

Innovating through the downturn



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1 Introduction

PricewaterhouseCoopers Oy has conducted a study on innovation strategies through the downturn held by Finnish business leaders. The aim was to gain a clearer picture of how Finnish companies will confront the challenges of global recession, today and during the next two years. The survey was conducted using an online questionnaire, for which the CEOs of Finland's 100 largest (in terms of turnover) companies, 100 biggest R&D investors (partly overlapping) and 200 innovative SMEs were selected as respondents. The 100 largest companies were selected from the Talouselämä (Economic Life magazine) Top 500 list of companies for 2008. The 100 biggest R&D investors were identified from the article of Tekniikka & Talous (Technique and Economics magazine). Innovative SMEs were selected from various sources, such as those funded by Finnish Funding Agency for Technology and Innovation (Tekes), finalists of the InnoSuomi (Innovation Finland) competition, patent registers etc. A majority of the SMEs fall within the technology industry.

As the global economy enters into recession, organizations face new challenges and opportunities. In today's interconnected world, it is impractical for companies to suspend their innovation initiatives until the worst of the storm blows over. To do so is to risk being well behind the curve when the economy does recover, and losing precious ground to competitors who found creative ways to keep their innovation initiatives moving during the darkest days of the downturn.

The survey "Innovation strategies through the downturn" was conducted in co-operation with the Ministry of Employment and the Economy and ZEF Solutions Ltd during the period 13-31 January 2009. An invitation to participate in the survey was sent out by email on 13 January 2009. Participants were given three weeks to respond to the survey. The first reminder was sent out on 19 January 2009 and the second on 26 January 2009. The response rate was 25% in spite of the survey's timing and the shortness of the response period.

The questions were divided into three sections: innovation environment, innovation strategies and innovation policy. We also included additional questions around the situation today and the expected situation during the next two years. Each section contained eleven items, one of which was reserved for free-form comments. Respondents were asked to evaluate the importance of said items in Finland as seen from their own company's perspective. All evaluated items are presented in this publication.

2 Division of R&D investments

As part of the globalization process, since the 1990s companies have started locating their strategic R&D (product development for global markets) in certain emerging economies. Such companies have mainly been multinational corporations. Further, in a more recent development, some companies from emerging economies have also started carrying out R&D to develop products for global markets. These processes are facilitated by the liberalization of economies worldwide and, most importantly, the changes in technology dynamics in several industries that allow delinking of manufacturing and R&D as well as the divisibility of innovation process into specialized modules. This permits a geographically distributed division of labor. Such global R&D has implications for both host countries (where the R&D is performed) as well as for the companies' home countries (mainly industrialized countries from where some R&D is moving away). For instance, outsourcing of R&D is leading to the emergence of pools of scientific entrepreneurs in emerging economies, in the form of R&D service providers. (Reddy, 2007).

According to Statistics Finland, nearly EUR 6.4 billion was spent on research and development in Finland in 2008. Of all research expenditures, the percentage of corporate research expenditures was slightly over 70%, totaling EUR 4.6 billion. However, its GDP share is expected to contract by one-tenth of a percentage point from the total 3.5 per cent level where it has stood for the past few years.

According to Statistics Finland, the company survey shows that R&D investments are still considered important, and that their increase is promoted by the need for new products and services as well as technological development and other factors. Places where research and product development are practiced are most heavily affected by the availability of researchers, availability of R&D knowledge and predictability of legislation regulating R&D activities. Labor costs are of least interest, considering their proportion of total investment. Companies prefer to maintain their R&D operations in their country of domicile. (Statistics Finland, 2005 & 2008)

According to data gathered from the Confederation of Finnish Industries (2008) member companies, just under one-quarter of R&D personnel and some 47% of R&D investments are in foreign countries. This mainly applies to the metal and electronics industries, which together account for over 90% of all company R&D operations abroad. However, in the forestry and chemical industries, the importance of foreign R&D has increased during the last years. Foreign growth indicates not only the need to be close to markets, but also the availability of skilled resources and other factors related to the quality of the innovation environment, not to mention the internationalization of companies. Large corporations in particular have enjoyed R&D growth abroad, resulting from R&D units gained through corporate acquisitions.

Innovating through the downturn

Division of R&D investments

Total



- 1 = Share of R&D investments in Finland today
- 2 = Share of R&D investments in Finland in two years

We asked CEOs to estimate the division of their respective company's R&D investments between Finland and foreign countries. According to the survey, 55% of R&D investments are earmarked for Finland, when examining the average of all companies queried. The figure is thus very close to those arrived at in previous survey. The situation is, however, changing very rapidly, based on CEO estimates. In two years there will be a 10% reduction in the amount of R&D investments earmarked for Finland, bring the total to 45%. Consequently, R&D investments will continue to be directed abroad in the future. Thus the trend which R&D investments have followed in recent years will continue.

