clearly achieved both their ALs and SLs, whereas the players of intrapreneurial role *Ingham* achieved neither their AL nor their SL. The outcomes of the supporting role *Barney* are not evaluated here because the role is not part of the game and negotiation space (see Chapter 5, Section 5.1).

Table 6-21: Achievement of the key roles' aspiration and satisfaction levels (based on cases C-1, C-2 and C-3)

	Achievement of AL			Achievement of SL		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
BU Manager Churchland (KR)	7	4,43	1,988	7	5,86	1,069
Marketing Manager Marthiensen (KR)	7	4,71	1,604	7	6,14	,378
R&D Manager Rudolph (KR)	7	5,86	1,215	7	6,29	1,254
R&D Engineer Ingham (KR)	7	1,71	,756	7	2,14	1,215

Key: KR = key role, AL = aspiration level, SL = satisfaction level
Evaluation: 7-point scale ranging from 1 = full disagreement to 7 = full agreement

The analysis of both the simulation outcomes and simulation processes that were observed in the field-tests produced two main findings. First, the simulations and more specifically the role-players did not produce the desired simulation outcomes – namely, final decisions that are made on the basis of a mutual agreement. Second, the simulation processes evolved – in particular in those cases in which the conflict was distinctly emerging – not in a converging way based on cooperative strategies between the individual and the organizational process levels. Given these findings, one might wonder whether the simulation game is an effective means to create awareness of and insight into an intrapreneurship-conducive culture.

6.3 Development of prerequisite design requirements

Based on the analysis of simulation outcomes and processes that was conducted in Section 6.2, this section seeks to derive and evaluate by means of a cross-case analysis prerequisite design requirements. To show that the simulation game is an ecologically valid and reliable intervention, both in-depth qualitative data (collected in the semi-structured group discussions

and interviews) and quantitative descriptive data (gathered through the post-simulation questionnaire) are used. Subsection 6.3.1 evaluates the scenario as to whether it is ecologically valid, and Subsection 6.3.2, evaluates the procedure for playing the simulation game in order to show that it is a reliable intervention.

6.3.1 Evaluation of the scenario

Simulation games used for experiential learning build on the simulation of a scenario that is close to reality (Geurts et al., 2000), a quality criterion that is also referred to as game fidelity (Druckman, 1995) or in experimental research to ecological validity. In order to possess ecological validity, the methods, materials and setting of the experiment must approximate the real-life situation that is under study (Brewer, 2000; Ulijn, 2000). Drawing on in-depth qualitative evidence resulting from the moderated group discussions involving 51 players and semi-structured interviews involving 24 players the scenarios that were used in the cases are evaluated in regard to seven design requirements. Table 6-22 below evaluates these design requirements for each case on the basis of the following values: 'not realistic' (-1), 'indifferent' (0), and 'realistic' (1).

Table 6-22: Analysis of the scenario

Case	B-1	B-2	C-1	C-2	C-3	Mean
a) Underlying conflict of intrapreneurship	1	0	1	1	1	0,8
b) Decision-making meeting	-1	-1	-1	-1	0	-0,8
c) Role Business Unit Manager Churchland	0	-1	1	1	1	0,4
d) Role Marketing Manager Marthiensen	-1	-1	1	1	1	0,2
e) Role R&D Manager Rudolph*	1	0	0	0	1	0,4
f) Role R&D Engineer Ingham	0	-1	1	1	1	0,4
g) Role Business Consultant Barney	-1	0	-1	-1	0	-0,6
Mean	**-0,14**	**-0,57**	**0,29**	**0,29**	**0,71**	**0,11**

Evaluation: 3-point scale ranging from -1 = not realistic to 0 = indifferent to 1 = realistic.
** In case B-1 the role of the Plant Manager Peters was used.*

The cross-case analysis shows that the scenario could be improved in the course of the developing multiple-case study from case B-1 (mean = -0.14) to case C-3 (mean = 0.57). While in case B-1 the scenario was tailor-made for the host company, case B-2 revealed that the underlying scenario still has major shortcomings so that the players perceived the scenario to be unrealistic. After a major redesign, the scenario appeared to be quite realistic in the final three cases C-1, C-2 and C-3; only minor refinements had to be made. Given this, the scenario-related design requirements a) to g) will be evaluated in the following.

a) The underlying conflict of intrapreneurship

Across all cases, the underlying conflict scenario was considered to be realistic – at least realistic enough for this kind of simulation game. The players recognized reality insofar that *"every day people will find things that will improve in certain areas, including the type of drastic change modeled in the simulation, but generally there is no room to come up and develop further new ideas."* In the simulation, the players are confronted with exactly this conflict and can develop an integrated perspective on intrapreneurship because they experience in a realistic case many considerations and constraints at the same time.

Yet, in two applications the scenario was even perceived to be too close to reality. As a consequence, the players had difficulties accepting the level of simplification that is given in the simulation. For instance, in case B-1 the players missed the playing elements of a simulation game that would allow *"performing some aspects that could be interesting for future R&D activities and the way of managing innovation"*. Part of the reason is that in this case the scenario was customized to the specific situation in the host company (see Subsection 6.2.1). The other example is Case C-3 in which the players, who were very familiar with the negotiation topic, had difficulties accepting the limitations and simplifications made by the scenario. As a consequence, the negotiation became very technical instead of providing room for experimentation and searching for a common decision.

b) The decision-making meeting

As described in Chapter 5, Section 5.1, in order to simulate the underlying conflict of intrapreneurship, the scenario is based upon an account of a projected course of action and, more specifically, an event that typically occurs in the course of the intrapreneurship process. A particularly crucial event is the moment of decision-making on opportunity exploitation. Across all cases the players perceived the decision-making meeting, the overall flow of events and the lack of interaction before and during the simulation as artificial. A process that normally takes several weeks, months, or even years can not put into one single meeting of less than one hour.

More specifically, the players criticized that *"it is unlikely that an engineer has developed something on his [or her] own and then, without consulting anybody before, asks for an appointment with the management to make a decision on how to further proceed"*. In other words, the players missed a sort of mutual understanding and common knowledge they would normally built up before the simulated decision-making meeting is being held. Moreover, it as perceived as unrealistic that the players do not know which kind of information the other roles

have. Because of the daily communication it is likely that in reality more or less the same information is available for everybody.

c) The role of the *Business Unit Manager Churchland*

The role of the *Business Unit Manager Churchland* could be improved significantly on the basis of the first two case studies B-1 and B-2 in which the role was perceived to be unrealistic and not distinct enough to provoke the conflict of intrapreneurship. In the final cases C-1, C-2 and C-3, the performance of this role was satisfying. More precisely, the role was considered to be realistic. The tasks that role has to accomplish in the simulation were considered to be quite complex and demanding. Besides the overall objective to work towards a commonly accepted decision on *LEO Fiber*, *Churchland* has to chair and moderate the negotiation. It is especially the latter which makes the role quite challenging to play. It became evident that the personality and skills of the player seem to have a major impact on the role's effectiveness and, as a consequence, on the simulation process and outcomes.

d) The role of the *Marketing Manager Marthiensen*

In the early cases B-1 and B-2, the role of the *Marketing Manager Marthiensen* was not realistic and did not effectively operationalize the intrapreneurship conflict. During the course of the field-testing it could be improved and was finally perceived to be realistic (C-1, C-2, and C-3). The players of this role complained that the role descriptions did not contain any market information about *LEO Fiber*. Basically, they had difficulties accepting that believable market data and key facts are most likely not available for radically new technologies. Moreover, in the early cases B-1 and B-2 the role of *Marthiensen* was too positive *vis-à-vis LEO Fiber* – that is, the role description was lacking *"the pressure and the limitations, thinking about budget and time"*, a fact that retarded the underlying conflict intrapreneurship to emerge in the meeting.

e) The role of the *R&D Manager Rudolph*

The qualitative data analysis shows that the role of the *R&D Manager Rudolph* could be improved from case to case and resulted in the end in a realistic and effective role. In the early cases, the role description was lacking an *"internal conflict"*, which the players considered to be typical for R&D managers. In reality, an R&D manager would be *"very proud, if one of his engineers comes up with a new idea"* and, therefore, support the intrapreneur, would also meet major restrictions in regard to budget and time that are imposed by top management: "*in*

reality the R&D budgets are very tight and the business units have a lot of pressure to be successful". This internal conflict is essential to give the role an active and effective part in the simulation in order to contribute to the emergence of the conflict of intrapreneurship.

f) The role of the *R&D Engineer Ingham*

As in real-world intrapreneurship, the role of the *R&D Engineer Ingham* is a key role in the *Intrapreneurship Game*, and the personality and the skills of the players seem to have a major impact on how the role is performed in the simulation. Since the role description is to some extend idealized, some players had difficulties seeing it as a role for real life. During the course of the field-testing, the role could be improved towards a realistic and effective role. In the final cases C-1, C-2 and C-3, the players recognized it as a role that is applicable in reality. According to the players, R&D is a rich source of creative ideas, and "a lot of these ideas can lead to new products, can lead to new businesses, but people are not willing to take the intrapreneurial role and to start-up a new venture".

Yet, the intrapreneurial role is not suited for everybody because some people in R&D just want to remain researchers inventing something new, being enthusiastic about it, but not interested in the follow-up issues, such as developing a business case, marketing, and the like.

g) The role of the *Business Consultant Barney*

As outlined in Chapter 5, Section 5.1, the role of the *Business Consultant Barney* is a so-called supporting or consulting role. Especially in areas of conflict in which the negotiation parties tend to keep their initial gaming positions, external expertise and information are essential to trigger the simulation process by providing so-called critical incidents. In this way, a supporting role aims at opening doors, providing creative solutions and building up trust among the protagonists by asking questions and stimulating an open discussion. Hence, the objective of this role is to facilitate the simulation process.

Despite major efforts to improve and even redesign the role of the *Business Consultant Barney*, it remained ambiguous until the final application. There is only limited evidence that the role could effectively trigger the simulation process towards the intended simulation outcomes. According to the players, it is realistic that the management seeks in this kind of scenario for advice from a consultant, but it is questionable whether a consultant takes part in such a meeting. The players had, across all cases, difficulties understanding what they can expect from the role, and especially what information and how this information is provided in

the meeting. As a consequence, they did not take the consultant seriously and ignored the critical information that the role was offering during the course of the negotiation.

As a result, the role was redesigned again and replaced by the role of the *Market Expert Barney* (see the final version of the *Intrapreneurship Game* enclosed in Appendix A). The general objectives of the role remain the same – namely, to facilitate the simulation process. But being a market expert instead of a business consultant, it is expected that that role become more effective by providing critical information in more neutral way.

6.3.2 Evaluation of the procedure

The design of a simulation game not only comprises its underlying scenario, but also the procedure to make the scenario available for the participants – that is, to play the simulation game. As described in Chapter 5, Section 5.2, the procedure includes a) the briefing and role-wise preparation phase; b) the simulation including two intermediate debriefings after 15 and 30 minutes, and c) the final debriefing including the administration of the post-simulation questionnaire. Again, in order to evaluate the procedure, both qualitative and descriptive quantitative data is used. In order to take into account the cyclic-iterative nature of the design process, the following data analysis differentiates between the early cases B-1 and B-2 involving 18 players and later cases C-1, C-2, and C-3 involving 33 players.

a) Briefing and role-wise preparation phase

The purpose of the briefing is to introduce the simulation game to the players by addressing the goal and the procedure of the simulation, the technique itself, the background situation, as well as the roles and tasks to be accomplished in the simulation. Also, the players have enough preparation time to study the materials and develop role-wise, in teams of one player and observers, a negotiation strategy for the simulated decision-making meeting.

Table 6-23: Evaluation of briefing and role-wise preparation phase

	Cases B-1 and B-2			Cases C-1, C-2, and C-3		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
The briefing was sufficient.	18	4,89	1,530	33	5,36	1,220
The preparation time was sufficient.	18	5,67	1,085	33	5,73	1,306
Players have understood the scenario.	18	5,89	1,023	33	5,58	1,032
Players have fully understood their role.	18	6,06	,802	33	5,70	1,075

Evaluation: 7-point scale ranging from 1 = full disagreement to 7 = full agreement

As show in Table 6-23 above, the empirical data suggests that the briefing and the group-wise preparation phase were considered to be sufficient and helpful to prepare for the simulation. Comparing the early cases (B-1 and B-2, N = 18) and the later cases (C-1, C-2, and C-3, N = 33), iterative improvements could be made during the course of the field-testing. In the end, the materials and the amount of information to be processed before the simulation were considered to be well balanced. The slightly higher means in the cases B-1 and B-2 can be explained by the fact that the game version used in case B-1 was tailor-made for the host company and that the players in case B-2 were very familiar with the *LEO Fiber* technology.

b) Simulation including the intermediate debriefings

It is important that all the players – and in particular the players of the key and supporting roles who actively perform the simulation – participate voluntarily in the simulation game and feel comfortable about performing their roles. As shown in Table 6-24 below, the analysis of the descriptive survey data shows that the players of the key and supporting roles played their roles voluntarily, and a clear majority felt comfortable about playing their roles. Compared to the early cases B-1 and B-2, these conditions were even better fulfilled in the later cases C-1, C-2, and C-2. This is certainly the result of the continuous improvements in regard to the briefing session and the preparation phase.

Table 6-24: Key and supporting roles' comfort in the simulation (quantitative evidence)

	Cases B-1 and B-2			Cases C-1, C-2, and C-3		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Players of KR/SR participated voluntarily.	10	6,00	1,155	15	6,87	,352
Players of KR/SR felt comfortable.	10	5,00	2,000	15	5,60	1,765

Key: KR = key roles, SR = supporting role
Evaluation: 7-point Likert scale ranging from 1 = full disagreement to 7 = full agreement

A closer look at the qualitative data further substantiates this evidence. The majority of players reported that they liked playing and could identify themselves with their roles. Some players had difficulties getting into the roles and gained a better feeling only during the course of the simulation, and especially in the intermediate debriefings, in which they had the opportunity to consult with their corresponding observers. Yet, a few players did not feel comfortable in their roles mainly because they had a limited understanding of their roles and the related tasks and expectations. These players criticized in particular that they were missing important information to be able to play the roles. One player even reported that he felt stressed because of the lack o believable information.

As summarized in Table 6-25 below, the players of the key and supporting roles felt comfortable about playing their roles (mean = 0.4 points). As outlined in Chapter 5, Section 5.1, the role of the *Business Unit Manger Churchland* (mean = 0.4 points) and especially the role of the *R&D Engineer Ingham* (mean = 0.2 points) are quite challenging to play: While the former has, besides the general objectives in regard to the pursuit of *LEO Fiber*, the job to moderate the meeting, the latter is in a challenging negotiation situation as being opposed to three managers. In contrast, the roles of the middle managers *Marthiensen* and *Rudolph* (mean = 0.6 points) are in this respect less challenging to play. As stated before, the role of the *Business Consultant Barney* (mean = 0.2 points) remained ambiguous across all five case studies. Only in the final two applications the players felt a little more comfortable about playing this role.

Table 6-25: Key and supporting roles' comfort in the simulation (qualitative evidence)

Case	B-1	B-2	C-1	C-2	C-3	Mean
Player of KR BU Manager Churchland	1	1	0	-1	1	0,4
Player of KR Marketing Manager Marthiensen	-1	1	1	1	1	0,6
Player of KR R&D Manager Rudolph	1	1	1	1	-1	0,6
Player of KR R&D Engineer Ingham	-1	1	1	-1	1	0,2
Player of SR Business Consultant Barney	0	0	-1	1	1	0,2
Mean	**0,0**	**0,8**	**0,4**	**0,2**	**0,6**	**0,4**

Key: KR = key role, SR = supporting role
Evaluation: 3-point scale ranging from -1 = not comfortable to 0 = indifferent to 1 = comfortable

The case-to-case comparison shows that in each case the majority of players felt comfortable about playing their roles. Discomfort was mostly the consequence of case-specific requirements or constraints, such as the role of the *R&D Manager Rudolph* in the final case C-3 As described in Subsection 6.2.5, his discomfort about playing this role can be explained by the player's background, expertise and personality of that particular person. As he worked over several years on a similar technology, which has in the meantime been discontinued after 10 years of research, the player was very familiar with *LEO Fiber*. As a consequence, he perceived the whole scenario to be unrealistic and had difficulties accepting the made abstractions and simplifications that are made in the simulation.

