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Open Innovation – The Dutch Treat: Challenges in Thinking in Business Models

Han van der Meer

This article covers the subject of the practical application of the principles of open innovation in Dutch industry. Open innovation is considered to be the third stage in evolving systems for innovation management. The results of the study showed that innovative Dutch companies have successfully adopted the principles of open innovation regarding open innovation culture and importing mechanisms. Some challenges are found in the use of exporting mechanisms; but the biggest challenges for innovative Dutch companies lie in the flexible and open way of handling their business models.

Introduction

Management of innovation is in essence the process of bringing monetary value to technological knowledge and creativity, and in recent years a particular model of doing so has been popularized: open innovation. The essence of open innovation lies in several key elements. One is the notion that it takes a lot of effort to bring monetary value to technological knowledge, because the knowledge itself has little value in itself. A second is that innovation seems to pay better if a company's own knowledge is combined with that of others.

Yet the reality of open innovation seems to be that it is easier said than done. Over 80 per cent of all patents generated by Dutch universities are left unused (Dekker & van der Meer, 2005). And even when knowledge is commercialized, its actual applications are often quite different from those originally envisioned by its inventors. Peters and Waterman demonstrated this effect in their 1982 book, and more recent studies (Tidd, Bessant & Pavitt, 2001; Stefik & Stefik, 2004) do not lead to any different conclusions.

And it is not just open innovation practice that is lagging behind its promises. Looking at outcomes of international benchmark studies (Lucking, 2004), Dutch companies as a whole innovate considerable less than those in other countries. These studies show that the pace of innovation in Holland is slower in terms of

measured outcomes, such as new products, new business ventures and fast growing technology-based firms, than elsewhere in the world. This raises some questions: why does innovation in Dutch companies lag behind, and to what extent does open innovation play a role?

This article presents the first set of results of a survey on open innovation practices in Dutch companies. The survey consisted of a written questionnaire ($n = 814$) followed by in-depth interviewing within 28 highly innovative companies. Before presenting these results we will first deal with the theoretical background on how to innovate and the origins of open innovation, the understanding of which is important to the interpretation of the survey.

Defining Innovation

To be unambiguous about our interpretation of innovation, we have chosen the following out of the several hundreds of different definitions of innovation in the literature:

Innovation is the total set of activities leading to the introduction of something new, resulting in strengthening the defendable competitive advantage of a company. (van der Meer, 1996)

This broad definition includes all types of innovation, such as new products, new

Table 1. Several Factors Important to an Innovative Climate

Negative		Factor		Positive
short	←	horizon	→	long
kept out	←	maverick	→	accepted
punished	←	failures	→	tolerated
formal	←	communication	→	informal
kept out	←	uncertainty	→	accepted
analyses	←	planning	→	action
means	←	planning	→	opportunities
closed	←	external co-operation	→	open
autocratic	←	decision-making	→	participative
internal	←	orientation	→	customer
vague	←	strategy	→	clear

markets, new technologies and new organizational forms, 'new' meaning new to a particular company.

Approaching Innovation

Much evidence can be found indicating that innovation is a fruitful way for firms to live long lives and prosper (Collins & Porras, 1994; Christensen, 1997; De Geus, 1997; Cobbenhagen, 2000; Tidd, Bessant & Pavitt, 2001). Therefore, the question is not why to innovate, but *how* to innovate. In answer to this question, there are basically two ways to stimulate innovation in a company (Arthur D. Little Inc., 1985; van der Meer, 1996):

1. Culturally: creation of an innovative climate.
2. Structurally: systematic use of innovation mechanisms.

We will now provide a short overview of these two approaches. By discussing how management should pursue these approaches to enable innovation within a company, several paradoxes and ways of coping with these paradoxes will become apparent.

Cultural Approach

The cultural approach towards enabling innovation entails creating an innovative climate. An innovative climate is the set of attitudes and values that are favourable to innovation (Ekvall, 1996; Isaksen & Tidd, 2006).

Several factors important to an innovative climate are summarized in Table 1.