SMEs



- 1 = Share of R&D investments in Finland today
- 2 = Share of R&D investments in Finland in two years

When looking at the division of SME R&D investments today and during the next two years, one can see that the investments earmarked for Finland would decrease from 53% to 47%. This represents a decrease of some six percentage points. This result indicates that SMEs are already investing heavily in R&D abroad. According to free-form comments made, one of the biggest reasons for directing R&D investments outside of Finland was the cost of R&D services there. SMEs quite simply did not have the financial resources to obtain the necessary services in Finland. Indeed, investments have been increasingly targeted at Eastern European countries, particularly Poland and the Czech Republic, which are considered to have highly skilled human resources, good skills in English and relatively good working environments.

Large firms

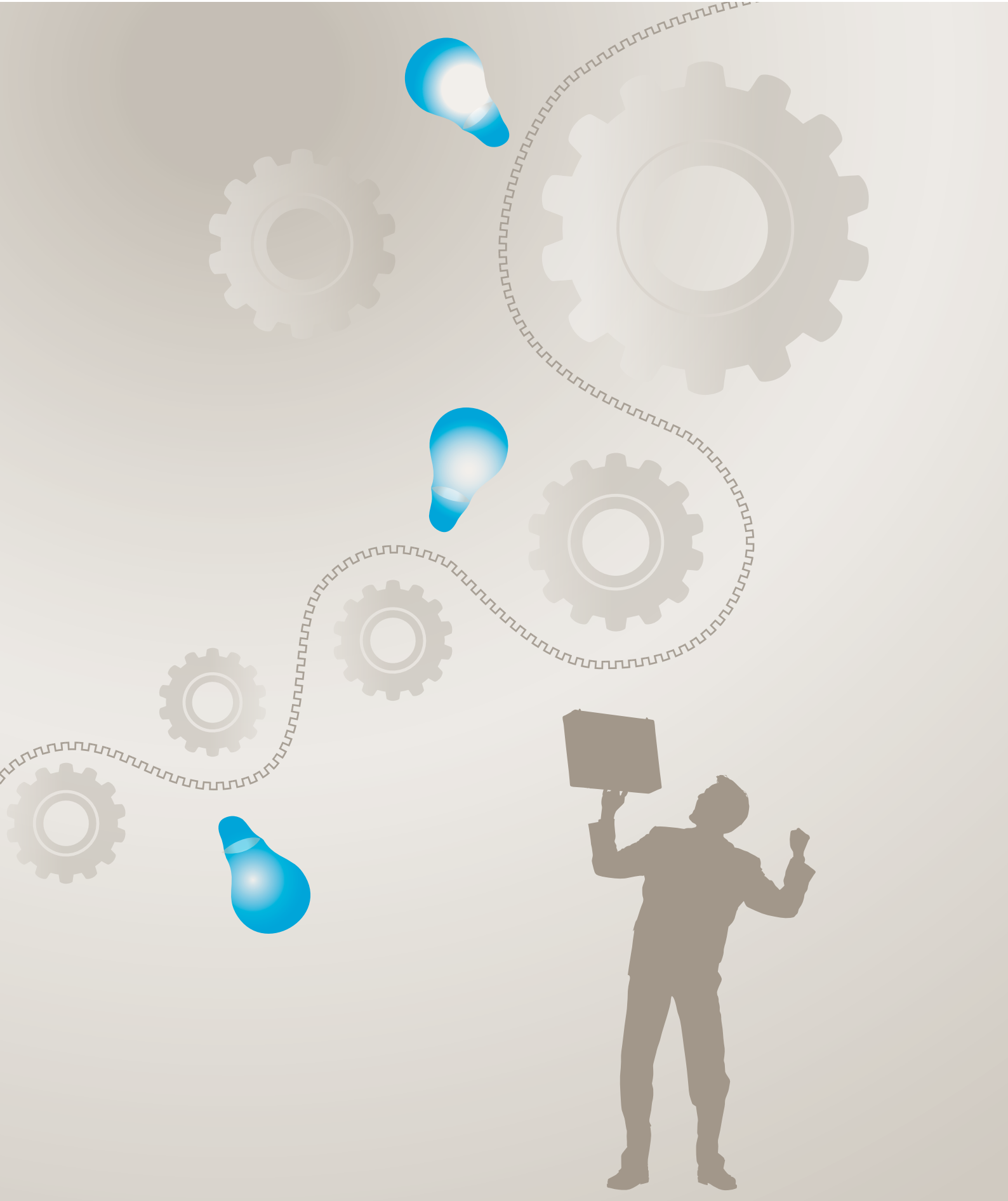


1 = Share of R&D investments in Finland today
2 = Share of R&D investments in Finland in two years