Next to the key and supporting roles, the simulation also involves minor roles, who have the task to coach and observe their corresponding key and supporting roles (see Chapter 5, Section 5.1). The empirical data shows that the players of those minor roles felt actively involved and comfortable about partaking in the simulation. This is important because firstly, in this way collective learning is effectuated among all participants and not only among the

active role-players, and secondly, minor roles that are actively involved in the simulation contribute to the ecological validity and, hence, to the effectiveness of the intervention.

Table 6-26: Involvement of the minor roles

	Cases B-1 and B-2			Cases C-1, C-2, and C-3		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
KR/SR perceived the MR to be supportive.	10	4,90	1,197	15	5,13	1,598
MR felt involved in the simulation.	8	5,88	1,356	18	5,44	1,294
MR could support the KR/SR.	8	5,38	1,061	18	5,11	1,323

Key: KR = key roles, SR = supporting role, MR = minor roles
Evaluation: 7-point Likert scale ranging from 1 = full disagreement to 7 = full agreement

As Table 6-26 above shows, the players of the key and supporting roles (N = 25) perceived the coaching by the minor roles (N = 26) to be helpful. In turn, the players of the minor roles felt involved in the simulation and could support their corresponding key/supporting role. In the final three cases C-1, C-2 and C-3, the players of the minor roles were more reserved and had, as a consequence, a limited part in the simulation. Thanks to the interaction between the protagonists and the observers during the preparation and the intermediate debriefings, it can be assumed that the observers could, nevertheless, positively contribute to the simulation and the ecological validity of the outcomes.

Next, an important design element is the intermediate debriefing that literally interrupts the simulation process and forces the players to delay the negotiation. As described in Chapter 5, Section 5.2, it invites the players to recapitulate what was achieved so far and get a better understanding of each party's negotiation interests and positions. Intermediate debriefings are essential to turn closed and deadlocked negotiation situations into constructive time-outs that help to facilitate the negotiation process. The empirical data suggests that the intermediate debriefings after 15 and 30 minutes had a positive effect on the course of the simulation. As shown in Table 6-27 below, the quantitative data was only collected in the final three C-1, C-2, and C-3.

Table 6-27: Effectiveness of the intermediate debriefings

	Cases B-1 and B-2			Cases C-1, C-2, and C-3		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
The time-outs were perceived to be supportive.	n/a	n/a	n/a	33	5,79	1,453

Key: KR = key roles, SR = supporting role, MR = minor roles, n/a = not applicable
Evaluation: 7-point Likert scale ranging from 1 = full disagreement to 7 = full agreement

It could be observed in all simulations that very divergent discussions in the beginning became more convergent and went more fluently after the intermediate debriefings. During the time-outs the players could realize – at least to some extent – that in order to achieve a commonly accepted decision in the end, all negotiation parties need to be both explicit in regard to their interests and positions, depart from their initial gaming position that were indicated in the role instructions and look for opportunities for cooperation. Moreover, several players, who had a difficult start into the simulation and felt uncomfortable about playing their role, felt after the time-outs more comfortable about and involved in the simulation.

c) Final debriefing

The final debriefing aims at inverting the briefing process by turning the implicit simulation experience into explicit learning. As outlined in Chapter 5, Section 5.2, it establishes a link between the immediate simulation experience – that is, the simulation outcomes and process – and reality. In this way, the debriefing is an essential element to trigger long lasting learning effects. The descriptive-quantitative data collected by means of the post-simulation questionnaire shows that the participants considered the debriefing to be sufficient. As shown in Table 6-28, this data applies only to the final three cases C-1, C-2, and C-3.

Table 6-28: Final debriefing

	Cases B-1 and B-2			Cases C-1, C-2, and C-3		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
The final debriefing was sufficient.	n/a	n/a	n/a	33	5,61	,864

Key: n/a = not applicable
Evaluation: 7-point scale ranging from 1 = full disagreement to 7 = full agreement

This finds support from the qualitative data that was gathered in the debriefings and semi-structured follow-up interviews. Actually, the debriefing was perceived to be a highly important element of the overall game design. It serves as the platform for analyzing the simulation outcomes and process from retrospect and enables the players – as well as the facilitator – to recognize what was achieved and how it was achieved. In order to enable collective learning, this deliberated semi-structured group discussion not only involves the protagonists (that is, the players of the key and supporting roles), but also the observers (that is, the player of the minor roles), and even the more silent participants.

This brings us to the final question of whether the players would again participate in the *Intrapreneurship Game*. As shown in Table 6-29 below, the descriptive survey data –

supported by qualitative evidence – suggests that the players of both the key/supporting roles (protagonists) and the minor roles (observers) would partake in the simulation again.

Table 6-29: Would the players participate again?

	Cases B-1 and B-2			Cases C-1, C-2, and C-3		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Players of KR/SR would partake again.	10	5,40	1,075	15	6,13	1,125
Players of MR would partake again.	8	4,88	1,458	18	4,56	2,093

Key: KR = key roles, SR = supporting role, MR = minor roles
Evaluation: 7-point Likert scale ranging from 1 = full disagreement to 7 = full agreement

In analogy to real-life, people seem to like assuming and playing roles, desire to achieve something and learn about self and others, as well as the reactions they show in the simulated context. The simulation provides in the form of a game an interactive platform to think of and communicate about new ideas and explore and test approaches to radical innovation and intrapreneurship other than the known and standard R&D routines.

6.3.3 An ecologically valid and reliable simulation game

In the previous subsection, a cross-case analysis was conducted to evaluate the *Intrapreneurship Game* as to whether its underlying scenario is ecologically valid and the procedure to play the simulation is reliable. The findings can be summarized as follows.

First, the cyclic-iterative process of field-testing and improvement resulted in an ecologically valid simulation game. The underlying scenario and, as a consequence, the basic process model of intrapreneurship that served as a theoretical framework to design the *Intrapreneurship Game* are ecologically valid representations of reality (see Appendix A). The four key roles that operationalize the basic process model are realistic as well. Still, the role of the external *Business Consultant Barney* remained to some extent ambiguous. Obviously, due to its embedding in a game, the *Intrapreneurship Game* has its limitations. In particular, the simulated meeting is not a realistic setting because intrapreneurship is a lengthy process that can not be squeezed into one single meeting. Nevertheless, the level of abstraction and simplification is acceptable – that is, the overall scenario approximates the real-life situation.

Second, the empirical data analysis suggests that the simulation game is a reliable intervention. The procedure to run the simulation and make the scenario available for the players could be iteratively improved in the course of the field-testing. The procedure as described in its final version of the *User Manual* (see Appendix B) is sufficiently well-

designed. After the introductory briefing and the following role-wise preparation phase the players felt prepared for the simulation. While the protagonists performed the simulation voluntarily and felt comfortable about playing their roles, the corresponding observers indicated that they could support their corresponding role-players and felt indirectly involved in the simulation. The debriefing session was appreciated because by collective reflection learning points are being established and the link to business and R&D practice is being made.

So far, the empirical data analysis suggests that the *Intrapreneurship Game* is an ecologically valid and reliable intervention. The question of whether the simulation is actually suited and effective to raise awareness of and provide insight into an intrapreneurship-conducive culture will be addressed in the following section.

6.4 Validation of an intrapreneurship-conducive culture

The previous section showed that the *Intrapreneurship Game* is an ecologically valid and reliable intervention. Given that, this section intends to further substantiate the findings by answering the question of whether the simulation game is actually suited to raise awareness of and provide insight into an intrapreneurship-conducive culture. To answer this question, it is necessary to understand what type of cultural environment the role-players consider to be conducive of intrapreneurship in industrial R&D, and whether their perception corresponds to the description that was deductively derived in Chapter 4.

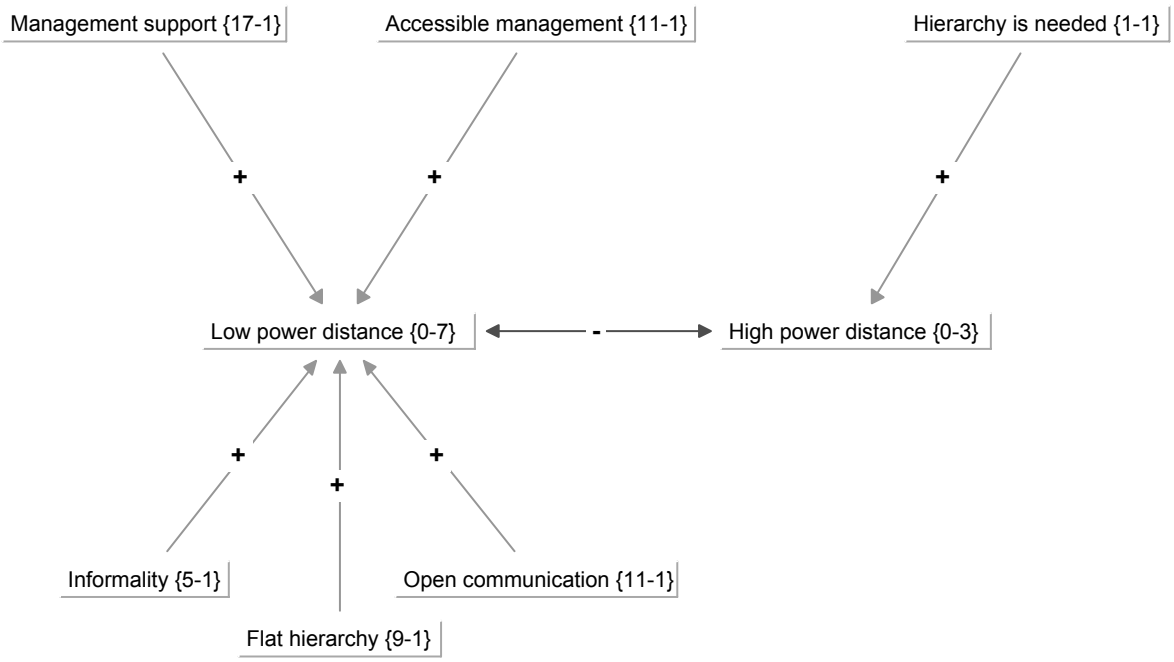
To make the players' rather implicit perception that relies upon their immediate simulation experience explicit and available, qualitative empirical data was collected by means of five moderated group discussions involving 51 participants and semi-structured, follow-up interviews with 24 players of key, supporting and minor roles. The discussions and interviews were tape-recorded, transcribed and then analyzed by coding. As a total, 334 chunks of text (quotations) have been retrieved in the transcripts and assigned to 36 antecedent variables (codes). These variables, in turn, were attached to the six cultural dimensions that are deemed to describe an intrapreneurship-conducive R&D culture (see Chapter 4).

To facilitate the qualitative data analysis, the software tool *ATLAS.ti* was used. On a textual level, the software supports research activities, such as segmenting the transcripts into quotations, annotating passages and coding selected passages to facilitate their retrieval. On a conceptual level, the software allows to visually connect selected passages, memos, and codes into diagrams that graphically outline complex relations. Networks, defined as a collection of nodes and links, are used to display the antecedent variables and their relevance. The nodes

represent the codes which are connected by directed links. The relevance of each code is given through the absolute number of quotations that are attached to the code. Thereby, items might have been mentioned several times by one and the same player or not at all.

6.4.1 Low versus high power distance

The distribution of power and how individuals regard power differences is embedded in a society's or organization's culture. As the network display in Figure 6-4 below shows, the qualitative data analysis suggests that an intrapreneurship-conducive culture is correlated with low power distance. The qualitative data contained 63 quotations (assigned to 5 codes) that can be associated with low power distance, whereas only one quotation could be retrieved that can be associated with high power distance. This ratio results in a score of 2 points.



Key: Node {no quotations – no linked nodes}; + = "is cause of", - = "contradicts"
Data base: moderated group discussions (N = 51); semi-structured interviews (N = 24)

Figure 6-4: Low vs. high power distance

The players experienced in the simulations what has been outlined in Chapter 2, Section 2.2: without deliberate management support the intrapreneurship process is unlikely to evolve (17 quotations). Hence, it should be part of the managers' agenda to shape organizational conditions that further intrapreneurship and give moral support to the individual (would-be) intrapreneur. This not only applies to top management, but also and especially to middle management that is in direct interaction with the individual level: "*if your direct boss is not supportive or does not like the way you act, you still have a big barrier*".

For successful intrapreneurship top management must be accessible (11 quotations). As simulated in the *Intrapreneurship Game*, nascent intrapreneurs must get a chance to discuss already in early stages of the intrapreneurship process even immature ideas and proposals of new technologies and products. It is important that these ideas and proposals get room to be nurtured and developed. Hence, short communications lines to the decision makers need to be established because as an intrapreneur *"one should not need to try to convince every person or managerial role in-between"*.

As outlined in Chapter 2, intrapreneurship can be defined as an intra-organizational negotiation process that requires a dialogic approach. To enable and facilitate the sharing and discussion of ideas across different functions and positions, an intrapreneurship-conducive culture appreciates open communication structures (11 quotations). Especially in the early stages of the intrapreneurship process ideas and positions have to be shared, discussed and confronted with other viewpoints and the reaction of other people: *"an open way of communicating and a trustful atmosphere are very important"*. In this way, new insights are offered and new ideas are generated.

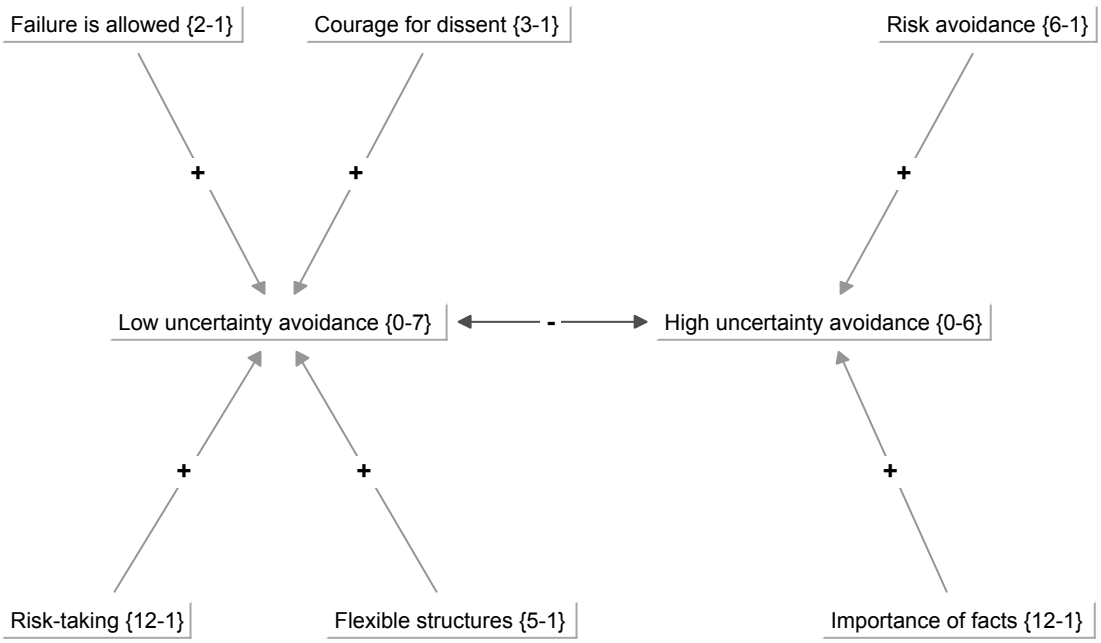
Next, a flat organization structure is a prerequisite to decentralize the power structure of the company and to break it down to the operational level (9 quotations). The power should not be concentrated at the management level but delegated to the regular or lower employee level. *"Trust from the management in the people who are working on bright ideas in order to foster some kind of self-management among them"* is, hence, a crucial factor of intrapreneurship. In this way, the individual level of intrapreneurship is empowered to push for change, make self-reliant decisions and realize innovations, including the radical ones.

Finally, interaction should not only be formally institutionalized by means of meetings or events, during which different employees or research groups can present their work, but also occur continuously in more informal ways (5 quotations). Especially, an intrapreneur has to *"convey information and to educate people around his [or her] idea"* so that a common understanding of the intrapreneurial opportunity can be built. Hence, it is important to allow for mutual interference in a non-structured way, as for instance suggested by one of the participants, who considered the coffee machine as an informal way to establish a personal network.

6.4.2 Low versus high uncertainty avoidance

Uncertainty avoidance refers to how people deal with uncertainty ambiguity, and future doubt. The empirical data suggests that intrapreneurship requires people who are willing to

accept uncertainty. Yet, running within the boundaries of an existing organization, intrapreneurship can not ignore the organization's way of dealing with uncertainty. As Figure 6-5 below visualizes, 22 quotations (attached to 4 codes) were found that can be associated with low uncertainty avoidance. In contrast 18 quotations (attached to 2 codes) refer to high uncertainty avoidance. This ratio results in a score of 45 points.