While cultural factors are clearly important in enabling innovation (Kanter, 1983), some authors would have us believe that there is

nothing more to innovation than an innovative climate. However, there are also advocates for the structural approach.

Structural Approach

The structural approach towards enabling innovation concerns the organized use of enabling innovation mechanisms. Innovation mechanisms are organizational entities designed to promote the development and management of new ideas, projects and business (Arthur D. Little Inc., 1985). Well known examples of innovation mechanisms include champions, task forces, venture teams, skunk works, spin-offs, enabling acquisitions, spin-ins, venture capital, licensing, innovative budgets, partnering, listening posts, among many more (van der Meer, 1996).

After this short introduction to the cultural and structural approaches to enabling innovation, we will now discuss how management should handle them.

Three Stages, Three Tasks for Management

To discuss which approach management should use to enable innovation, we suggest breaking the innovation process down into three basic stages:

1. The *concept stage* in which new ideas are found; the stage of 'invention' and free creativity.
2. The *development stage* in which ideas are transformed into projects.
3. The *business stage* in which projects are turned into new business.

As it turns out, the task for management to enable innovation is different in each stage.

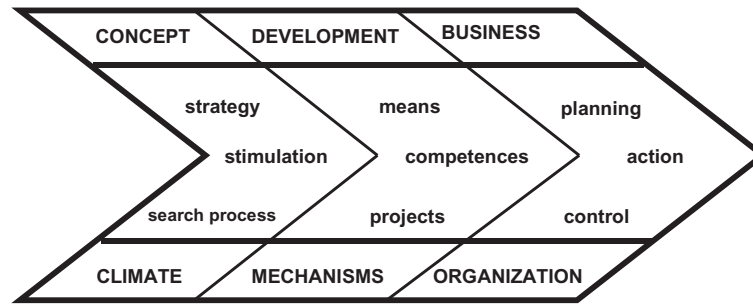


Figure 1. The Three Stages in the Innovation Process

Figure 1 shows the three stages in the innovation process and which management task suits them.

As shown in Figure 1, the task of management during the three different stages in the innovation process can be described follows (van der Meer, 1996):

- In the concept stage, the task of management is to create a climate favourable to innovation through the use of the cultural approach.
- In the development stage, management should establish the correct enabling mechanism to nurture the projects.
- In the business stage, management should follow a classical approach: planning, action and control.

From this list it becomes apparent that managing innovation really is managing paradoxes. The complete innovation process requires all three tasks of management, even when these tasks will be in mutual conflict. For example, even when a decent amount of accepted uncertainty may be beneficial to an innovative climate, it surely is incompatible with the planning required during the business stage or with any partnering mechanisms during the development stage.

The ways in which management has seemed to cope with these paradoxes show us evolving systems within companies, which finally lead to the open innovation model that is central to this article.

Evolving Systems for Innovation Management

Looking at the normal evolution of innovation systems in companies, we found the following stages:

- Stage 1:* natural innovation
- Stage 2:* systematic innovation with a closed system

Stage 3: systematic innovation with an open system.

A modern innovation approach combines a good innovation climate (stage 1) with a stage-gate methodology (stage 2) in an open system approach (stage 3) (Chesbrough, 2003). We will now discuss these three stages in further detail.

Stage 1: Natural Innovation

In the natural innovation stage, innovation in a company flows naturally and ideas are generated in a climate favourable to innovation. A clear and shared vision of a company's strategic position is of special importance to this stage, so that innovation contributes to a company's business (Parker, 1990; Nanus, 1992).

The major way to develop during the natural innovation stage is by dynamic champions on each project, and it has been shown that a top manager is often the champion of several innovation projects (Howell & Boies, 2004). Combined with the fact that it is the management's responsibility to develop and embed a clear strategic vision, it becomes clear that top management plays a dominant role in the natural innovation stage.

The natural innovation stage can be very fruitful, but is limited in the way innovation can be controlled. Most innovation starts and finishes with top management and when the company grows we see a need for a more structural approach. It can then be concluded that the extent of this stage is limited by the size and complexity of a company.