The changes in R&D investments seem to be the most dramatic in large corporations. According to the survey, a decrease of 20 percentage points is expected, resulting in a change from 60% to 40%. This trend will have a significant impact on Finnish society as a whole for several reasons: First, when R&D personnel are increasingly hired abroad, tax revenues in Finland are reduced. Second, large corporations usually employ smaller companies, from which they purchase R&D services for their own needs. If the change is in line with the survey results, these small R&D service providers will suffer a major blow to their operations. What might further exacerbate the situation is the fact that, despite Finland's high technology level, the sale of these services to foreign companies may prove to be extremely difficult. At present, the sale of Finnish R&D services to foreign companies is marginal at best, and no serious efforts to rectify the situation have been made. If large corporations were to purchase their R&D services from foreign service providers, the (third) result might be a decline in R&D investments in Finland.

“ In order to become an attractive world class player in the future, Finland should concentrate on next level of value creation. This means that we need to create new mechanisms for building understanding of the markets, and transforming market opportunities into new high growth businesses.”

Innovating through the downturn
Innovation environment

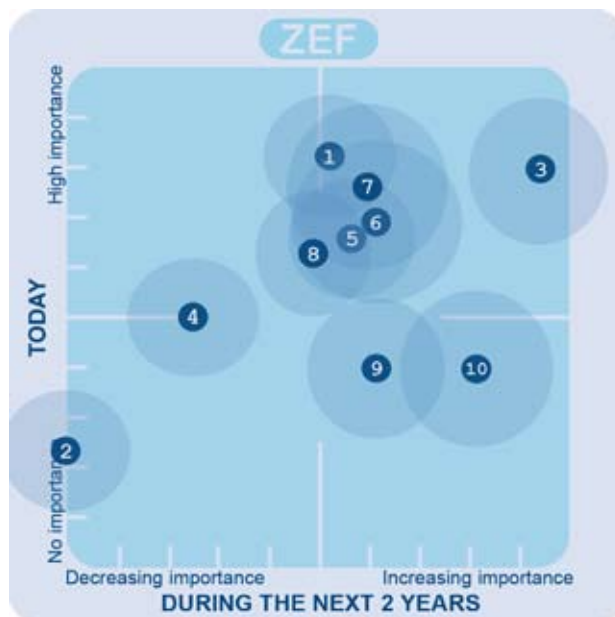


3 Innovation environment

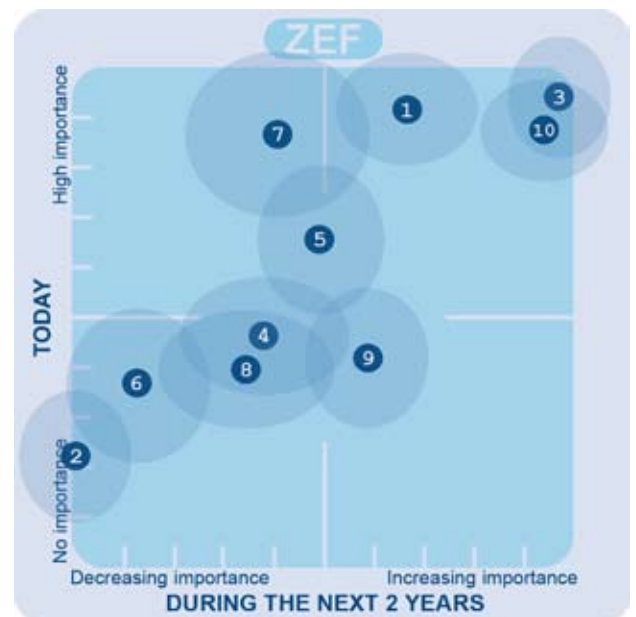
The innovation environment comprises institutions which, together and individually, contribute to the development and dissemination of new information and new technologies and which comprise a structural and legal framework on which the government executes policies promoting innovation. The innovation environment consists of structures, actors, reciprocalities and a legally created operating environment. In addition to these, other key elements include an innovation culture, processes that inspire individuals and organizations to create the new, global information channels as well as shared innovation knowledge and interpretative frames of reference. (Hautamäki & Kuusi, 2005.)

Considering relevant items related to the innovation environment, we asked the following questions in our survey. After the list of items, the results are presented separately for SMEs and large companies. In the analysis part, results presented in small figures illustrate the average of all answers, including SMEs and large firms. In addition, we have included some comparative answers (=grey circles) from a previous study of innovation environment in Finland (Saarinen et al, 2006).