Key: Node {no quotations – no linked nodes}; + = "is cause of", - = "contradicts"
Data base: moderated group discussions (N = 51); semi-structured interviews (N = 24)

Figure 6-5: Low vs. high uncertainty avoidance

How people perceive and deal with uncertainty seems to be a critical condition of intrapreneurship. Both the individual and the organizational process level must be willing to take risk and, likewise important, have a similar understandings and perception of the risk that is inherent in intrapreneurial ventures (12 quotations). While in case of independent entrepreneurship risk is mainly personal and financial, in organizational intrapreneurship it seems to be rather socially and organizationally related. The ultimate risk that an intrapreneur will face is to loose his or her job, a risk that clearly differs from the risk of a total financial loss that an entrepreneur usually bears. Similarly, managers need to take both personal and organizationally related risks. In this respect, the field-tests revealed a clear direction: *"indecision is often worse than having a negative decision; indecision still takes resources to get results"*.

In order to facilitate creativity and idea generation, organizational structures, formalization, rules and control should be reduced (5 quotations). As the size of companies grows, complexity grows too, a development that requires well-defined procedures and processes.

However, in the existence of too many processes reduces the flexibility, lengthens the response time and impedes quick and pragmatic decision-making. This conflict between flexibility and formalization is particularly evident in the context of laboratory experimentation and testing. As one player stated, these typical R&D activities implicitly require a certain degree of flexibility and room to maneuver. However, often *"one has to do the testing in the way as determined and agreed upon in the very beginning. One has not the freedom to take initiative and change, iterate, or leave the given track".* Also, permanent supervision and control – *"What are you doing? Why are you doing this?"* – should not be part of an intrapreneurship-supportive culture.

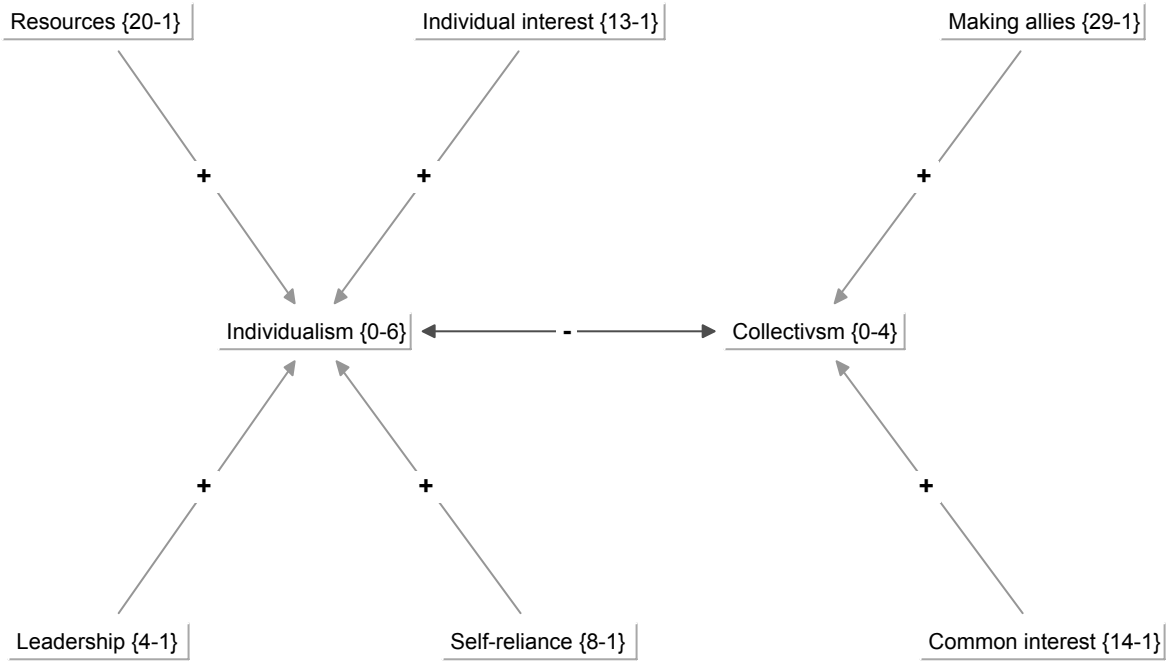
Related with uncertainty avoidance is conflict and how people deal with conflict. Successful intrapreneurship seems to require that the organizational members, and especially potential intrapreneurs, should not fear conflicts and dissent (3 quotations). Believing in the opportunity, intrapreneurs must be willing to *"go against the rules and against all pressure upstream, and not to go with the flow."* Also, people should be curious and willing to experiment and accept that things may fail (2 quotations). And, in the case of failure, they should not be punished, but be encouraged to learn from the failure and experiment and try again.

On the other hand, in order to make intrapreneurship a success, the risk reduction is critical. If an intrapreneur can not explain the risk to colleagues and superiors, there will be only limited chance of success. The players learned from the simulations that solid knowledge about the new business opportunity is essential to justify and provide a certain transparency in respect of the involved risk (12 quotations). An intrapreneur has to provide this information in order to convince the decision makers and prevent that money is blindly invested. This ability will create *"a sort of ease for the managers to decide to further proceed and have the next discussion when another risk is reduced".*

Therefore, it is crucial that all parties concerned have a clear understanding of the risk that is inherent in an intrapreneurial venture and are willing to stepwise reduce the risk as a solid basis for starting the new venture initiative (6 quotations). According to the participants, an intrapreneur has to have the knowledge and skills to *"present a plan including an assessment of the risk involved and how he or she is working towards reducing the risk".* By contrast, an entrepreneur would face other requirements in this respect, such as the expectation of business angels, institutional investors or other stakeholders. Hence, the quest of risk reduction seems to be a given boundary that an intrapreneur has to accept and learn to deal with.

6.4.3 Individualism vs. collectivism

The dimension of individualism (versus collectivism) refers to the relationship that individuals have with the community that surrounds them – that is, whether people are rather concerned about themselves or about others. The empirical data indicates that an intrapreneurship-conducive culture builds upon a balanced combination of individualistic and collectivistic cultures. As depicted in Figure 6-6 below, the transcripts contain 45 quotations that can be associated with individualism (assigned to 4 codes) and 43 quotations that refer to collectivism (assigned to 2 codes). This ratio results in a score of 51 points.



Key: Node {no quotations – no linked nodes} ; + = "is cause of", - = "contradicts"
Data base: moderated group discussions (N = 51); semi-structured interviews (N = 24)

Figure 6-6: Individualism vs. collectivism

According to the role-players, the availability of financial resources, spare time and free capacities is crucial in order to enable and encourage potential intrapreneurs to work on new ideas and projects (20 quotations). This is nicely underscored by the following statement that is also representative for other players: *"Money and free capacities enable the engineer to work on this kind of opportunities that are necessary for intrapreneurship"*. Thus, intrapreneurs must be free and have time available to search, find out, develop in-depth knowledge and test their ideas. This includes room for creativity, for explorative research and later for feasibility studies before more money is invested into the project.

In addition, initiating and running an intrapreneurship process requires independent thinkers and employees with an individualistic drive (13 quotations), a trait that one of the

players affirmed in the following way: *"Do not let your dreams be disturbed by people in your surrounding!"* In order to seize new business opportunities and exploit them, intrapreneurs need to take action on and responsibility for it, otherwise radical innovation can not be achieved. That is to say, intrapreneurs are rather individual thinkers and have an individual drive to introduce newness and change. And this attitude needs to be not only accepted, but even more important valued by the other organizational members.

To support young intrapreneurial ventures, and to start and push them forward, rather small and self-reliant units should be set-up, preferably detached from the line business and daily operations (8 quotations). Those intrapreneurial groups can *"concentrate on this bright idea; just have a focus to get it through"*. Thereby, one person – ideally the intrapreneur who discovered the opportunity – should have the lead (4 quotations). In this way, the emerging venture can work and develop in a rather autonomous way, as purely entrepreneurial ventures would do.

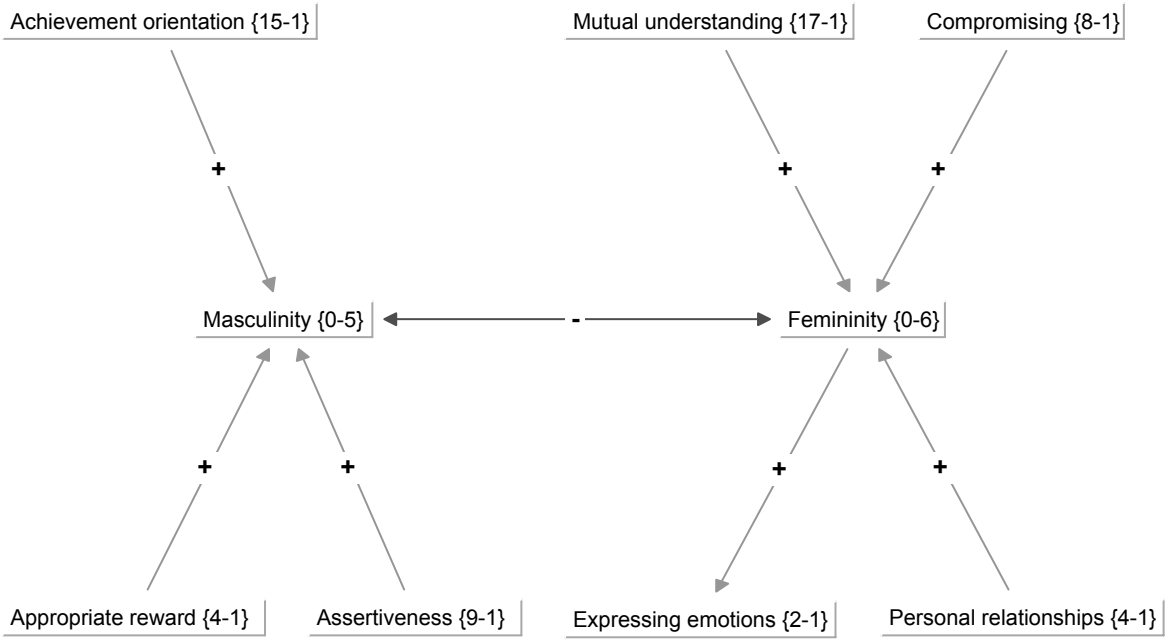
However, an overly individualistic culture could also impede intrapreneurship, a process that involves – in contrast to entrepreneurship – not only the intrapreneur, but also other organizational members and stakeholders, such as colleagues, management and shareholders. The intrapreneurship process may start from an individual initiative, but widespread support across the entire organization is needed in order to make it lastingly successful. Going for something radically new requires establishing a personal network by *"finding allies and preparing coalitions before the decision making in the meeting"*. Hence, the intrapreneur must be able to win allies and promoters both vertically across hierarchies and horizontally across functions (29 quotations).

As outlined in Chapter 2, Section 2.3, the intrapreneur and the management need to develop a common understanding of the opportunity and pursue cooperative strategies towards a common goal that goes beyond the persons' individual interests and goals (14 quotations). "*A maverick can be a risk not only for a start-up, but also for a big company. In a big company even more people depend on the company's success".* If those maverick types of persons maintain their individualistic approaches, intrapreneurship has only limited chances of success.

6.4.4 Masculinity vs. femininity

The masculinity (versus femininity) dimension of culture reflects the dichotomy of assertiveness and altruism. According to the participants' simulation experience, intrapreneurship is nurtured by a culture that relies on both feminine and masculine elements,

with a tendency to masculinity. As the network display in Figure 6-7 below illustrates, the qualitative data analysis identified 34 quotations (referring to 3 nodes) that can be associated with masculinity and 24 quotations (referring to 4 nodes) that underscore the feminine elements in an intrapreneurship-conducive culture. This results in a score of 59 points for this dimension.



Key: Node {no quotations – no linked nodes}; + = "is cause of", - = "contradicts"
Data base: moderated group discussions (N = 51); semi-structured interviews (N = 24)

Figure 6-7: Masculinity vs. femininity

According to the players' simulation experience, an attitude of achievement orientation and striving for success are essential for innovation – that is, the successful market launch of an idea or new technology (15 quotations). In the process from opportunity to innovation, *"true intrapreneurs want to win the game and take it as a personal goal to bring the new idea or technology a step further into a product, into a new business, into something more."* This attitude is based upon a strong belief that intrapreneurial initiatives will be successful in the end, even envisaging the option to leave the company in the end and engage in individual entrepreneurship.

On the way to intrapreneurial success intrapreneurs have to push their ideas upstream and overcome managerial resistance and organizational barriers towards change. Reflecting on the simulation experience, intrapreneurs need to have the confidence of assuming decisions: *"I will go this and that way and if you do not agree you can fire me!"* So, what seems to differentiate intrapreneurs from other employees is that *"once you really believe in something, you are willing to go against the rules and against all pressure upstream."* Hence,

potential intrapreneurs need to be persistent, to some extent assertive and partly even aggressive (9 quotations).

Moreover, potential intrapreneurs must have the prospect of gaining something from engaging in intrapreneurship. Otherwise there is no or only a limited motivation to engage in intrapreneurial activity. In case of independent entrepreneurship a potential reward is based on the fact that the entrepreneur owns his or her company, or at least parts of it, which may serve in turn as s source of wealth. Since an intrapreneur remains employed in an organization, appropriate reward in the form of wealth or status must be given to the successful achiever (4 quotations).

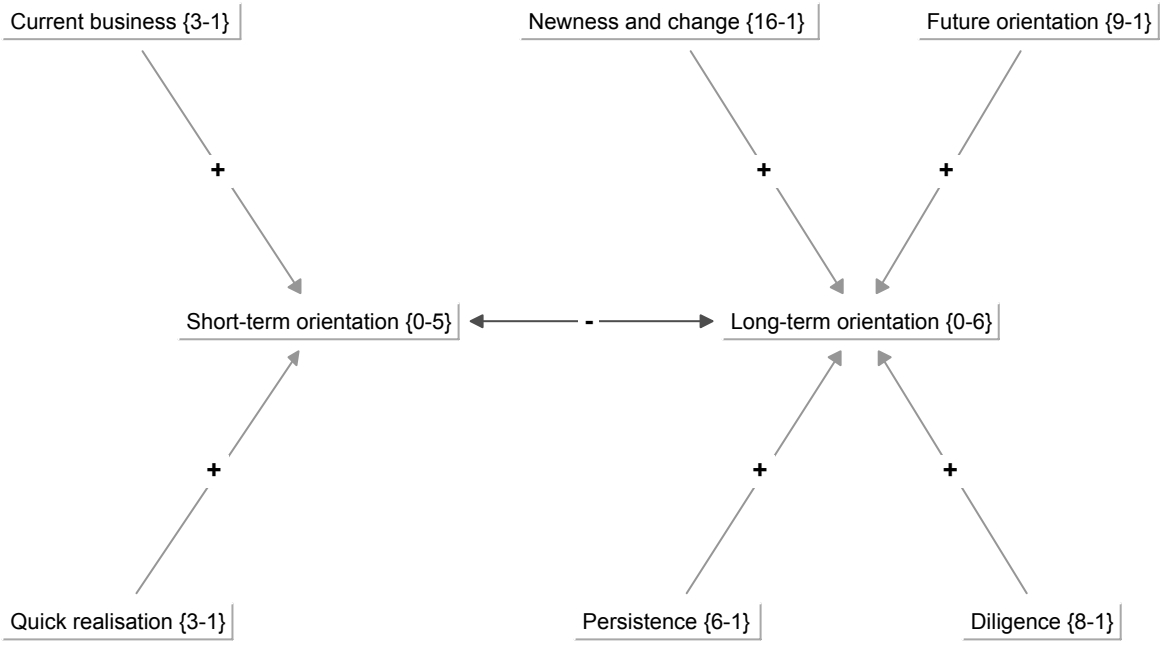
Yet, a dominantly masculine culture would miss some elements that seem to be crucial to sustaining intrapreneurship. In order to build a common understanding of the intrapreneurial opportunity, the involved parties should have a certain degree of empathy (17 quotations). The analysis of the simulation processes shows that both the intrapreneur and the managers need to *"be more sensitive towards other people's constraints and problems"*. This includes the behavior and activities such as listening to the others' opinion and standpoints, asking questions and gathering as much information as possible.