Stage 2: Systematic Innovation with a Closed System

In the second stage, control over the innovation system is found by installing a more formal innovation pipeline, also named a funnel. Here we find elements of what Saren (1984) describes as activity- and decision-based inno-

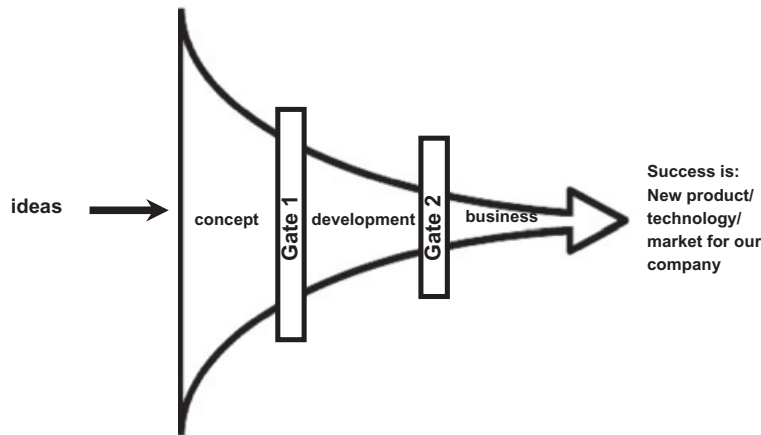


Figure 2. Closed System Stage-Gate Model for Innovation

vation models, which describe and decompose the innovation process. These formalized models finally lead to the introduction of stage-gate models (Cooper, 1992; Tidd et al., 2001). Figure 2 illustrates a simple format of such a funnelling model.

In this second stage of evolving systems, the success of the system is narrowly defined as 'a new P(roduct)/T(echnology)/M(arket) combination for our company'. As can be seen from their definition, these systems are inward looking and hence characterized as closed.

These systems feature a pipeline of stages in the innovation process, in between which are gates that try to filter out potential losers. The criteria here are based on three overall clusters for successful innovation (Cooper, 1992; Besemer, 2000; Bytsebier, 2002):

- novelty
- feasibility
- effectiveness.

As ideas, projects and business flow through the pipeline, their number drops dramatically from one stage to another. A steep mortality curve of 3,000 ideas to 60 small projects, seven market introductions and one market success is accepted as a natural phenomenon of innovation and can be influenced only slightly by the way the process is managed (Stevens & Burley, 1997).

This systematic and closed approach has several major advantages, including a clear overview of projects in progress and use of active portfolio management. However, the criteria gauged at the gates cause it to be a double-edged sword. The feasibility criterion leads to a conservative portfolio, and the effectiveness criterion causes any potential innovations outside the dominant business model to be left unused. Similarly, the idea/project/

business inflow is closed in nature, and 'out of the box' thinkers are repressed in human resources potential (Kirton, 1994). In the most extreme of cases, the funnel vision ultimately leads to tunnel vision.

Stage 3: Systematic Innovation with an Open System

In modern innovation management, open models for systematic innovation have been designed to overcome the limitations of closed systems. Open models differ from closed systems in their definition of success. In open models success not only entails the successful implementation of ideas in the original business domain of a company, but also the successful implementation outside that domain (Chesbrough, 2003). Figure 3 gives a simple format of such an open system.

The open system model has several major advantages over the closed system. First, it allows money to be made in every stage: not only by selling, but now also by licensing out or spinning out at earlier stages. Second, it allows for the full use of human resource potential since it also allows 'out of the box' thinking.

One of the leading scholars on open innovation is Chesbrough who popularized open innovation in his 2003 book *Open Innovation*. He decomposes open innovation into three elements: culture, structure and business model. To provide a better understanding of open innovation, we will briefly introduce these elements in more detail.