SMEs



Large firms



1. Availability of skilled (domestic) personnel
2. Services provided by external experts
3. Culture that supports entrepreneurship
4. Technical resources and equipment
5. Predictability of technological development
6. Availability of risk financing and private equity investments
7. Personnel costs
8. Predictability of growth opportunities
9. Taxation policy
10. International networks

“ The financial crisis has a positive effect on availability of skilled personnel”



1. Availability of skilled (domestic) personnel

Skilled labor is a national asset. When it moves from Finland to foreign shores, Finland's own economy loses the utility it provides. As global competition gets tougher, the pressures exerted on the Finnish educational system are constantly increasing. According to the latest PISA surveys, the Finnish educational system has thus far done exceptionally well in international comparisons, even to such an extent that other countries are modeling their own educational systems after the Finnish system. As international competitiveness increases, numerous different actors have begun to make recommendations to improve the educational system. One solution model has been specialization. Finland can only be home to a few top international universities. Discussions have also touched on improving the attractiveness of vocational education by systematically updating the equipment and teaching environments of educational institutes, in order to ensure the availability of skilled personnel in the years to come.

This need to ensure a sufficient supply of skilled labor is underlined by the fact that Finnish high-tech companies still suffer from a chronic shortage of educated labor, and total employment in the cluster would certainly be much higher without this restriction. In the near future, when the so-called large generations will retire, the availability of skilled personnel in Finland will be much more difficult. This is made evident in, for example, a survey conducted by Talouselämä (Vihma, 2006), in which the directors of personnel development from 40 of Finland's largest companies were asked to give their opinion on the adequacy of labor as well as the expertise needs for management and expert personnel. Just over half of the large corporations believe they will get a sufficient number of qualified supervisors and experts over the next five years. How well Finland is able to maintain and attract a sufficient amount of skilled personnel will be a key issue in the near future.

When CEOs were asked about the importance of availability of skilled personnel today and during the next two years, the future growth trend seems to be pretty good. Faith in the availability of skilled personnel is, in the view of several respondents, increasing. Today, domestic expertise is highly valued. If we compared these results with the previous ones (Saarinen et al, 2006), an enormous change has taken place during the last three years. One possible explanation for this change could be a successful education policy, which means that the future needs of Finnish industry are foreseen clearly, the results of which are emerging already today. On the other hand, in the free-form comment section, quality of Finnish universities and lifetime professorships met quite heavy criticism.

2. Services provided by external experts

Dramatic economic turmoil typically throws up unusual problems which may well be new to many business people, or emphasizes issues which have been below the surface insidiously affecting business performance. These may include once-in-a-business-lifetime issues, and as such there may be a lack of internal experience; consequently, now may not the time to try to become an expert but it may be the time to employ one. Using appropriate experts to solve specific problems for companies will not only ensure the problems are solved effectively, but it will also leave company managers free to run the normal day-to-day business.

The use of external specialists is very much the way modern businesses operate, where companies typically employ the necessary core of key staff while using external companies or individuals to flex around varying demand and varying needs. Other things leading businesses to use external capabilities include outsourcing; the current trend for smaller business to operate as almost virtual companies in the sense that they may have no fixed abode; very little infrastructure; and few employees other than the founders or owners.

In our survey we asked about the importance of services provided by external experts. According to the results, Finnish companies consider the role of external experts is playing minor role for their business. In addition, the expectations for the future are even more skeptical. This topic scores the lowest values of all when the importance during the next two years is analyzed. However, there were some positive comments in the free-form answering part about this item. Some respondents mentioned that during the last crisis they tried to do everything themselves. However, that turned out to be the worst possible solution. During this recession, they use the external experts from the very beginning. Unfortunately, this type of behavior is more often adapted only in those companies whose CEOs and boards have personally experienced the previous crisis. The number of such companies is extremely low in Finland.

3. Culture that supports entrepreneurship

Promoting enterprise involves creating an atmosphere in which companies can succeed and which encourages individuals to use their creativity and new ideas as effectively as possible, thus creating new jobs. A strong entrepreneurial culture produces new and competitive companies and rejuvenates existing companies and organizations. As a result of this, the development of entrepreneurial education and training was a key area of focus in a government enterprise project initiated in Finland at the beginning of 2000. Factors such as work ethic, enthusiasm, incentive and motivation as well as negative aspects such as envy are integral parts of the entrepreneurial culture.