Moreover, a common decision can only be made, if both the individual and the organizational level of intrapreneurship are willing to compromise by manipulating their initial negotiation positions (8 quotations). This does not mean that one must accommodate to the needs of everybody, but certain boundaries that are given in large, established organizations are to be respected: *"being too ambitious and stressing these boundaries would cost the intrapreneur lots of energy and would not satisfy him or her at all."* Thus, intrapreneurship involves people that are willing to make compromises and accept that at times things are given and can not be altered easily.

Also, the embeddedness within the social system of an organization requires that the process agents build and maintain good personal relationships (4 quotations). Being an individual as part of a larger social network, *"a totally direct approach trembling over everyone's interests and needs is not working. The intrapreneur would be stopped before he or she is reaching the goal."* If there is potential conflict – and intrapreneurship creates conflict – it should remain factual and not become interpersonal. In this respect, it has been mentioned that besides expert knowledge the ability to express emotions can be beneficial as well (2 quotations). This may be of particular relevance for the intrapreneur who needs to win allies (see Subsection 6.4.3).

6.4.5 Short-term vs. long-term-orientation

The dimension of long-term versus short-term orientation refers to people's time horizons, attitudes to tradition and change, as well as preferences of static or dynamic environments. The analysis of the participants' simulation experience shows that intrapreneurship requires people that have a long-term orientation to the future. As the network display in Figure 6-8 below shows, the empirical data contain 39 quotations (assigned to 4 codes) that can be associated with long-term orientation, whereas six quotations (assigned to 2 codes) refer to short-term orientation. This ratio results in a score of 89 points.



Key: Node {no quotations – no linked nodes}, ; + = "is cause of", 0 = "contradicts"
Data base: moderated group discussions (N = 51); semi-structured interviews (N = 24)

Figure 6-8: Short-term vs. long-term orientation

Intrapreneurship is about doing something (radically) new and, thereby, changing the settings of established organizations (16 quotations). The intrapreneurship process – which was described in the debriefings and interviews as *"taking new ideas into the organization, into development"* – is the basis for establishing new domains of business that go beyond the core business of the firm. Hence, intrapreneurship requires an organization and people that are open-minded, constantly scan for new opportunities, explore new and unknown pathways and accept that things can and will change.

Innovation is by definition clearly future-oriented, and to get to innovation, and especially to radical innovation people need to *"look for future opportunities and have a long term vision"*. Especially major innovations require long-term research into new materials, technologies and processes that will serve as the basis of new products and services. This

includes the ability to anticipate future market needs and possible uses of the new technology. The organization and its members need to have a long-term perspective into the future that goes beyond the results that are relevant in regard to the current fiscal year (9 quotations).

Innovation also requires diligence and a willingness to work hard to develop both in-depth knowledge and comprehensive understanding of the intrapreneurial opportunity as the basis to develop a marketable product or service proposition (8 quotations). In order to convince the organizational decision makers, solid technical and market knowledge is necessary and ideas must be well though-out. The simulation showed what certainly holds true for real-life intrapreneurship: *"a good preparation for the meeting and a good presentation are very important to convince management"*. Therefore, an intrapreneur is someone who *"is working long hours, is just burning hours, not just a guy who is taking a day of smoking a cigar and coming up with a new idea. This is not how it works."*

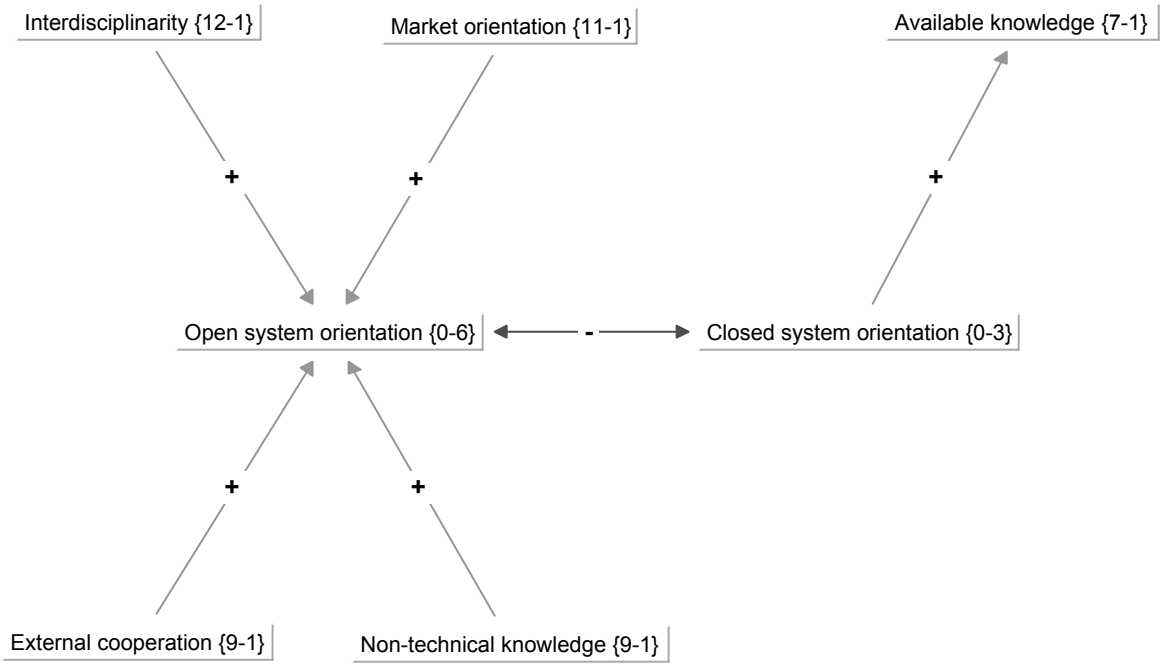
Intrapreneurship is not only a long, but also a cyclic iterative process of experimenting, testing and improving, as well as overcoming organizational hurdles and resistance to change. In organizations, in which the majority of people is occupied with their day-to-day business operations, both intrapreneurs and managers have to be persistent and motivated over a long time (6 quotations). To put it with the words of a player, "*they need to have a very long breath to pull it up"*, and attitude that includes the acceptance of high levels of frustration, if things do not work as expected.

Yet, although intrapreneurial initiatives and ventures tend to have rather long time horizons, it is crucial to take immediate action and realize things pragmatically (3 quotations). In this way (intermediate) results can be produced that may be motivating for the intrapreneur and serve as a means to convince the management in situations as simulated in the *Intrapreneurship Game*: *"if you have a good idea you will get funding for it, even it is small, but in any case take the next step"*. So, speed and a certain degree of time pressure are essential for successful intrapreneurship.

Moreover, intrapreneurship can not neglect the short-term requirements of the established organization in respect of the current business (3 quotations). Also, it was discussed in the debriefings and interviews that *"some people like to hold on to the past, some people only want to do the new things. Holding on the past means that one still wants to work on the cash cows, and we need those people"*. So, both types of people have a place in an intrapreneurship-conducive R&D culture.

6.4.6 Open vs. closed system orientation

Open (versus closed) system orientation refers to the degree to which an organization and its members monitor and respond to changes in the external environment, as well as the ability to be in exchange-relations with other communities and organizations. The analysis of the empirical data suggests that intrapreneurship can not develop in a hermetically sealed organizational system. Rather, it seems to require people that understand an organization as being an open and permeable system. This is visualized by the network display in Figure 6-9 below: four factors (linked to 41 quotations) refer to an open system, whereas one factor (linked to seven quotations) is associated with a closed system orientation. This results in a score of 85 points for this dimension.



Key: Node {no quotations – no linked nodes}; + = "is cause of", - = "contradicts"
Data base: moderated group discussions (N = 51); semi-structured interviews (N = 24)

Figure 6-9: Open vs. closed system orientation

The analysis of the players' simulation experience suggests that innovation needs to be understood as the result of a collective effort that involves people from various functions and disciplines across the entire organization. The more complex the technology, the more disciplines are involved in the innovation process. Hence, the intrapreneurship process relies not only upon the interaction between the individual and the organizational process level, but also upon an interdisciplinary way of working (12 quotations).

Moreover, an orientation to the market and more specifically to the customer needs is essential for intrapreneurship (11 quotations). This does not mean that *"the market tells you*

what to make, but you have to understand what the market needs. And once you know that, you can find a way to get there". R&D is not a target *per se*; rather it is a function or instrument to develop new products that meet market and customer needs – no matter whether they exist or are newly created. The R&D workforce should, therefore, not only rely on their technical knowledge and expertise (9 quotations). They must be willing to widen their horizons and acquire knowledge other than their technical knowledge.

The open system approach includes also cooperation with external parties and access to external sources of knowledge (9 quotations). Regarding complex products and services offered by companies that participated in the case studies, an entirely internally-orientated approach to innovation would make the innovation process slow and costly. Moreover, knowledge or components that are required to deploy the new product or service are often supplied by third parties. Besides cooperation in the sense of sourcing, it is important to monitor the activities of competitors and other technological developments as well.

Yet, the orientation the external environment has its limitations. The knowledge and the resources that are already available within the organization and R&D should be used first and in a way that people capitalize on what they know and are good in (7 quotations). Intrapreneurship can only start from one's own domain of knowledge, and *"the first step is that you limit yourself to that area where you have or can get the knowledge that is directly attached to your work."* In this sense, technology push is part of intrapreneurship: radical innovation, implying a high degree of novelty in regards to both technology and market, rather creates new than fulfills existing market needs (see Chapter 2, Section 2.1).

6.4.7 An effective simulation game

In order to prove whether the *Intrapreneurship Game* is suited to raise awareness of and provide insight into an intrapreneurship-conducive culture, it was necessary to understand what type of cultural environment the participants of the filed-tests consider to be conducive of intrapreneurship, and whether their perception corresponds to the description that was deductively derived in Chapter 4. So, the aim was not an inventory of the currently present R&D culture, but to derive – based on the players' (more or less) immediate simulation experience – a holistic picture as to how they perceive and describe a cultural environment that favors intrapreneurship in industrial R&D.

The empirical data analysis resulted in the following six-dimensional profile of an intrapreneurship-conducive culture: a very low power distance (PDI = 2 points); a relatively low uncertainty avoidance (UAI = 45 points); a balanced combination of individualism and

collectivism (IND = 51 points); a combination of masculine and feminine elements (MAS = 59 points); a long-term orientation (LTO = 89 points); as well as an open system orientation (OSO = 85 points). In Figure 6-10 below, this profile is visualized in the form of a radar plot and compared to the description that was deductively developed in Chapter 4, Section 4.3. A brief characteristic of each dimension is given in the following.

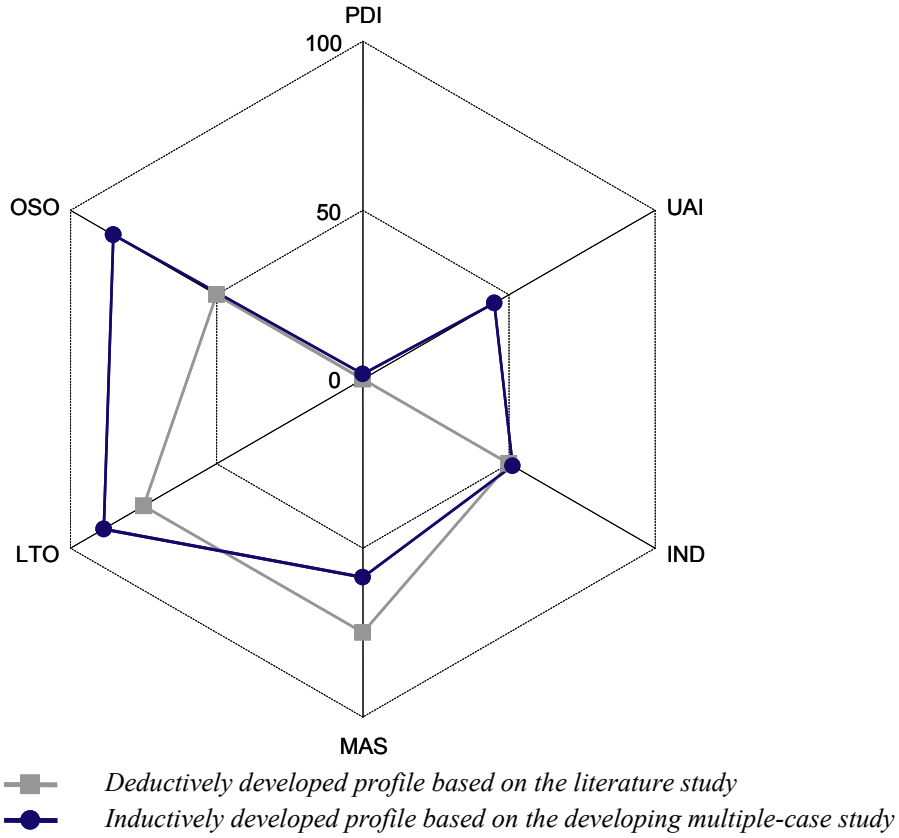


Figure 6-10: An inductively developed description of an intrapreneurship-conducive culture

First, low power distance (2 points) refers to flat hierarchies, decentralized power structures and egalitarian values. Potential intrapreneurs must be encouraged to openly deliberate their ideas and initiatives across all hierarchies. At the same time, management needs to be accessible and establish direct links to the individual process level. As simulated by means of the scenario, it is part of the challenge of intrapreneurship that the intrapreneurial process agents (that is, the players in the simulation) are able to decrease the power distance between the individual and the organizational process level (that is, to depart from the initial gaming positions). Otherwise it is difficult to resolve the intrapreneurship conflict.

Second, to foster intrapreneurship the individual and the organizational level need to have a similar understanding of and are willing to accept and take of the involved risk or at least part of it. The intrapreneur may initiate an intrapreneurial process, but in the end the management needs to support this initiative. Moreover, intrapreneurship will only emerge, if

rules and formalization are reduced and people are fault-tolerant. Yet, in comparison to independent entrepreneurship or spun-off ventures, intrapreneurship still runs within the boundaries of an existing organization. In particular, large, established organizations have a certain level of risk avoidance and formalization so that uncertainty avoidance can be neither absolutely low nor extremely high; rather it is a middle course (45 points).

Third, a balanced combination of individualistic and collectivistic orientations seems to be conducive of intrapreneurship (51 points). The intrapreneur, who certainly needs to be individualistic to some extent, must not forget the interests of the organization and its stakeholders. Again, pursuing an entrepreneurial opportunity individually may be a successful strategy in case of independent entrepreneurship, but will probably fail in case of intrapreneurship. Hence, the involved parties need to have a greater, common goal and purse this by means of cooperative strategies.

Fourth, in regard to the masculinity dimension, the empirical data suggests a combination of masculine and feminine cultures, with an emphasis of the former (59 points). On the one hand, intrapreneurship requires enormous efforts to be made and multiple barriers to overcome so that potential intrapreneurs should be goal and achievement oriented, two typical masculine orientations that the rest of the organizational members need to accept and value. On the other hand, a helpful atmosphere and good relationships between colleagues still need to be maintained. Otherwise, it will be more difficult to achieve a mutual agreement or compromise on the pursuit of the intrapreneurial opportunity, being one of the defining elements of intrapreneurship.

Fifth, large-scale innovations require a long-term orientation to the future (89 points). As a consequence, intrapreneurship, as one possible pathway to radical innovation, requires a general openness to explore the new and the unknown, a vision of the future, the acceptance of change and persistence to engage in lengthy and iterative R&D processes. Still, the organization should not disregard that renewal and stability should be balanced. This is especially a task of management that needs to keep a balance between the short-term demands, while providing room for activities that tend to have long-term impacts.

Finally, an open organization is recommended for promoting intrapreneurship (85 points). This does not imply a fully open system, but the boundaries of the organization should be permeable, in both directions from the inside to the outside and the other way around. Such a setting provides the intrapreneur with a larger variety of options than a closed system would do, such as making the best use of both internal and external resources and knowledge. An open system will be beneficial along the entire intrapreneurship process, from opportunity

recognition and idea generation, to sourcing and sharing of knowledge, to joint development and funding, to marketing and distribution of a new product.

To recapitulate, by using Hofstede's (1980, 2001) theory on national cultures and Ulijn and Weggeman's (2001) conceptualization of innovation culture as ancillary frameworks, this six-dimensional description can be understood as a report of the players' perception of an intrapreneurship-conducive culture. Confronted with a realistic scenario of intrapreneurship, the players experienced in the simulations the underlying conflict of intrapreneurship and the challenge to resolve it. In part, they were able to resolve it, but in the majority of cases the conflict remained unsolved. This leads to two main findings.