Open Innovation Culture

Innovating in an open system requires a different way of thinking. The set of norms, beliefs

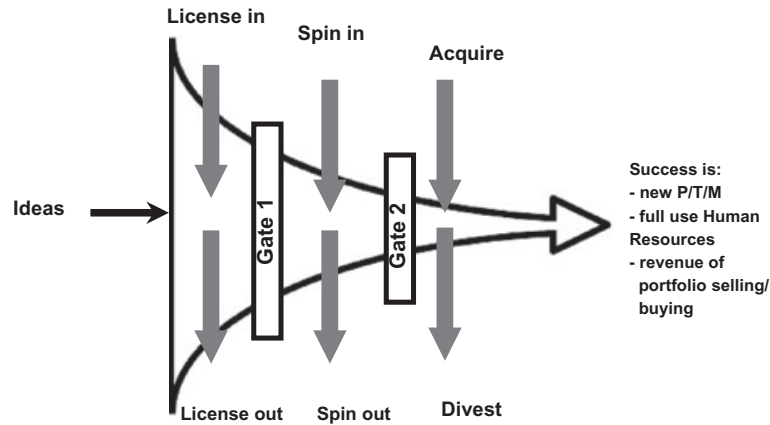


Figure 3. Open System Stage-Gate Model for Innovation

Table 2. The Culture of Open Innovation (Chesbrough, 2003)

Contrasting Principles of Closed and Open Innovation	
Closed Innovation Principles	Open Innovation Principles
The smart people in our field work for us	Not all the smart people work for us. We need to work with smart people inside <i>and</i> outside our company.
To profit from R&D, we must discover it, develop it, and ship it ourselves	External R&D can create significant value; internal R&D is needed to claim some portion of that value
If we discover it ourselves, we will get it to market first	We don't have to originate the research to profit from it.
The company that gets an innovation to market first will win.	Building a better business model is better than getting to market first
If we create the most and the best ideas in the industry, we will win	If we make the best use of internal and external ideas, we will win
We should control our innovation process, so that our competitors don't profit from our ideas	We should profit from others' use of our innovation project, and we should buy others' IP whenever it advances our own business model.

and values that work well in the open innovation system (or open innovation culture) is illustrated in Table 2, taken from Chesbrough (2003).

process that enable in- or outflow. Some examples for such mechanisms are listed in Table 3.

Open Innovation Structure

Inspecting the open innovation model closer, we can see mechanisms for importing and exporting knowledge, ideas and projects. Such mechanisms include methods, structures and systems in every stage of the innovation

Business Model: Terra Incognita

In Chesbrough's (2003) description of open innovation, he adds an important and dominant element: the flexible use of several business models. This idea is of special importance to open innovation, because it circumvents the 'Not Sold Here' syndrome that is present with closed system innovation companies. By the

Table 3. Some Mechanisms of Open Innovation

Stage	Importing	Exporting
Concept	<ul style="list-style-type: none"> • Creative sessions networking with universities and scientific institutes • Knowledge clusters 'Open Day' • Conferences • Fairs • Suppliers and end-users • Licensing in 	<ul style="list-style-type: none"> • Cluster projects • Industry groups • Public-private co-operation • Licensing out
Development	<ul style="list-style-type: none"> • Patent search • Partnering • Spinning in 	<ul style="list-style-type: none"> • Patent brokers • Spinning out
Business	<ul style="list-style-type: none"> • Venturing in 	<ul style="list-style-type: none"> • Venturing out

development and adoption of additional business models when new opportunities arise, companies open themselves up to a greater range of money-making activities.

The business model is described as a 'cognitive device to convert technical aspects of a product or service into economic value' and revolves around the central question of what it takes to transform technology or specific know-how into (commercial) success. The industry of copier machines flourished because someone figured out you should not sell high-priced machines, but instead you make your money out of paper and toner. The business model links the technical domain (what do we deliver?) with the social domain (how much value does this give to the user and how are we paid for it?). Thinking in business models is the pivot in the open innovation paradigm.

Goretex ('breathing' waterproof clothing) resulted from a Dupont employee's idea to use the properties of Teflon technology in quite another way, and it resulted in a world-leading company. The cell phone experienced a major breakthrough on the market when somebody invented the prepaid concept. Google provides services for free and makes money out of advertising. All these are examples of how business models link technical domains to social domains.