Even at the EU level, attention is given to improving the



“ The academic entrepreneurship has to be encouraged in order to get the “innovation brains” of our country to as productive workplaces as possible in order to create jobs for others”



entrepreneurial culture. Efforts have been made to encourage SMEs and service sector companies in particular to, for example, create new jobs. Furthermore, efforts have been made to use new technologies and innovation to create and develop new companies as well as to promote environmentally-friendly production and consumer approaches. There has also been a dramatic increase in research and development funding. In addition to this, attention has been given to: facilitating the founding of companies and engaging in business operations; reducing the general costs of hiring new employees; developing risk capital markets; and altering taxation policies to move job creation in a favorable direction. (European Commission, 2005)

According to the survey, entrepreneurial culture is considered to be highly important in Finland. This has been affected by measures promoting enterprise which have been realized by the government in recent years. Attention has also recently been given to attitudes. Efforts have been made to create a positive perception of enterprise, particularly in the eyes of students. During the next two years, according to our survey, the importance of entrepreneurial culture will even increase. In fact, it gets the highest scores of all when future scenarios are considered in marked contrast to the previous survey.

In the free-form comment section, CEOs gave advice on how entrepreneurial culture could be developed in Finland. The main comment was that companies would like to get their voices heard better in the future. The current development of entrepreneurial culture is still at some extent driven by institutional self-preservation instinct, not by the real needs of the companies.

4. Technical resources and equipment

The level of technology in Finland underwent a dramatic period of “catch-up” following the Second World War, when it developed from an almost non-existent state to one of the highest in the world. (Saarinen, 2005.) The equipment base of companies has improved significantly over the past few decades. Following a brief downturn in the early 2000s, the fixed investments of Finnish industrial companies has experienced slight growth since 2004. According to a Confederation of Finnish Industries EK survey (2008), in 2008 the primary objective of industrial investments will be to replace existing production capacity. Unfortunately, this has not been the case in a large number of Finnish firms.

According to the survey, CEOs rate the importance of technical resources in Finland as medium. In the future, technical resources and machines are expected to decrease in importance. One reason for this trend might be the increase in R&D investments, which are not considered as physical investments. Compared to the previous results, there has been a big downgrading in CEOs estimations



about the current state. In free-form comments SMEs expressed concern that they would not necessarily have the financial resources to invest in the acquisition of new equipment and machinery.

5. Predictability of technological development

The current rate of change in the opening and expansion of world trade as well as the continuous development of technology pose major challenges for all companies. During such rapid worldwide growth, it is even more important to identify future weaknesses as early as possible. Vast amounts of data and estimates concerning these are produced throughout the world and in Finland. Those firms who are able to transform the data for the advantage of their own business will be the winners in this game.

Technology forecasting comprises information on what new technologies are on the horizon, the maturity and developmental dynamics of technologies, which boundary conditions and correlations affect development, and when technologies can be moved from the laboratory into production. The charting of key actors in technological development, various competitive situations and, for example, the impact of standards on technological development are also crucial. Technology forecasting also involves technological applications and new innovations in various industries. Technology forecasting helps generate ideas for developmental paths in the future.

The predictability of technological development is generally easier in technical fields which are close to the company's own core technology. We asked our CEO respondents to evaluate the importance of predictability of technological development today and during the next two years. According to the results, the predictability of development is quite important today and will be equally important in the future. These results are almost in line with the previous results, as can be seen in the figure above.



6. Availability of risk financing and private equity investments

Until the mid-1980s the banking system in Finland was based on continental Europe's central banking system and a weakly developed risk capital market, presenting weak conditions for nurturing entrepreneurship and financing new small and medium-sized enterprises. After that time, a vibrant venture capital market emerged as a result of the liberalization of the financial sector. This provided unparalleled financing opportunities for innovative high-tech firms, which are now able to enter the market at a relatively early stage of product development.

The amount of venture capital investments increased more than tenfold between 1995 and 2000. It is estimated that about one third of private equity investment in Finland went to information and

“ For small companies it is difficult to get financing for internationalization of business activities”



communications technology during this period. During the 21st century, the venture capital investments in Finland have decreased continuously. Today, the status of the Finnish VC industry is critical. The number of active funds investing in early-stage is currently less than 10. The total annual value of the VC industry is around EUR 200 million. Most of the funds have moved to more mature stages or MBO/MBI-investments. (Ruohonen, 2007)

According to the survey, the results differ greatly between SMEs and large firms. CEOs of SMEs judged that the availability of risk funding has of quite high importance for the company and will be of increasing importance in the future, whereas CEOs of large companies estimated totally the opposite. It is clear that raising money during a recession is a little harder. However, good teams with good ideas can always get venture capital or angel funding. In fact, VCs are sitting on cash right now and they want to invest it in hot new startups. In fact, many VCs are reluctant to dump more money into an existing startup that is struggling, but will invest in a new startup idea.