First, the empirical data analysis proves that the *Intrapreneurship Game* works in its intended context of use – that is, it can be used to raise awareness of and provide insight into an intrapreneurship-conducive culture in industrial R&D. As outlined in Chapter 2, Section 2.4 with regard to experiential learning, it is the collective reflection of the players' immediate simulation experience that creates an increased awareness of and provides insight into the culture that is conducive of intrapreneurship. Moreover, creating awareness of self and others – that is, how individuals behave, interact, communicate, or negotiate – is a necessary step towards building cultural knowledge and developing skills that can be applied to real-life.

Second, besides the main objective (to prove that playing simulation game raises awareness of and provides insight into an intrapreneurship-conducive culture), the developing-multiple case study resulted in an increased understanding as to how such a culture is to be described. In fact, the field-testing validated and enriched the description that was deductively developed in Chapter 4. Having played the simulation game that was grounded in the basic process model of intrapreneurship and its underlying conflict and reflected upon it, the players described a (cultural) environment that they consider to be conducive of intrapreneurship. In other words, they described from a post-simulation perspective the simulation's ideal target situation based upon their simulation experience.

6.5 Summary and implications for applying the simulation game

The empirical data analysis that was presented in the previous sections suggests that the *Intrapreneurship Game* can be used to create awareness of and provide insight into a culture that is conducive of intrapreneurship in industrial R&D. It is an ecologically valid, reliable and effective simulation game. To prove this, an initial, theory-based design of the simulation was field-tested, iteratively developed and improved in the scope of a developing multiple-case study. The result of this cyclic-iterative process is the final version of the

Intrapreneurship Game as part of the following grounded and field-tested design proposition: *"In order to promote intrapreneurship in industrial R&D (C), one can use a scenario-based simulation game (I), which will through experiential learning (M) create awareness of and insight into an intrapreneurship-conducive culture (O)."*

First, the simulation game was pre-tested at technical universities in Eindhoven and Delft (the Netherlands), as well as Darmstadt and München (Germany) involving at total of 219 engineering students. Both in-depth qualitative and descriptive quantitative data was collected by triangulating three sources of evidence: moderated group discussions (debriefings), post-simulation questionnaires and personal memos. The main objective of the pre-testing was to substantiate the underlying conflict scenario, prove the simulation game's general functional capability and learn what procedural format is most suited to play the simulation game. Since students most probably lack business experience, robust conclusions can not be drawn for applying the *Intrapreneurship Game* within industrial R&D. Nonetheless, the pre-testing can be seen as a major step towards the following field-tests in its intended context of use.

Based on that, five field-tests were conducted within industrial R&D organizations in France, Germany, and the Netherlands involving a total of 51 professional R&D engineers and scientists. Both in-depth qualitative and descriptive quantitative data was collected by triangulating three sources of evidence: moderated group discussions (debriefings), post-simulation questionnaires and semi-structured follow-up interviews. The gained empirical evidence suggests that the cyclic-iterative design process resulted in an ecologically valid, reliable, and effective simulation game. Moreover, it has resulted in an enriched understanding of how an intrapreneurship supportive-culture is to be described.

First, the simulation game is ecologically valid. The underlying scenario including the four key roles that are used to operationalize the underlying conflict of intrapreneurship is realistic in the sense that it approximates the real-life situation. Still, the consulting role remained to be ambiguous to some extent. Moreover, the simulated meeting limits the ecological validity in the sense that intrapreneurship is a lengthy process that can not be simulated in one single meeting. Nevertheless, the overall level of abstraction and simplification that is inevitable in the case of simulation is considered to be acceptable.

Second, the procedure that is employed to run and play the simulation game is reliable. The introductory briefing and the following role-wise preparation phase are sufficiently well-designed to prepare the players for the simulation. The players of both the key and supporting roles (protagonists) and the minor roles (observers) are involved in and can contribute to the simulation. Finally, the debriefing session allows for a collective reflection of the simulation

experience. Being a reversal of the briefing process, it aims to establish long lasting learning points and link the simulation experience to reality and business practice.

Third, the simulation game is an effective intervention in order to create awareness of and provides insight into an intrapreneurship-conducive culture. Confronted with a realistic scenario of intrapreneurship, the simulation invites the players to experience the underlying conflict of intrapreneurship and the challenge to resolve it. By reflecting on their immediate simulation experience, the players reported what they consider to be an intrapreneurship-conducive cultural environment. On a collective level, their descriptions validate and enrich the description that was deductively developed and defined as the simulation's ideal target situation. Hence, it can be concluded that the simulation created awareness of and provided insight into how intrapreneurship can be promoted from a cultural point of view.

Given this, the field-testing also added to our understanding of intrapreneurship and how it can be supported from a cultural point of view. The developing multiple-case study not only proved that playing the simulation game does indeed create awareness of and insight into that culture (which was the main objective of the design research process), but also contributed to the theory on intrapreneurship and culture. By proving that the simulation game is ecologically valid, it could be shown that the basic process model of intrapreneurship that was used to load the simulation is also ecologically valid. Moreover, the description that was deductively developed in Chapter 4 and used as the simulation's ideal target situation could be empirically validated and enriched by proving that the simulation game works in its intended context of use.

Chapter 7

Conclusion

This research set out to study how large, established organizations, and their R&D units in particular, can foster intrapreneurship – that is, the ability to harness entrepreneurship inside of their boundaries. Intrapreneurship is founded in the logic of discovering and pursuing entrepreneurial opportunities that lead to the development of radical innovations that feature – in contrast to incremental innovation – a high degree of novelty, address and open up new markets, and engage in risky projects with long-term time horizons until profitability. It has been outlined in Chapter 1 that firms should periodically invest in radical innovations in order to push internally centered growth into completely new market opportunities that are unrelated to the current mainstream business activities.

However, many companies, especially the large and established ones, have difficulty implementing and sustaining intrapreneurship. A major reason for this is the underlying conflict that usually arises because entrepreneurship is clearly contradictory to the administrative mode of established organizations; entrepreneurs and the organizational management simply do not match regarding the pursuit of opportunities for radical innovation. Especially industrial R&D organizations are rather designed for incremental innovation focusing on current business activity than for radical innovation aiming at the development of new business domains. The true challenge of intrapreneurship is to resolve this underlying conflict and shape a cultural environment in which intrapreneurship is nurtured and can develop again and again.

Given this, the goal of this doctoral dissertation was to develop knowledge to understand and explain the occurrence of intrapreneurship, as well as knowledge to promote and implement the process in the context of industrial R&D. More specifically, the aim was to design a scenario-based simulation game, the *Intrapreneurship Game*, the purpose of which is to raise awareness of and provide insight into an intrapreneurship-conducive-culture. Designing a tool or course of action to improve business practice falls within the paradigm of the design sciences. The typical research output is a so-called design proposition that has been grounded in theory and field-tested in its intended context of use.

The overall result of design process is the *Intrapreneurship Game* – an ecologically valid, reliable and effective simulation game that can be used to create awareness of and provide insight into a culture that is conducive of intrapreneurship in industrial R&D. More specifically, the result is the following grounded and field-tested design proposition: *"In order to promote intrapreneurship in industrial R&D (C), one can use a scenario-based simulation game (I), which will through experiential learning (M) create awareness of and insight into an intrapreneurship-conducive culture (O)."* To prove whether the design proposition works, an initial, theory-based design of the simulation was field-tested, iteratively developed and improved in the scope of a developing multiple-case study.

First, the simulation game was pre-tested at technical universities in Eindhoven and Delft (the Netherlands), as well as Darmstadt and München (Germany) involving at total of 219 engineering students. Based on that, five field-tests were conducted within industrial R&D organizations in France, Germany, and the Netherlands involving a total of 51 professional R&D engineers and scientists. Both in-depth qualitative and descriptive quantitative data was collected by triangulating the following sources of evidence: moderated group discussions (debriefings), post-simulation questionnaires, semi-structured follow-up interviews and personal memos.

Given this, the following sections present the key deliverables of the design process. In accordance with the design approach, the findings do not only contribute to science (Section 7.1), but also to professional practice (Section 7.2). More specifically, the result of the design process is knowledge that can be seen as the middle-ground between theory to describe and explain the phenomenon of intrapreneurship, and actionable knowledge to implement intrapreneurship in real world business environments. Finally, Section 7.3 concludes this doctoral dissertation by highlighting the major personal learning points.

7.1 Contributions to science

This doctoral dissertation confirmed what has been postulated earlier in scholarly intrapreneurship literature: intrapreneurship still lacks a generally accepted definition and is far from being a well-defined research field. Although there is a common understanding that intrapreneurship can be defined as *"entrepreneurship within organizations"*, the concept is still perceived ambiguously. As outlined in Chapter 2, various definitions of intrapreneurship and synonymously used terms refer to the same or different phenomena, such as the propensity of either the individual employee or the whole organization to engage in

entrepreneurial or intrapreneurial activity, or an organizational climate that is supposed to promote entrepreneurship within existing organizations.

Recent contributions to this field show increasing consensus that intrapreneurship should be defined, in analogy to entrepreneurship, as "*the process in the course of which an intrapreneur discovers and exploits an entrepreneurial opportunity to develop new means-ends relationships within an existing organization"* (Chapter 2). Indeed, this doctoral dissertation showed that, firstly, intrapreneurship must be understood as a process and, secondly, the separated consideration of the individual level (intrapreneur) and the organizational level (management) needs to be abandoned. Without a doubt, both the individual and the organization are necessary ingredients in intrapreneurship, but considered alone they are not sufficient to explain it as a whole.

Therefore, for intrapreneurship to be successful, it is important that it evolves as an integrative and cooperative process involving both the individual and the organizational process level. The intrapreneur and the management need to engage in a dialogical approach. Interaction in the form of intra-organizational negotiation processes is essential to resolve the underlying conflict of intrapreneurship. This conflict arises when intrapreneurial initiatives emerge on the level of the individual employee, but the management shows no interest in pursuing them, or if management's interest in intrapreneurship is not matched by a significant number of intrapreneurial initiatives originating from the individual level.

This definition and model of intrapreneurship was both theoretically-grounded (Chapter 2) and empirically validated (Chapter 6) in the course of the cyclic-iterative process of development, field-testing and improvement. Initially, it served as the basis to design a preliminary concept version of the *Intrapreneurship Game*. Finally, the gained empirical evidence suggests that the simulation is ecologically valid – that is, the methods, materials and setting of the simulation approximate the real-life situation. From this it follows that the basic process model of intrapreneurship that is used to theoretically ground the simulation game is also ecologically valid – that is, reality is correctly modeled and represented.

Likewise, this doctoral dissertation produced strong evidence that an intrapreneurship-conducive culture is an antecedent condition for intrapreneurship. The description of such a culture, which has been deductively developed in Chapter 4, could be inductively validated and enriched by applying the *Intrapreneurship Game* in industrial R&D (Chapter 6). The simulation exercise invites and enables the participants to reflect on their own observations and concrete simulation experience to deduce new theory and, in turn, implications for action that are pertinent for real life situations. By connecting the individual level with the larger

context of the organizational level, as well as with the external, remote environment of the intrapreneurship process, the players can develop increased awareness and the insight that intrapreneurship requires a dialogical approach to be successful.

This still implicit awareness on the part of the players has been made explicit in the post-simulation debriefings and interviews. The transcripts of the collected qualitative data can be seen as protocols of the players' perception of an intrapreneurship-conducive culture, the analysis of which resulted in a comprehensive description that is both theoretically grounded and empirically validated and enriched. Thereby, it suggests that the design proposition, in the form of the following cause-effect relationship, is internally valid: "*In order to promote intrapreneurship in industrial R&D (C), one can use a scenario-based simulation game (I), which will through experiential learning (M) create awareness of and insight into an intrapreneurship-conducive culture (O)"*.

Still, the external validity of the findings remains limited in the sense that design research generally aims at developing context-specific knowledge that is valid for a class of cases or situations. Given the players' cultural backgrounds, which were divers in terms of national, professional and corporate cultures, the developing multiple-case study showed that the simulation game and, as a consequence, the design proposition are suited to be applied in intercultural settings. The outcomes of the simulations appeared to be independent of the different national and corporate cultures, but remained focused in the professional culture of engineers and scientists. Thereby, the objective was not to study the influence that national, corporate, and professional culture may have on intrapreneurship. The findings, therefore, can be generalized to a real-world population limited to the context of industrial R&D in pan-European settings.

To increase the validity of both the basic process model of intrapreneurship and the description of an intrapreneurship-conducive culture, the findings should be taken as an opportunity to further advance and refine theory on intrapreneurship and to work towards a commonly accepted definition. Further empirical studies are recommended, such as quantitative approaches involving more organizations (in both European and non-European countries) and larger sample sizes. Moreover, both longitudinal and multidimensional studies can be considered to link intrapreneurship and intrapreneurship-conducive culture to organizational innovativeness and performance. This would help to substantiate the theory that intrapreneurship is indeed a value-creating process and needs to be nurtured by an appropriate cultural setting.

7.2 Contributions to professional practice

It has been outlined in this study that implementing intrapreneurship is not about implementing the intrapreneurship process itself, but rather about shaping a cultural environment that facilitates the process. Certainly, a valid process model of intrapreneurship and a description of a culture that is conducive of it contribute to intrapreneurship theory and help to better understand the phenomenon, but do not necessarily change or improve anything in the business world. The *Intrapreneurship Game* has been designed to create awareness of and provide insight into an intrapreneurship-conducive culture, a culture that is made and confirmed by human interaction, conventionalized and passed on to others or newcomers and, at the same time, determines further interaction.

The *Intrapreneurship Game* is a scenario-based simulation game with which industrial R&D engineers and scientists can experience a realistic scenario of intrapreneurship and its underlying conflict (which they may recognize from reality). Confronted with the scenario, they have the opportunity to both interactively develop solutions to resolve the conflict and, in turn, apply and test these solutions in a safe environment that is realistic enough, but still provides room for exploration, development and testing. In this way, the simulation game, including the briefing and debriefing, functions both as a mirror (how are we doing?) and as a window (what alternatives ways are there of doing things?) of how the participants deal with intrapreneurship both in the simulation and in reality. The assumed advantage is that what is learned collectively will transfer to the settings where the acquired knowledge and skills will be used.

In the course of the design process actionable knowledge was created that is used to improve business practice. The empirical evidence gained in the course of the developing multiple-case study suggests that the simulation game works in its intended context of use – that is, it is an ecologically valid, reliable and effective intervention that can be used to create awareness of and provide insight into an intrapreneurship-supportive culture (Chapter 6). It could be observed in the simulations that the modeled conflict of intrapreneurship arose and that the players encountered major difficulties to resolve it. Instead of pursuing cooperative strategies, the players tended to adhere to their positions and defend their interests individually. A dialogical approach between the individual and the organizational process was not observable. As a consequence, the intrapreneurship conflict remained unresolved.

Triggered through the simulation experience, it is the act of reflection on the part of the players that created awareness of and produced insights into intrapreneurship and its usefulness for business reality. Creating awareness of self and others – that is, how

individuals behave, interact, communicate, or negotiate – is a necessary step toward building cultural knowledge and developing skills that can be applied to real-life. The players became aware that their way of dealing with the scenario will not facilitate intrapreneurship – both in the simulation and most probably in reality. It is only when people realize that a certain habit of doing does not work anymore that behavior, attitude, values, and perceptions – that is, culturally bound elements of human being and action – may be affected or even changed.

The results that have been obtained are encouraging to further improve and apply the *Intrapreneurship Game* and to widen its scope of use. Intrapreneurship not only relies on the presence of an intrapreneur alone, but also on an intrapreneurship-friendly organization. Hence, besides industrial R&D engineers and scientists, the target group may also comprise managers, both at top and middle management level. Another enlargement would be to embed the simulation in a series of interventions to simulate the intrapreneurship process in a more holistic way, incorporating the phases of both opportunity discovery and opportunity exploitation. Moreover, (radical) innovation is not only relevant in technical areas such as industrial R&D, but also in service, trade or financial departments and organizations. Given the modular design, the underlying game scenario may be altered to be used in contexts other than industrial R&D.

The pre-testing with engineering students showed that the *Intrapreneurship Game* seems to be likewise well-suited as an educational tool for engineering students. As possible future R&D engineers or managers they represent another relevant target audience. However, variations in the design of the procedure seem to be necessary: the simulations with students appeared to be less realistic, mainly because they lack professional experience. For instance, the simulation game can be embedded into a series of lectures, seminars, or workshops that provide a theoretical framework that the students can refer to in the simulation. In addition, the involvement of professionals as expert coaches and observers helps to establish the missing link to business practice and, in turn, to increase the ecological validity.