In hindsight it is always easy to analyse clearly the essential success factors in a business model. Drawing one up from scratch is quite another story and is not easily or logically deductible from activities at hand. Most companies stick to their existing business model and by doing so miss a lot of opportunities (Christensen, 1997; Cooper, 2005). A business model should provide in two respects:

- It should create value for the end user (and the following parties in the value chain).

- It should guarantee that the innovator (or creator or other key players) gets a fair share of the value added.

Most companies find it very difficult to define their present business model, let alone handle more than one business model at the same time or develop a new innovative business model (Gerards, 1979; Collins & Porras, 1994). Yet this is exactly where opportunities arise to create value for the company because a business model is by definition based on a company's unique core competencies, experience and innovative potential. Companies with an open innovation approach are fully aware of their dominant business model and can develop new ones if needed. They can value new innovative models proposed by outsiders and adopt them if they wish. But for most companies thinking in alternative business models is still a long way from home, as our research will show.

The Research

Having discussed the characteristics of open innovation, we will now introduce our research and discuss our findings. Our research on innovation was focused on the Netherlands and the open systems model. Research questions were the following:

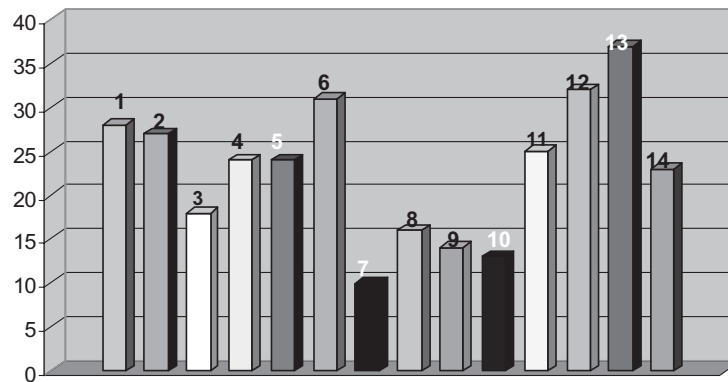
- Which factors are hampering innovation in Dutch companies?
- To what extent do Dutch companies plead to open behaviour?
- To what extent do Dutch companies exhibit open behaviour?

Data Collected

We collected the research data by using a questionnaire called the (Dutch) National Innova-

Table 4. Distribution of Number of Cases in Case Analysis

	Size in number of employees					Total
	50–99	100–199	200–499	500–999	>1,000	
Industry	4	5	2	3	2	16
Service	5	3	1	2	1	12
Total	9	8	3	5	3	28



1. Enterprise's innovation potential (e.g. R&D, design, etc.) too small
2. Lack of skilled personnel
3. Lack of information on technologies
4. Lack of information on markets
5. Innovation costs hard to control
6. Resistance to change in the enterprise
7. Deficiencies in the availability of external technical services
8. Lack of opportunities for co-operation with other firms and technological institutions
9. Lack of technological opportunities
10. No need to innovate due to earlier innovations
11. Innovation too easy to copy
12. Legislation, norms, regulations, standards, taxation
13. Lack of customer responsiveness to new products and processes
14. Uncertainty in timing of innovation

Figure 4. Factors Hampering Innovation in Dutch Companies

tion Survey (*Nationale Innovatie Enquête*, 2003). In spring 2004, 5,000 such questionnaires were sent to companies in all sectors of industry and services with more than 50 employees. There were 814 responses and an additional in-depth interview and case analysis of 28 companies that rated themselves in this questionnaire as forerunners in innovation were carried out. Table 4 shows the distribution of the cases analysed.

From these cases we charted factors that were found to hamper innovation. These hampering factors are illustrated in Figure 4.