7. Personnel costs

Finland has been part of the Euro zone since the beginning of 1999. Changing the external value of domestic currency is no longer possible, which has compromised the ability of national policy to affect the price competitiveness of companies. Instead, it is still possible to affect company cost development, particularly in regard to labor costs. With the advent of globalization, labor costs will face serious challenges, as the labor costs in new EU member states and especially China and India are only a fraction of those in Finland. Other costs, such as raw materials and energy, are largely determined by global market prices.

The CEOs felt that the personnel costs are important and will have an increased importance in the near future. This could mean that companies are continuously searching for attractive and cheap locations for their business operations. On the other hand, personnel costs have increased rapidly in the so-called "low cost countries" during the last five years. In the previous study (Saarinen et al, 2006) it was generally stated that, despite the high level of costs, Finland is a good country for doing business in comparison with other European countries. However, it was expected that company personnel costs will rise further in Finland during the near future.

8. Predictability of growth opportunities

Growth opportunities, as well as growth companies, are most often seen in the technology industries. A growth company can be defined as any firm whose business generates significant positive cash flows or earnings, which increase at significantly faster rates than the overall economy. A growth company tends to have very profitable reinvestment opportunities for its own retained earnings. Growth



companies such as Google are expected to increase profits markedly in the future, and thus the market bids up their share prices to high valuations. This contrasts with mature companies, such as diversified utility companies, which see very stable earnings with little to no growth.

Despite the economic downturn, one possibility where companies can find growth opportunities is among the 3.7 billion people at the "base of the pyramid" (BOP) by adopting innovative strategies that benefit local communities, according to two reports released in January 2009 by the World Economic Forum. Innovative companies are finding new strategies to engage the BOP in their value chains - providing much-needed income and food security to poor communities. Companies can tap these opportunities by adopting new strategies to discover hidden value and new business partners at the BOP. The telecom sector, for example, has developed technologies that lower unit costs and enable service provision in remote areas; applications that provide cash transfer or information services to BOP customers; and sales strategies that expand usage in partnership with local entrepreneurs.

In regards to the predictability of growth opportunities, the CEOs of SMEs gave similar marks as they did for the predictability of technological development, whereas CEOs of large and R&D intensive firms saw it slightly differently. For large companies, the importance of predictability of growth opportunities seems to be of minor importance. This result is quite surprising, but it explains pretty well the recent developments in the Finnish industry. New growth opportunities are not actively searched outside the company's core business, even when that core business is generating negative results. If we compare this result with the previous study, we see the difficulties mainly in the foreign markets. The predictability of the operating environment abroad was seen to be highly unsatisfactory.

9. Taxation policy

Social solutions concerning enterprise and taxation have direct impact on the competitiveness of companies. It is vital to Finland and the well-being of Finns that companies ensure Finland will remain a prime location for both Finnish companies and foreign investors. At present, it seems that taxation is becoming a complex competitive factor, in Finland as in Europe. Some OECD countries offer tax exemptions for R&D operations. In Finland the use of these types of incentives is quite low.

Taxation policy in general was seen to be of medium importance for Finnish companies. However, in the near future, the importance of this policy will slightly increase. In the previous survey in 2006, taxation policy received especially bad results. In addition to the poor marks, this issue produced the most heated commentary in the free-form section. It was emphasized that Finland must be able



to ensure the permanence of Finnish development resources and availability of foreign development resources through taxation and other means. It was hoped that taxation could be made more lenient where entrepreneurs are concerned. Taxation could also be much more effectively used to support bringing new innovations to market. The risks associated with innovations are currently borne by the entrepreneur, but the tax authority is the first to take revenues.

10. International networks

Networks have always played – and still play – an important role in the industrial and entrepreneurial life in Finland. Over the years, networks have been built up for various purposes, usually in order to rationalize the activities of the firms. However, over the years a wide variety of new kinds of organizational arrangements have emerged to support innovation. It is widely acknowledged that the industrial development in Finland before the mid 1980s was characterized by large number of cartels. As cartels became less acceptable, later on even forbidden by the law, other forms of networking increased their importance. Among these new forms, R&D collaboration turned out to be highly beneficial.

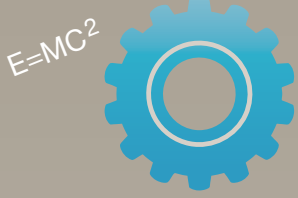
Small and medium sized businesses are said to concentrate on developing more incremental types of products than large multinational companies. It has also been argued that their development process lacks overseas partners, small companies tending to rely more on local networks and seek know-how locally. The main argument behind this is that of scarce resources; it could be presumed that small companies lack the resources to build long-lasting relationships with overseas partners. Entrepreneurship, more specifically the entrepreneur's previously gained contacts and experience of foreign activities, may enhance collaboration that is especially relevant for new start-up companies. For large companies, the situation is slightly different.