Finally, effective measures to evaluate the simulation and its effectiveness need to be developed. Instead of running post-simulation evaluations only, a combined pre- and a post-simulation evaluation would increase both the rigor of the intervention and the measurability of its effectiveness. While a pre-simulation questionnaire would take an inventory of the current culture, post-simulation data, collected after a reasonably long period of time, would intend to measure long-term effects of the simulation. Thereby, both the qualitative and quantitative evidence gained from the developing multiple-case study presented in Chapter 6 – together with a deliberate use of relevant theory and best practice examples – serves as a

solid basis to improve the evaluation process also with regards to the sustainability of the intervention.

7.3 Personal learning points

The motivation for this research project has its roots in my personal interest in entrepreneurship and innovation which started to arise during my studies of industrial engineering and management at the *Universität Karlsruhe (TH)* (Germany) and the *Institut National Polytechnique de Grenoble* (France). It is my personal belief that organizations – no matter whether emerging ventures, medium-sized or large, established companies – should consider innovation as an elementary pillar of sustained performance and success. Beginning with my master thesis (Menzel, 2003a, 2003b), I was especially curious how large, established companies and their R&D organizations can nurture and develop radical innovation. Studying the question of how entrepreneurship can be brought into established firms strongly relates to my vision of myself engaging in entrepreneurial activity.

To my understanding, answering this question should not only result in theoretical knowledge that helps to better understand and predict the phenomenon, but also in knowledge that can be applied to the settings of real-world R&D to improve business practice. Therefore, the design approach has been chosen as the underlying research strategy; it can be understood as an engineering approach towards management theory thereby serving as the middle ground between science and professional practice. Part of this motivation is certainly that I am an engineer myself: designing an artifact, something new to solve a problem, to improve or change business practice, or to shape the future is always an inspiring goal. In retrospect, the entire research and design process offered me a multiplicity of learning opportunities.

Design is a long and iterative process, and to get to something really new and make it working, various key elements of intrapreneurship seem to be helpful: freedom and resources to explore, develop and test, room for individual work but at the same time cooperation, goal orientation, a vision of the future, persistence, hard work, as well as an orientation to the external environment. By designing the *Intrapreneurship Game* I had the chance to develop a deep understanding of both independent entrepreneurship and intrapreneurship. Moreover, I experienced from an observer's perspective how R&D professionals as well as engineering students deal with this phenomenon in the simulations and most probably in reality as well. This is a rich reservoir of theoretical and applicable knowledge that I regard as highly valuable for my future career as a researcher, manager or entrepreneur.

Doing empirical work in industry and R&D settings in France, Germany and the Netherlands was a unique chance to learn about today's business reality. The research process was an excellent opportunity to interact and work with people as well as to learn about people and their different cultural backgrounds. I became aware of the important, mostly implicitly present role that culture plays in everybody's daily life. People who to not dare to look beyond their cultural boundaries, no matter whether national, corporate, or professional culture, will have difficulties working in the inter-cultural cooperation and cross-cultural collaboration and teamwork so common today. These networked work environments with people who have different cultural backgrounds require mutual understanding and respect across cultural borders.

Moreover, it is satisfying to experience that the result of this doctoral dissertation is tangible, still in use and of value for companies and educational settings at universities. The *Intrapreneurship Game* offers an approach to learning that I have personally missed throughout my whole studies and professional career. Other important personal learning points include both moderation and negotiation skills, both of which I learned by doing in the course of the field-testing. In the briefing the players need to be motivated and a limited but sufficient dose of theory needs to be given to the players so that they feel comfortable about playing the game. The simulation itself needs to be observed and controlled carefully in order to interrupt the process, if necessary, and provide feedback in the debriefings. Finally, the debriefing needs to be moderated so that all players are addressed and given the opportunity to express what they have experienced.

Negotiation theory served as a sort of ancillary knowledge used to design the simulation game. As outlined in Chapter 5, the underlying conflict of intrapreneurship is implemented by means of an intra-organizational negotiation encounter. Observing the players in the various applications in both educational and industrial R&D settings offered enriching insights into negotiation behaviors, mistakes negotiators typically make, and successful or promising negotiation strategies. This rich source of knowledge, both explicitly analyzed in the scope of this doctoral dissertation and implicitly observed and processed, is highly valuable for all sorts of negotiations that will occur in my future professional – an certainly also private – life.

To recapitulate, this research project resulted in both relevant contributions to science and professional practice. What is more, it was also very fruitful and enriching from a personal learning perspective. Altogether, it can be seen as a successful research project, the results of which will be used to further enhance intrapreneurship theory and will be applied to promote

intrapreneurship in the settings of both business practice and academic education. The *Intrapreneurship Game* is knowledge – but very tangible knowledge.

Appendix A: The Intrapreneurship Game

DESCRIPTION OF THE BACKGROUND SITUATION

The situation that is simulated today takes place at HAIDO, a large multinational corporation providing science and engineering-based solutions in areas such as food and nutrition, health care, coatings and color, apparel, and construction. HAIDO has annual sales of EUR 3.6 billion and operates worldwide in 25 different countries with about 38,000 employees.

HAIDO is currently in a phase of business restructuring across all business units. Given the current weak stock performance, the strategic five-year plan aims to raise profit margins from 7% to 10% through the implementation of lean processes and improved products that meet well-identified customer needs. The Business Unit Performance Materials (BU-PM), which employs about 11,000 people and accounts for nearly 40% of HAIDO's revenues, is concerned with industrial polymers, fiber-reinforced composites, and elastomers. In this market, where the prospects range from stable to moderately growing, HAIDO is amongst the three leading companies worldwide.

Recently, the young R&D engineer Ingham discovered unexpected material properties while working on new organic fiber materials for composite applications. Under certain conditions the fiber emitted light. Fascinated by this phenomenon, Ingham conducted some more experiments after work to better understand how the effect could be reproduced and controlled. After a series of first tests it became clear that Ingham had made a major technological discovery: Light Emitting Organic Fiber (LEO Fiber).

The mechanism of LEO Fiber is based upon a combination of an anode, a cathode and light emitting organic materials. When thin layers of different organic materials are sandwiched between appropriate anode (conductive glass) and cathode (metallic electrode) layers, a relatively modest voltage (typically 2 - 10 volts) applied across the material will cause the emission of light in a process called electro-luminescence. The color of the light depends on the organic material used. The layered system is very thin, usually less than 500 nm (i.e. 0.5 thousandths of a millimeter).

To discuss the pursuit of LEO Fiber, Ingham approached his direct boss Rudolph, who agreed on taking it a step further. Today, Ingham is presenting his discovery to the Innovation Board of the BU-PM, which is composed of the managers Churchland (Business Unit), Marthiensen (Marketing department), and Rudolph (R&D department). Churchland, who will chair the meeting, also invited Barney, who works as an independent market expert in the field of optical technologies.

The goal of today's meeting of the Innovation Board is to decide whether an officail LEO Fiber project will be started, or not.

SWOT ANALYSIS

Strengths and Opportunities

- LEO Fiber does not require a backlight to function. It requires less than half as much power as liquid crystal and generates far less heat than plasma display technology.
- The range of possible colors, brightness, richness in contrast and viewing angles is greater, and the circuit time is 1000 times faster than liquid crystal display technology.
- LEO Fiber can be printed onto a substrate using inkjet technology, enabling both more scalable and cost-saving manufacturing processes than other flat display technologies.
- High-resolution, graphical color displays can be used for small portable devices, which have until now made use of monochrome, low-resolution displays to conserve power. Other applications may include TV/computer flat screens, as well as displays for automotive or industrial human-machine interfaces.
- LEO Fiber can be applied to lighter, thinner, and even flexible displays used in clothes, virtual reality rooms, or continuous lighting applications, such as large-scale information or advertisement boards to replace distributed point sources of light based on light bulbs or inorganic Light Emitting Diodes.

Weaknesses and Threats

- The lifetime is still very limited; red and green elements already have lifetimes of well over 20,000 hours, whereas blue elements lag significantly behind with 10,000 hours.
- So far, only passive-matrix displays can be applied to small-scale displays. Active-matrix displays triggering each single pixel would allow for larger scale displays.
- The material is very sensitive to moisture, oxygen and water, which can damage and destroy the organics. This requires new, resistant sealing processes.
- Appropriate and scalable manufacturing equipment are key, but HAIDO has neither sufficient R&D nor manufacturing know-how available in-house. The big liquid crystal display manufacturers (in Asia) have expertise and certainly a competitive advantage.
- The market would completely differ from HAIDO's current customer base. As LEO Fiber is an emerging technology, HAIDO also needs to develop a completely new market.
- For a marketable product, still an enormous amount of R&D effort has to be made internally, or knowledge has to be acquired from the outside. The necessary investment can hardly be estimated, but it will not pay off before the next five to seven years.

AGENDA OF THE MEETING

Topic: Pursuit of LEO Fiber

Participants: Churchland (Business Unit Manager, BU-PM)
Marthiensen (Marketing Manger, BU-PM)
Rudolph (R&D Manager, BU-PM)
Ingham (R&D Engineer, BU-PM)
Barney (Independent Market Expert)

Date: _____

Time: _____

Place: HAIDO, Business Unit Performance Materials (BU-PM)

Points of the agenda:

- Opening by Churchland
- Short presentation by Ingham (max. 2-3 min.)
- Discussion of the pursuit of LEO Fiber
- Intervention by Barney (invited by Churchland)
- Decision of the pursuit of LEO Fiber
- Closure by Churchland

Questions to prepare for the meeting:

- What are possible commercial applications that LEO Fiber technology qualifies for?
- Will LEO Fiber replace current display technologies? What are new applications?
- What R&D effort is required to achieve a reliable technological level?
- Are HAIDO's R&D processes/resources appropriate for developing LEO Fiber?
- Should partners be involved in the development/manufacturing of LEO Fiber?
- Are competitors working on similar technologies/solutions?
- What are the market prospects of LEO Fiber?
- Who will be the customers, and will they accept LEO Fiber technology?
- Is the time-to-market critical?
- What investment is required to develop LEO Fiber?
- What are possible sources/models of funding?
- What type of organization is most appropriate for developing LEO Fiber?
- Who should "own" the R&D process and later the new product?

GUIDE FOR OBSERVERS

Please observe your player carefully during the simulation and make notes according to the following two levels of analysis. Your observations will be discussed during the debriefing session subsequent to the simulation.

Role observed:

Negotiation process: **What behavior did your player show in the simulation?**

Negotiation outcomes: **What has your player achieved in the negotiation?**

CHURCHLAND – BUSINESS UNIT MANAGER

You are the Manager of the Business Unit Performance Materials. Your educational background is in electrical engineering, and you hold an MBA from a prestigious business school. You have been working for HAIDO for more than 20 years, and three years ago you were promoted to Business Unit Manager.

Your goals for today's meeting defined in terms of full-time employees (FTE):

Your aspiration level – what you would like to achieve in today's meeting (given):

The BU-PM should concentrate on the current business restructuring process to achieve the corporate performance objectives. The current budget of the BU-PM can support new product development initiatives with 1 FTE only.

Your satisfaction level – what you ultimately can accept to finish the negotiation successfully (to be defined):

_____
_____
_____
_____
_____
_____

The following description may help you to define your negotiation strategy:

- As the Business Unit Manager you have full responsibility for the BU-PM's operational and financial performance; you report directly to HAIDO's executive board.
- The strategy of the BU-PM is to address existing markets with products (i.e. performance materials) that are purposefully developed and enhanced on the basis of well-identified customer needs.
- Besides ensuring the current and near-future performance of the BU-PM, you also need to look ahead for future opportunities of innovation and profitable new business activity.
- In any case, your personal success is strongly related to the success of the BU-PM, which has to achieve double digit profit margins within five years' time.
- Looking at these conditions and Ingham's new product proposal, it is doubtful whether LEO Fiber is a true business opportunity: the project seems to be too costly and will take too long to break even.
- It is your job to open and chair today's meeting, guide and moderate the discussion, and make sure that every participant has a say and may define his or her position.
- To build a common understanding, find out what all participants want to achieve and what they are willing to contribute (in terms of FTE) to the development of LEO Fiber.
- Since you have invited the independent market expert Barney, it is your task to ask for advice and to time his or her intervention(s).
- In the end, you have to make a clear decision including the definition of action points. Due to your full calendar, you have to close the meeting after exactly 45 minutes.

MARTHIENSEN – MARKETING MANAGER

You are the Marketing Manager of the Business Unit Performance Materials. Your educational background is business administration, concentrations in marketing and finance. Having worked over 10 years as a market analyst and as a product marketing manager, you were promoted to Marketing Manager one year ago.

Your goals for today's meeting defined in terms of full-time employees (FTE):

Your aspiration level – what you would like to achieve in today's meeting (given):

Marketing should concentrate all efforts on identifying customer needs, defining new and enhancing current products, as well as increasing sales in the short-term. In the current fiscal year 1 FTE is budgeted for new product development.

Your satisfaction level – what you ultimately can accept to finish the negotiation successfully (to be defined):

_____
_____
_____
_____
_____
_____

The following description may help you to define your negotiation strategy:

- **You are responsible for all marketing activities: market research and analysis, product portfolio management, product communication, and customer relationship management.**
- **The entire Marketing department has an annual budget of about 2.5% of sales (of the BU-PM) and employs about 50 people.**
- **The strategy of the BU-PM is to address existing markets with reliable products that are developed on the basis of known technology and well-identified customer needs.**
- **LEO Fiber does not seem to be in line with the strategy: it involves a high degree of novelty, coupled with tremendous development costs and a long time to break even.**
- **Since it seems to be a "high-risk/high-return project", you prefer to stay with the core business, for which the customer base is known and believable market data available.**
- **You are also missing a detailed business plan that provides – besides technological data – reliable market and financial data.**
- **Moreover, new product ideas that are pushed only by R&D are often far too technical, partly over-engineered, and ignore the actual needs and problems of the customers.**
- **In order to decrease the market risk of LEO Fiber, it is in any case necessary to conduct an in-depth market study before engaging in any further R&D activities.**
- **The current marketing budget does not offer room for maneuvering: it is budgeted for both customer-oriented enhancement and intensified marketing of the current products.**

RUDOLPH – R&D MANAGER

You are the R&D Manager of the Business Unit Performance Materials. Your educational background is in mechanical engineering, with a specialization in micro-systems engineering. Before joining HAIDO five years ago, you worked as an R&D engineer, a project manager, and later as R&D director in a medium-sized electronics company.

Your goals for today's meeting defined in terms of full-time employees (FTE):

Your aspiration level – what you would like to achieve in today's meeting (given):

R&D should focus on the short-term and concentrate all efforts on further enhancing and re-launching the current products. You would support new product development initiatives, if additional R&D funds were made available.

Your satisfaction level – what you ultimately can accept to finish the negotiation successfully (to be defined):

_____

_____

_____

_____

_____

_____

The following description may help you to define your negotiation strategy:

- You are responsible for all R&D activities: new product development, ensuring competitive technology, and establishing the direction of long-term research efforts.
- The R&D department has an annual budget of about 6% of sales (of the BU-PM) and employs about 200 R&D engineers and scientists.
- When Ingham discussed the discovery of LEO Fiber with you a few weeks ago, you agreed on taking it a step further and presenting it to the Innovation Board.
- Personally you do not have any objections to the project, but you are being pushed by top management to focus on the current business by enhancing the existing products.
- HAIDO's current business restructuring plan puts clear emphasis on increasing company performance and shareholder value in the short term.
- LEO Fiber is not in line with this strategy. To the contrary, in order to develop LEO Fiber into a commercial product, more basic, long-term R&D effort will be required.
- To reduce the technological risk it is most important to file a patent and develop a prototype as a proof of concept that can be used to approach possible customers.
- However, the current R&D budget has already been allotted in its entirety to the standard, ongoing R&D projects. Extra, long-term R&D projects would require extra funds.
- You highly value Ingham as an employee, who is one of your best R&D engineers and strongly needed for the realization of current and near-future standard R&D projects.

INGHAM – R&D ENGENEER

You are a young and motivated engineer working in the R&D department of the Business Unit Performance Materials. Your educational background is in electrical engineering and material science, and you started working for HAIDO three years ago, right after graduating from a prestigious polytechnic school.