Finally, we performed 28 case studies of Dutch companies that had scored themselves as forerunners in innovation by conducting

in-depth interviews with them to gauge whether these companies showed characteristics of open innovation. The in-depth interviews covered the items innovation culture, innovation mechanisms and the use of one or more business models. When 80 per cent of the characteristics of an open innovation culture were found (see Table 2) we ranked the company as 'showing the characteristics of open innovation culture'. When two or more importing or exporting mechanisms were found (see Table 3) we ranked the company as 'showing the characteristics of open innovation structure'. For each case study, an 8–10 page case report was produced giving the specific examples of the culture, the structures

Table 5. Percentage of the Dutch Companies Showing the Characteristics of Open Innovation ($n = 28$ self-declared 'highly innovative' companies with more than 50 employees)

Culture	Structure		More than one business model
	Importing	Exporting	
68%	74%	54%	7%

used and the use of one or more business models. Table 5 shows our findings, subdivided into cultural, structural and business model elements.

Internal Factors Hampering Innovation

Our research shows that the factors hampering innovation in Dutch companies are very similar to those found globally. Research by Resources Global Professionals (2004) shows that three-quarters of innovation projects are partly successful or not successful at all. Managers of the researched companies gave the following reasons:

- Too little commitment 37%
- Too little time available 37%
- Too few resources 21%
- Wrong innovation strategy 31%

The same type of internal causes is mentioned in the (Dutch) National Innovation Survey. According to this research, economic reasons also play an important role. Some notable results are that 44 per cent of the companies report 'long payback period', 40 per cent 'high innovation costs', 30 per cent 'legislation, standards etc.' as important factors hampering innovation in their companies. These results are included in Figure 4.

Beautiful excuses may not be far from the truth, yet somehow they seem to miss the point: management waste scarce time and motivation available for innovation. A lot of effort is put into wrong projects and innovation teams neglect knowledge already available elsewhere. Companies co-operate too little with other companies and research institutes. New technology gets far more (management) attention than non-technological aspects of innovation.

In short, management of innovation in Dutch companies shows much room for improvement. Yet these causes are internally focused and, important as they may be, they

do not have a direct link to open innovation practices but rather pertain to innovation in general.

Few Business Models

Open innovation practices become clearer in Table 5. As becomes apparent from the percentages, the dominance of the existing business model is the main challenge to open innovation in Dutch companies. In most of the cases this business model is not explicitly specified at all. Instead it lives implicitly and under the surface of the daily routine. Hardly any company in our sample was able to show flexibility in choosing appropriate different business models. The three cases where we did find this flexibility were diversified conglomerates with a high autonomy at business unit level, where its headquarters showed the ability to implement and use multiple business models, while we found the same rigidity as in the rest of our sample of 28 companies at business unit level.

Although we found that a lot of larger companies are charmed by the perceived benefits of exporting (obsolete) knowledge, our research shows that most companies find it difficult to install and maintain exporting structures that really pay.

Status Quo in Holland

There are some good examples of larger companies active in the field of exporting systems like Twentse Kabelfabrieken, Philips and DSM. The top management of these large companies already claim to use the principles of open innovation. Others, such as Heineken and Shell, now adopt strategic co-operations such as the highly successful joint development of Senseo coffeemakers by Philips and Sarah Lee. Philips recently started the High Tech Campus in Eindhoven where research capacity and laboratory capacity is provided to

companies that spun off Philips but also to other high-tech start-ups. According to DSM, open innovation has brought dynamics to their total operation. DSM made the transition from a classical mass chemical production plant to sophisticated consumer products like Dyneema strong fibres and food additives. This transition was made possible only by using strategic alliances with other companies and research institutes. DSM even went into revolutionary pre-competitive co-operation with their major competitors. These co-operative research projects were realized in an independent joint research institute, the Dutch Polymer Institute. DSM also puts sincere effort into corporate venturing by scanning literally hundreds of small high potential knowledge-based firms. Out of these hundreds, two or three are candidates for further financial investment for which DSM will provide venture capital. An especially interesting example of a cultural invention within DSM itself is the Innovation Award 2004 granted to the researcher who proposed stopping DSM's own research and license outside technology instead.