According to the survey, CEOs of large firms rate the importance of international networks as highly important, whereas CEOs of small firms see their importance as more moderate. However, in the future, international networks are seen to increase their importance. The recent studies concerning the importance of international networks for Finnish innovative firms illustrate that international networks have decreased their importance during the 21st century. In view of our results, this seems to be a temporary situation, as the results for the future show greatly positive expectations.



“ When you are aiming at international markets in your business, R&D operations have to be located in international markets as well”

Innovating through the downturn
Innovation strategies



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4 Innovation strategies

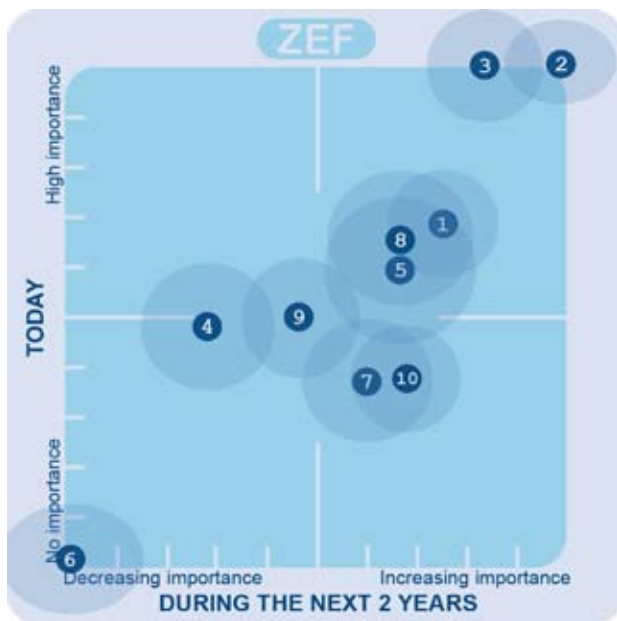
Recessions result big change and the longer and deeper the recession, the more change there is. Big change can take place in your consumer and client, in your market, in your industry, in global business as a whole. Big change is scary, but big change is good. Big change means big opportunities: Opportunities to change the game, to take advantage of weaker competitors, to find new and novel ways in which to not only survive, but to thrive. Innovation is all about realizing and capitalizing on the opportunities available to your company, and represents the way out of vicious cycles.

The good news is that companies intent on winning the game are now forced to look at innovation with a sense of urgency previously unseen. They will look towards innovation to revisit past assumptions, norms, and directions in a bid to become different from the competition in the eyes of the consumer and client. To no longer be able to be compared on a like for like basis, and to compete in a market of one instead of many. Winners emerging from this downturn in the economy will develop an innovation strategy that looks at innovation in a very unique way from most companies.

During economic downturns, innovation is the single most important condition for transforming the crisis into an opportunity. And while many businesses simply will not be able to afford further investment in innovation, governments should recognize that innovation systems, with all their academic, industrial, and public components, are strategic national assets that need to be protected, just like the financial and housing sectors. Times such as these call for government intervention to prevent the contraction of the knowledge bases upon which economies are now more than ever dependent. (Mahroum, 2008)

In order to get some understanding of innovation strategies during the downturn, we asked CEOs the importance of following items. The list of items is at large extent based on the study made by Frey and Callahan (2008). The results of this exercise are presented separately for SMEs and large companies.

SMEs



Large firms



1. Planning of future scenarios
2. Focusing on real customer needs
3. Marketing of innovative products and services
4. Leading-through long-term and risky innovation projects
5. Testing new ideas by energy and cost effective ways
6. Embracing open-source innovations
7. Extending your products by "creative" ways
8. Role of suppliers in the value-chain of your company
9. Updating your competitor and market analysis
10. Versatile exploitation of innovative operation models

1. Planning of future scenarios

During a recession it is a good time to think about innovation. The market turmoil and political transition will create opportunities for new products and services and will create shifts in markets and consumer demand. Companies who are willing to get the best out of the crises should start their scenario planning now, forecasting two to three years out and evaluating the likely changes and outcomes from the financial crisis, the political transition in the world and the impending recession and aftermath. All of these changes - financial, political and economic - will consolidate and create new opportunities and change existing markets. Firms that "stick to their knitting" risk being left behind. Some things that made sense before do not necessarily make sense now. (Phillips, 2008)

When CEOs were asked about the importance of planning of future scenarios today and during the next two years, we received quite positive answers. Today, both SMEs and large firms seem to understand the importance of future scenarios well. During the next two years, the importance of planning for future scenarios is expected to increase. This could be one sign of uncertainty, as traditional markets are losing their importance and competition in future new markets will increase. Those companies who are able to plan future scenarios better than their competitors will be the winners of this game.