Your goals for today's meeting defined in terms of full-time employees (FTE):

Your aspiration level – what you would like to achieve in today's meeting (given):

To develop LEO Fiber into a commercial application, an R&D project of 24 FTE is required – that is, a four-year R&D project staffed with six full-time employees from relevant disciplines. The R&D project should be managed by you.

Your satisfaction level – what you ultimately can accept to finish the negotiation successfully (given):

_____
_____
_____
_____
_____
_____

The following description may help you to define your negotiation strategy:

- **Currently, you are involved in the development of new fiber-reinforced composites that will help to enhance the current products (performance materials).**
- **You consider LEO Fiber to be a highly promising opportunity to both open up completely new business activity and to sustain the well-being of HAIDO in the long-term.**
- **Since discussing your discovery with your boss Rudolph, you are pleased to be invited to present LEO Fiber to the Innovation Board of the BU-PM.**
- **You are fully convinced that LEO Fiber will be a big market success in the end, revolutionizing the flat display industry by offering new applications and customer value.**
- **LEO Fiber is your discovery, and you have already made considerable personal effort in your spare time. It is your personal goal to make it work and take it to the next step.**
- **HAIDO's R&D processes are too formalized and slow. For this type of development, a high degree of flexibility and project autonomy are required.**
- **To convince the managers, prepare a "roadmap to the market" that provides answers to the questions outlined in the agenda of the meeting.**
- **In case top management refuses your proposal, think of alternative scenarios to develop LEO Fiber towards a commercial application/product – even outside of HAIDO.**
- **You aim for a clear go/no-go decision in today's meeting to have clarity as to whether you can develop LEO Fiber within HAIDO, or should start your own business.**

BARNEY – INDEPENDENT MARKET EXPERT

You are an independent market expert with specialized knowledge in the optical technologies. Your educational background is in material science and marketing, and over the past 25 years you have been working in leading positions in several small and large companies. Five years ago you started your own market research company.

Define your goals for today's meeting:

Your aspiration level – what you would like to achieve in today's meeting (given):

The meeting of the Innovation Board should be concluded with a decision that is based on your proposal: starting an internal 12 FTE R&D project managed by Ingham.

Your satisfaction level – what you ultimately can accept to finish the negotiation successfully (given):

At the very least, you should trigger a discussion that creates room for a negotiation, so that participants themselves are able to make a commonly accepted decision in the end.

The following information may help you to prepare your intervention:

Market prospects of the LEO Fiber technology:

- The world market for LEO Fiber technology is still a niche market but will be strongly growing within the coming five years, thereby resulting in aggregated sales of EUR 3,000 million (conservative) or even EUR 5,000 million (optimistic).
- Engaging in LEO Fiber is a risky endeavor, but it will also offer a strong competitive position based on technological leadership. LEO Fiber has the potential to substitute current flat display technologies, such as liquid crystal or plasma technology.
- There is not only the seemingly attractive TV/PC screen market, in which more than 60 competitors already provide high-end liquid crystal and plasma displays, but also other display applications, such as small display devices or machine-user interfaces for industrial and automotive applications.

Proposal to develop LEO Fiber into a commercial application within HAIDO:

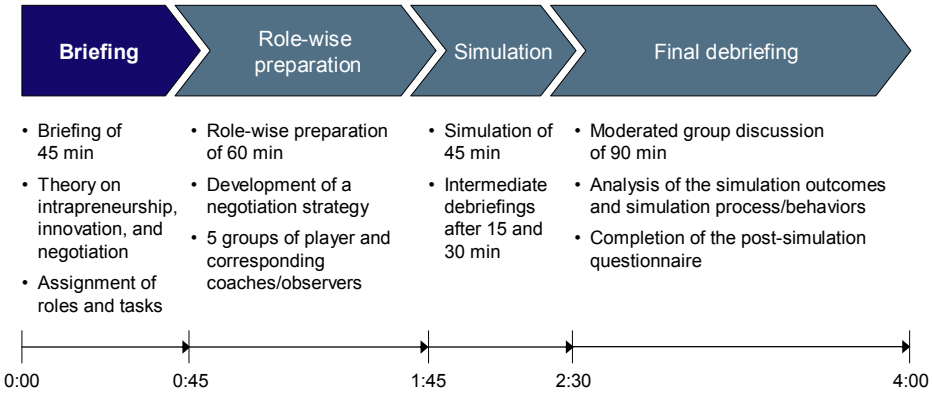
- You suggest a three-years internal R&D project staffed with four full-time employees from relevant disciplines and managed by Ingham.
- The financing should be based on hybrid-funding: 50% of corporate venture capital through HAIDO and 50% of funding through R&D and Marketing.
- Both cooperation with (e.g HAIDO provides LEO Fiber as core technology, whereas other components are supplied) and acquisition of a supplier or competitor should be considered.
- You can offer your vast personal network with excellent business contacts all over the world.

Underpin your interventions by means of convincing arguments and visualizations such as graphs, figures, charts, etc.

Appendix B: The User Manual

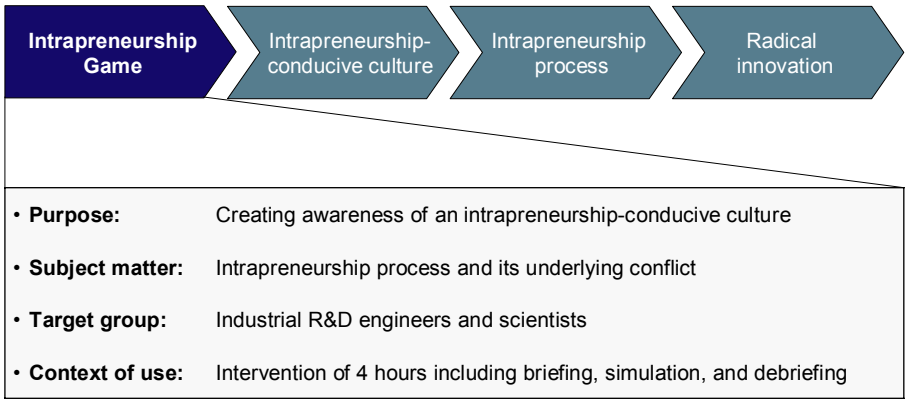
intrapreneurship
a game

Procedural format of the Intrapreneurship Game



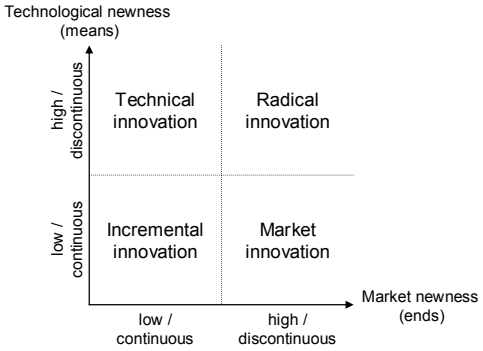
intrapreneurship
a game

Goal: Applying the *Intrapreneurship Game* to create awareness of an intrapreneurship-conducive culture



intrapreneurship a game

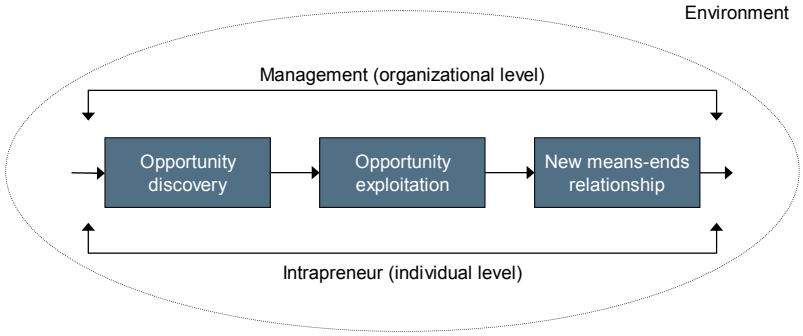
Innovation defined in terms of technology-market relationships: a successfully commercialized invention



(Garcia & Calantone, 2002; Gemünden, 2004; Hauschildt, 2004; Salomo, 2003)

intrapreneurship a game

*Intra*preneurship is the process of *entre*preneurship within the boundaries of existing organizations



Intrapreneurship is the process of discovering and exploiting an entrepreneurial opportunity to create value through the development of new means-ends relationships (innovation) within an existing organization.

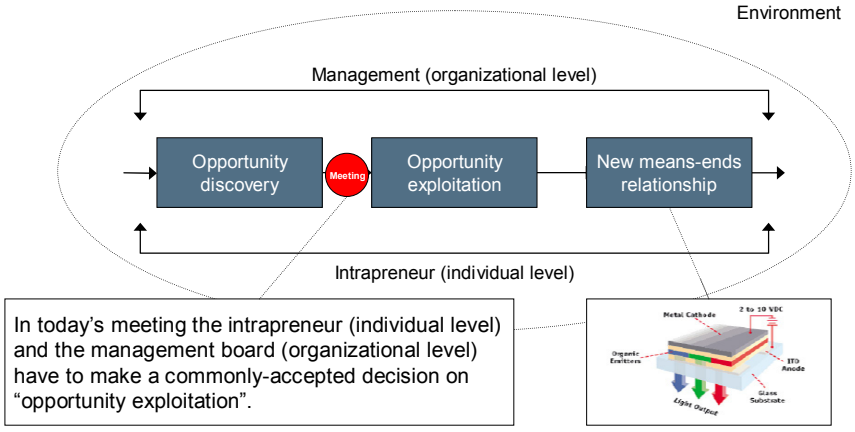
intrapreneurship a game

The underlying conflict of intrapreneurship: individual vs. organizational level

The individual level	The organizational level
• Exploration of new business opportunities	• Exploitation of existing business activities
• Deflection from the present practice	• Reinforcement of the present practice
• Revolutionary change	• Evolutionary change
• Uncertainty acceptance	• Uncertainty avoidance
• Long-term orientation to the future	• Short-term orientation to the present
• Flexibility, room to maneuver	• Planning and formalization of activities
• Visionary and intuitive decision-making	• Decision-making influenced by politics
• Holistic approach	• Functional expertise
• Fair compensation depending on venture success	• Traditional compensation independent from venture success

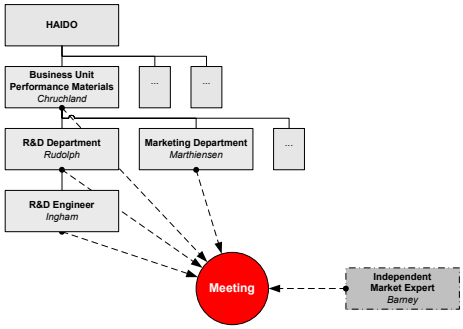
intrapreneurship a game

The Intrapreneurship Game simulates a scenario of intrapreneurship in R&D to develop radical innovation



intrapreneurship a game

Decision-making on “opportunity exploitation” as an intra-organizational negotiation encounter

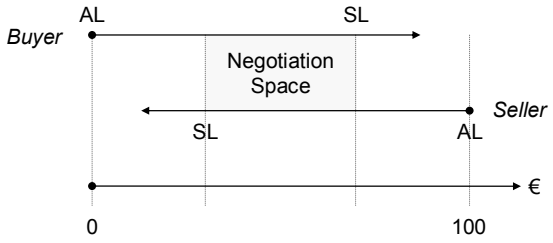


Negotiation is a process in which two or more entities discuss common or (apparently) different interests and objectives in order to reach an agreement or a compromise (contract) in mutual dependence because they see benefits in doing so.

intrapreneurship a game

How to reach a commonly accepted decision?

The **Negotiation Space** represents all possible, commonly accepted decisions:



- **Aspiration Level (AL)**: The level of achievement that you desire in an negotiation; you should disclose it to the other parties.
- **Satisfaction Level (SL)**: The lowest level of achievement that you can accept to finish the negotiation successfully; it stays hidden during the negotiation.

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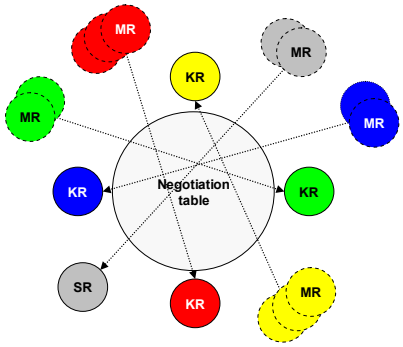
Physical arrangement of the simulation and assignment of the roles



President
Churchland

Vice-President Marketing
Marthiensen

Vice-President R&D
Rudolph

R&D Engineer
Ingham

Independent Market Expert
Barney

KR Key role (protagonist)

SR Supporting role (protagonist)

MR Minor role (observer)

intrapreneurship a game

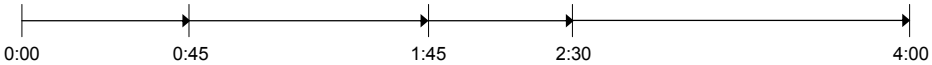
Procedural format of the Intrapreneurship Game

- Briefing of 45 min
- Theory on intrapreneurship, innovation, and negotiation
- Assignment of roles and tasks

- Role-wise preparation of 60 min
- Development of a negotiation strategy
- 5 groups of player and corresponding coaches/observers

- Simulation of 45 min
- Intermediate debriefings after 15 and 30 min

- Moderated group discussion of 90 min
- Analysis of the simulation outcomes and simulation process/behaviors
- Completion of the post-simulation questionnaire



intrapreneurship
a game

Role-wise preparation

- Develop a negotiation strategy in teams of player and observers/coaches.

- Define your goals in terms of full-time employees (FTE) that should be invested in the pursuit of LEO Fiber:
  - Aspiration Level: given in the role-briefs
  - Satisfaction Level: to be defined

- To prepare, please use following information:
  - Description of the background situation
  - New product proposal and SWOT analysis
  - Agenda of the meeting
  - Individual role-descriptions
  - .... your personal knowledge and experience.

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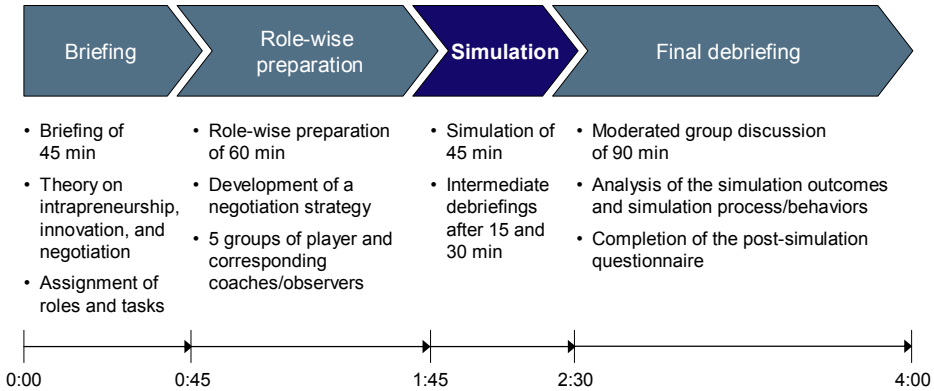
a game

Procedural format of the Intrapreneurship Game



intrapreneurship a game

Simulation

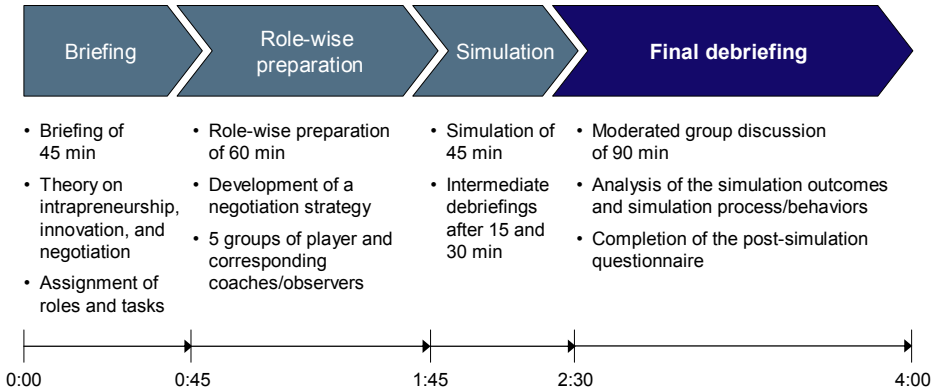
- The overall goal of the meeting is to make a decision on the pursuit of LEO Fiber that is accepted by all participants (i.e., every negotiation party has met at least his/her satisfaction level).