But these are exceptions. The reality in Dutch companies seems less ideal. Researchers and managers at business unit level within larger companies have a hard time finding balance between open and closed behaviour. When things really matter they demonstrate an overwhelming tendency towards the closed innovation principles, even when they are not the largest players in their market. Licensing out technology when it has been sitting unused on the company's shelves for years is easily acceptable for a company like Philips. It is the same game with different rules at Proctor & Gamble with their 'use-it-or-lose-it' policy. Here developments may be sold to direct competitors after not having been used for three years. But most Dutch companies do not warmly embrace this type of open behaviour.

Our first survey on open innovation in Dutch industry shows large companies primarily focusing on bringing their own obsolete ideas and knowledge outside by selling it to others. The use of patent information licensing, new business start-ups stimulating spin-offs and corporate venture capital departments are examples of exporting structures. Both academic researchers and R&D managers see opportunities to generate short-term cash. Top and business unit level management recognize interesting playgrounds in these exporting structures to obtain rich experience without direct threats to their existing business. Almost all cases are in a knowledge domain outside the direct interest of the company itself.

As a start-up for an open innovation system, opportunistic approaches can be useful in the short term. Companies are forced to identify their key competences or crown jewels and the crucial knowledge domain they want to keep and protect. But it is only a first step on a long journey to establish an open innovation system based on long lasting, deep co-operation with a larger number of partners in alternating coalitions. Research based on the results of the Community Innovation Surveys (CIS) has shown that such behaviour is only displayed with 'high-level' innovations that are more radical, complex or new markets so that companies may acquire higher certainty by pursuing market information or share the resources necessary for market introduction (Tether, 2002; Miotti & Sachwald, 2003; Belderbos, Carree & Lokshin, 2004).

For small and medium sized enterprises (SMEs), the situation is somewhat more complex. Examples of smaller companies, such as Eastside Tanner who licensed their newly developed system for wastewater recovery to a large engineering company, are very rare in Holland. Yet a lot of entrepreneurs recognize their normal way of thinking in open innovation principles. Most SMEs do not own huge R&D capacity and so borrowing, hitchhiking and combining all types of external knowledge is their normal pattern of behaviour (Brown & Hagel, 2006). And so a more open attitude by large companies and research institutes could provide SMEs with even more opportunities. Co-operation, sharing of knowledge and joint exploitation in several stages of the innovation process seems necessary out of opportunistic motives or perceived or real lack of capacity to deliver. Since both large and small companies benefit from consortium-like co-operation, the power distance between these partners is (perceived) smaller.

Even the smallest player in such a consortium can make the difference between success and failure. Therefore, the basic assumption of open innovation is equality of partners regardless of their size. Naivety, second fiddle or unreliable behaviour is punished even harder than usual in a business surrounding operating under the closed innovation paradigm. A lot of SMEs and their partners still have to experience this practice.

On Collaboration

As is apparent, we have found evidence that there is a difference in collaboration between innovative larger companies and innovative SMEs. Innovative larger companies have a

tendency to display closed behaviour when things really start to matter, while innovative SMEs are more naturally suited to engage in open innovation.

Yet comparable research based on data from the CIS shows that firm size is no predictor of the amount of collaboration or success thereof (Faems, van Looy & Debackere, 2005). The key to explain this apparent contradiction is the specific focus on companies that are innovative. As Faems, van Looy and Debackere (2005) state, the CIS data did not include characteristics of organizational structure. We then hypothesize that by grouping all types of companies, high innovators and low innovators and anything in between, that there will be no statistically significant relationship between firm size and amount or success of collaboration. Indeed, the smaller amount of highly innovating larger companies may be offset by a greater amount of highly innovating SMEs, and vice versa.

Therefore, we believe that the research based on the CIS data actually supports our work rather than contradicting it. Collaboration is indeed one of the ingredients of open innovation and as figures from CIS research suggest, it can surely and positively influence the success of innovation projects. Our contribution to this element is that larger companies face a greater challenge than SMEs in this respect, with some significant examples leading the way.

Open Challenges

It has been shown that open innovation is not just about the hype, with a number of major examples leading the way. It does, however, need a deep involvement to really pay off, and in this respect Dutch companies find it hard to find a good fit. The value added by the open innovation paradigm is thinking in business models, but handling them in an open way. This is the real challenge for Dutch industry.

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