- Intermediate debriefings of 2-3 min after 15 and 30 minutes:
  - establishing what has been reached so far
  - characterization of the negotiation process
  - if necessary, re-adjustment of the negotiation strategies

- Closure of simulation the after 45 minutes based on a commonly made decision.

intrapreneurship a game

Procedural format of the Intrapreneurship Game



intrapreneurship
a game

Final debriefing guide

1. Overall analysis of the simulation (10 min.)
   a. Simulation outcomes
   b. Simulation process
2. Analysis of the individual roles (12 min. for each role)
   a. Simulation outcomes
      i. What was the role's Aspiration Level and Satisfaction Level?
      ii. To what level of achievement did the role get in the end?
   b. Simulation process
      i. How did the player reach his/her goal?
      ii. How did the player feel about playing his/her role?
3. Concluding discussion (10 min.)
   a. Given the simulation experience, what is intrapreneurship?
   b. Is intrapreneurship relevant for and applicable in reality?
4. Completion of the post-simulation questionnaire (10 min.).

Appendix to the User Manual

- Pre-simulation checklist
- Post-simulation questionnaire
- Interview guide

Pre-simulation checklist

Resources to be prepared for the simulation game:

- O Presentation
- O Beamer
- O Flip chart, paper and markers
- O Copies of the simulation game
- O Negotiation table with chairs for players and coaches/observers
- O Name tags
- O Debriefing guide
- O Copies of the post-simulation questionnaire
- O Drinks and snacks

Materials to be sent to the players one week before the simulation game:

- O Handouts of the presentation
- O Background information
- O New product proposal and SWOT analysis
- O Agenda of the meeting

Post-simulation questionnaire

This questionnaire aims at measuring the quality and the outcomes of today's simulation. Please evaluate the given statements on a 7-point scale from **fully agree** to **fully disagree**.

1. Personal data

Gender:	female ☐	male ☐
Nationality:	_____	
Educational background/studies:	_____	
Current job/function:	_____	
Your task during the role-play:	player ☐	observer ☐
What role did you play/observe?	_____	

2. Please evaluate the scenario	I fully agree						I fully disagree
The underlying conflict scenario was realistic.	☐	☐	☐	☐	☐	☐	☐
The simulated meeting was realistic.	☐	☐	☐	☐	☐	☐	☐
The role of the Business Unit Manager Churchland was realistic.	☐	☐	☐	☐	☐	☐	☐
The role of the Marketing Manager was realistic.	☐	☐	☐	☐	☐	☐	☐
The role of the R&D Manager Rudolph was realistic.	☐	☐	☐	☐	☐	☐	☐
The role of the R&D Engineer Ingham was realistic.	☐	☐	☐	☐	☐	☐	☐
The role of the Market Expert Barney was realistic.	☐	☐	☐	☐	☐	☐	☐

3. Please evaluate the simulation outcomes	I fully agree						I fully disagree
My role's Aspiration Level has been achieved.	☐	☐	☐	☐	☐	☐	☐
My role's Satisfaction Level has been achieved.	☐	☐	☐	☐	☐	☐	☐
The final outcome is a commonly made decision.	☐	☐	☐	☐	☐	☐	☐
The final outcome clearly supports intrapreneurship.	☐	☐	☐	☐	☐	☐	☐
The intrapreneur is most important for intrapreneurship.	☐	☐	☐	☐	☐	☐	☐
The managers are most important for intrapreneurship.	☐	☐	☐	☐	☐	☐	☐

4. Please evaluate the simulation process	I fully agree						I fully disagree
The briefing was sufficient.	☐	☐	☐	☐	☐	☐	☐
The materials were well-prepared.	☐	☐	☐	☐	☐	☐	☐
I had enough time to prepare for the simulation.	☐	☐	☐	☐	☐	☐	☐
I have fully understood the underlying scenario.	☐	☐	☐	☐	☐	☐	☐
I have fully understood my role.	☐	☐	☐	☐	☐	☐	☐
The time-outs had a positive influence on the simulation.	☐	☐	☐	☐	☐	☐	☐
The simulation was conducted in a trustful atmosphere.	☐	☐	☐	☐	☐	☐	☐
The simulation was just a game.	☐	☐	☐	☐	☐	☐	☐
The final debriefing was sufficient.	☐	☐	☐	☐	☐	☐	☐
I would partake again.	☐	☐	☐	☐	☐	☐	☐
Players only							
I played my role voluntarily.	☐	☐	☐	☐	☐	☐	☐
My observers could support me in the preparation phase.	☐	☐	☐	☐	☐	☐	☐
My observers could support me in the time-outs.	☐	☐	☐	☐	☐	☐	☐
I felt comfortable about playing my role	☐	☐	☐	☐	☐	☐	☐
Observers only							
I could support my player in the preparation phase.	☐	☐	☐	☐	☐	☐	☐
I could support my player in the time-outs.	☐	☐	☐	☐	☐	☐	☐
My observations contributed to the final debriefing.	☐	☐	☐	☐	☐	☐	☐
I felt involved in the simulation.	☐	☐	☐	☐	☐	☐	☐

5. What are your suggestions to improve the simulation?

_____

_____

_____

_____

_____

_____

_____

Interview guide (optional)

1. Analysis of the simulation process and outcomes
   a. What is your background in regard to nationality, education and work?
   b. Was the simulated scenario realistic?
   c. Was the role you played/observed realistic?
2. Analysis of the simulation effects
   a. Given the simulation experience, please define intrapreneurship?
   b. Did the Intrapreneurship Game stimulate you to change your behavior?
   c. What organizational environment (culture) is required in order to promote intrapreneurship (as defined above)?
3. Identification of directions of improvement
   a. What were your expectations of the Intrapreneurship Game?
   b. Did you like or dislike the Intrapreneurship Game?
   c. What would you recommend to improve the Intrapreneurship Game?

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- Menzel, H. C., Aaltio, I., & Ulijn, J. M. (2007). On the way to creativity: Engineers as intrapreneurs in organizations. *Technovation*, 27(12), 732–743.

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- Ulijn, J. M., Menzel, H. C., Karatas Ozkan, M., & Nicolopoulou, K. (2007). Conceptualizing and measuring intrapreneurship: Towards a cross-cultural way of paradigming. In N. Parikh, A. Mehta & R. Patel (Eds.), *Intrapreneurship: Concepts and cases* (pp. 31-59). Hyderabad: ICFAI University Press.

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Samenvatting

Intrapreneurship –ondernemerschap (entrepreneurship) binnen bestaande organisaties – is een interessant onderwerp van onderzoek om het innovatieve vermogen van bestaande organisaties te verhogen. Het is van essentieel belang voor industriële R&D organisaties om radicale innovaties te introduceren die buiten het gevoerde portfolio vallen, als basis voor nieuwe producten en diensten. Ondanks het cruciale belang, hebben vooral de grote en gevestigde bedrijven problemen om dit proces in hun R&D organisaties te starten, te ontwikkelen en te onderhouden. Een belangrijke reden hiervoor is het onderliggende conflict in intrapreneurship, dat zich voordoet als ondernemerschap binnen de grenzen van de gevestigde bedrijven wordt gebracht. Ondernemers en management hebben namelijk een verschillend referentiekader en verschillende doelen in het proces van het ontwikkelen van radicale innovatie.

Het doel van dit proefschrift is zowel het ontwikkelen van theoretische kennis om het fenomeen intrapreneurship te begrijpen en te verklaren, als het ontwikkelen van kennis die kan worden gebruikt om het proces van ondernemen te verbeteren, dat wil zeggen: het starten, ontwikkelen en onderhouden van intrapreneurship in industriële R&D organisaties. Meer specifiek is het doel van deze dissertatie om een op scenario's gebaseerd simulatiespel, *the Intrapreneurship Game*, te ontwerpen, dat kan worden ingezet en gebruikt om bewustwording van en inzicht in een intrapreneurship ondersteunende cultuur te bevorderen. De simulatie is ontwikkeld in industriële R&D organisaties in 3 landen: Duitsland, Frankrijk en Nederland.

Het ontwikkelen van een methodologie en een werkwijze die tot doel hebben om bedrijfsactiviteiten te verbeteren door middel van het veranderen van systemen naar gewenste situaties valt binnen het paradigma van de *Design Sciences*. Dit leidt tot een zogenoemde design propositie welke is getest in bovengenoemde praktijksituatie, met als resultaat: *"Om intrapreneurship in industriële R&D organisaties te bevorderen, kan een simulatiespel op basis van scenario's gebruikt worden, dat door middel van ervarend leren een besef stimuleert en inzicht creëert in een intrapreneurship ondersteunende cultuur"*.

We hebben geprobeerd hiervoor empirisch bewijs te vinden door het ontwikkelen van een multiple-case studie waarin 250 ingenieurstudenten en R&D professionals deelnamen. In de eerste fase is de design propositie getest met 219 ingenieurstudenten van verschillende Duitse en Nederlandse technische universiteiten. Als potentiële R&D ingenieurs en managers zijn zij

een representatieve doelgroep waarmee de design propositie is geverifieerd. Hierna is de design propositie getest en verbeterd in de context van industriële R&D organisaties in Frankrijk, Duitsland en Nederland; 51 professionele R&D ingenieurs en wetenschappers namen hieraan deel. Hierbij zijn data verzameld via zogenoemde triangulatie van vier verschillende methoden: gemodereerde groepdiscussies, postsimulatie enquêtes, semi-gestructureerde interviews en persoonlijke aantekeningen. Dit heeft geleid tot de volgende drie uitkomsten.

Ten eerste, het toepassen van *the Intrapreneurship Game* in een industriële R&D organisatie creëert en stimuleert het bewustwordingsproces en vergroot het inzicht in een intrapreneurship ondersteunende cultuur. Professionele R&D ingenieurs en wetenschappers ervaren gedurende het spel een realistisch scenario en het onderliggende intrapreneurshipconflict. Geconfronteerd met het scenario wordt men aangemoedigd om het intrapreneurshipconflict interactief met elkaar op te lossen. Daarnaast is men in staat om de oplossing(en) toe te passen in een omgeving die veilig is en bovendien aansluit bij de dagelijkse praktijk. Het stimuleren van intrapreneurship in dit realistische scenario functioneert in de eerste plaats als een ‘spiegel’; hoe doen we het?. In de tweede plaats heeft het spel een 'raamfunctie'; welke alternatieven hebben we om het op te lossen?. Het voordeel van dit spel is dat men collectief leert en het geleerde toepast in de complexe praktijk.

Ten tweede, dit proefschrift laat zien dat intrapreneurship een proces is waarin de intrapreneur een kans ziet om te ondernemen en die aangrijpt binnen de context van een bestaande organisatie. Dit model is zowel theoretisch onderbouwd als empirisch getest. In de eerste plaats is een theoretisch concept gebruikt voor de initiële ontwikkeling van de *Intrapreneurship Game*. Daarna is het simulatiespel empirisch getest door middel van iteratieve procedures, waaruit bleek dat het spel relevant en geldig is in de desbetreffende situatie. Het onderliggende theoretische model modelleert de realiteit derhalve correct en is bovendien ecologisch geldig. De simulatie biedt dus een representatief scenario.

Tenslotte zijn er sterke aanwijzingen dat een intrapreneurship ondersteunende cultuur een absolute voorwaarde is voor het daadwerkelijk bereiken van intrapreneurship en innovatie. Om intrapreneurship te ontwikkelen zullen personen in een desbetreffende organisatie bepaalde specifieke waarden moeten delen. Het design proces resulteerde in een geheelomvattende beschrijving van een intrapreneurship-ondersteunende cultuur. Het is deductief ontwikkeld en gebaseerd op een uitgebreide literatuurstudie en inductief gevalideerd door *the Intrapreneurship Game* toe te passen in een realistische industriële R&D context.

Summary

Intrapreneurship – that is, entrepreneurship within existing organizations – became a subject of interest because of its effects on innovation and organizational revitalization. It is of paramount importance in the context of industrial R&D organizations to develop radical innovation as the basis of new business activity that is unrelated to the current mainstream business of the firm. However, many companies, especially the large and established ones, have difficulty implementing and sustaining this process within their R&D organizations. A major reason for this is the underlying conflict of intrapreneurship that arises when entrepreneurship is brought into the boundaries of established organizations. Entrepreneurs and the organizational management simply do not match in respect of the needed pursuit of opportunities for radical innovation.

The goal of this doctoral dissertation is to develop both the theoretical knowledge to understand and explain the occurrence of intrapreneurship (in large, established organizations) and actionable knowledge that can be used to improve business practice – that is, to promote and implement intrapreneurship in industrial R&D. More specifically, the aim is to design a scenario-based simulation game, the *Intrapreneurship Game*, the purpose of which is to raise awareness of and provide insight into an intrapreneurship-conducive culture. Designing a tool or course of action to improve business practice by changing existing situations and systems into desired ones falls within the paradigm of the design sciences. The overall result of this design research process is the following theoretically-grounded and field-tested design proposition: *"In order to promote intrapreneurship in industrial R&D, one can use a scenario-based simulation game, which will through experiential learning create awareness of and insight into an intrapreneurship-conducive culture"*.

Empirical evidence has been gained from a developing multiple-case study conducted with 250 engineering students and R&D professionals. In the first phase, the design proposition was pre-tested with 219 engineering students enrolled in technical universities in Germany and the Netherlands. As possible future R&D engineers and managers, they represent a pertinent audience to verify the tool's general functional capability. Then, it was tested and improved in the context of industrial R&D organizations in France, Germany, and the Netherlands involving 51 professional R&D engineers and scientists. Thereby, data was collected through triangulating four different sources of evidence: moderated group

discussions, a post-simulation questionnaire, semi-structured interviews and personal memos. This led to the following three main outcomes.

First, the *Intrapreneurship Game* is an ecologically valid, reliable and effective intervention that can be used within industrial R&D to create awareness of and insight into an intrapreneurship-conducive culture. Professional R&D engineers and scientists are invited to experience a realistic scenario of intrapreneurship and its underlying conflict. Confronted with this scenario, they are encouraged to interactively solve this conflict and, in turn, apply and test these solutions in an environment that is safe and approximates reality. In this way, the simulation game functions both as a mirror (how are we doing?) and as a window (what alternatives ways are there of doing things?) as to how the participants deal with intrapreneurship both in the simulation and in reality. The assumed advantage is that what is learned collectively will transfer to the settings where the acquired knowledge and skills will then be used.

By designing the simulation game, this doctoral dissertation has shown that intrapreneurship needs to be understood as a process, during the course of which an intrapreneur discovers and exploits an entrepreneurial opportunity to develop new means-ends relationships within an existing organization. This definition or model is both theoretically-grounded and empirically validated. Initially, its theory-based concept served as the basis to design the *Intrapreneurship Game*, but then the empirical evidence resulting from the cyclic-iterative field-testing in industrial R&D suggests the simulation game is ecologically valid – that is, the methods, materials and setting of the simulation approximate the real-life situation. From this one can conclude, in turn, that the underlying process model is also ecologically valid, and that reality is correctly modeled and represented by the scenario.

Moreover, the developing multiple-case study produced strong evidence that an intrapreneurship-conducive culture is an antecedent condition for intrapreneurship. To make intrapreneurship evolve, organizations and its members need to share and feature a specific cultural profile. The design process resulted in a comprehensive description of a so-called intrapreneurship-conducive culture. It was deductively developed based on an extensive literature review and inductively validated and enriched by applying the *Intrapreneurship Game* within the context of industrial R&D.

About the author

Hanns Menzel was born in Ostfildern (Germany) on September 20th 1976. In 1996 he graduated from the Merzschule Stuttgart (Germany) and in the same year he started his compulsory military service at the Federal German Navy. In October 1997, Hanns started his studies of Business Engineering at the Universität Karlsruhe (TH) (Germany), School of Economics and Business Engineering, which he completed by April 2003. As part of his curriculum he also studied during two academic years (from October 2001 until June 2003) at the Institut National Polytechnique de Grenoble (France), Ecole Nationale Supérieure de Génie Industriel (ENSGI). By June 2003, he received a Diplôme d'Ingénieur and a Diplôme d'Etudes Approfondies en Génie Industriel.

In November 2003, Hanns started working as a project assistant at Horváth & Partners Management Consultants in Stuttgart (Germany). In the same year he started his PhD (part-time) at the Technische Universiteit Eindhoven (the Netherlands), Faculty of Technology Management, Organization Science and Marketing Group. From May 2005 until April 2006 he was a visiting doctoral student in Eindhoven, funded by a full-year scholarship from the German Academic Exchange Service (DAAD). In August 2006, Hanns joined TRUMPF in Ditzingen (Germany), where he started as a product marketing manager in the machine tools division. As of November 2007 he is head of product marketing.

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