2. Focusing on real customer needs

Customers always have problems to solve, even in a downturn. The recession itself is eliminating some jobs customers previously needed to get done, while at the same time creating new ones. At the very least, the current economic conditions are wreaking havoc on the trade-offs people make when they consider "hiring" a product or service to get a job done, with convenience now factoring lower than cost for many customers. Real customers continue to face real problems. And as always, innovators who figure out different ways to solve those problems – and make money doing so – will have opportunities to create new growth businesses. In fact, the creative destruction unleashed by a crisis always opens up opportunities for innovation. (Anthony, 2009)

The other thought is that companies really need to think, more than ever, about how the customer determines value. A core disruptive concept is that many companies unintentionally "overshoot" swathes of the market by improving features and functions beyond what matters to many customers. Looking at what the customers use to determine value can help companies do smart cost-cutting and think about low-cost plays that are particularly in tune with the market's needs. (Anthony, 2009)

In addition, if there is one thing the customers desperately want today, it is more value for their money. Ideally, they would like to derive



“ The most important issue in innovation strategies is to move from an organization-focused to a customer-focused innovation point of view”

that value without investing more in new products. Fortunately, it is likely that there are many ways companies' products can be used, including ways that are not described in instruction manuals. As a result, new products can often deliver additional value without any modification. Companies just need to communicate these new uses to the customers. But before they do that, companies' need to identify new uses for their products. (Baumgartner, 2008)

The absolute worst thing companies' can do in a stalled economy is to assume that they can just continue to sell the same old product or service to the same old customers in the same old way and at the same old price. Instead, companies' need to get busy working out how their customers' priorities may have changed, and quickly realign their business model to address their new needs. (Gibson, 2008)

In our survey we asked about the importance of focusing on real customer needs. According to the results, Finnish companies consider the real customer needs as the most important issue in their business today and during the next two years. This result indicates that Finnish companies have finally made a transition from pure technology push type of thinking towards the pattern of market demand. This pattern has also been realized in recent studies of Finnish innovations (Hyvönen & Saarinen, 2009), in which the role of customers as the origin of innovation has increased rapidly during the 21st century. The open innovation literature states the benefits of integrating the customer into the innovation process (open to market side). The Finnish development might be a result of the open innovation movement, or as a result of long term evolution away from technology-led innovation towards market- and customer-driven innovations.

3. Marketing of innovative products and services

Besides innovative efforts such as R&D activities, it is commonly understood that a market orientation is an equally key determinant of the performance of firms. However, as Pohjola and Aro (2006) note, in the framework of the National Innovation System - which has thus far formed an important guide for R&D and innovation policies – a conceptual gap exists which addresses the role of markets in innovation. It is argued that market and R&D strategies should be connected and aligned, and will line out the interface between the much more mature field of firm-level strategic planning, and a novel market-oriented R&D policy planning.

During a recession it is essential to promote new product and/or service's value for customers. The first thing should be to communicate to clients and customers how important the new product or service is and how it will help customers survive the economic slowdown better than not buying it. What does this mean for companies today? It suggests that it may be fruitful to re-think portfolios of offerings and to consider old products that may be lying in an R&D warehouse, or that are on the market but have been de-emphasized. Formally stalled



innovations could thrive in the new environment where the definition of “good enough” has changed, and would be low-hanging fruit for success. (Waber, 2008)

According to the survey, marketing of innovative products and services is considered to be highly important in Finland. In fact, it scores as highly as the previous item, focusing on real customer needs. This result is rather surprising, because there is a lack of empirical studies on the role of marketing in new innovative products and services. For both SMEs and large firms it seems to be equally important, now and during the next two years. Marketing of innovative products and services is expected to have increasing importance for Finnish companies. Hopefully there will be more studies about this particular topic and its importance for innovation activities of companies in the future.

4. Leading-through long-term and risky innovation projects

When trying to innovate in a downturn, prioritization is crucially important. Companies cannot do all that they want to do, so they have to pare their lists and work on the things that will bring them the most impact and are the most relevant to their strategic priorities. Reshuffling talent can also be helpful in ensuring that good people can be redeployed into innovation execution roles, where otherwise they may be lost in layoffs within underperforming divisions. (Rae, 2008)

During downturns, many companies are cutting back on activities that are not income-generating and focus entirely on lean operations. According to the survey, CEOs rate long-term and risky innovation projects as being of medium importance. In the future, these types of projects are expected to decrease in importance, particularly among SMEs. This result is in line with expectations, as prioritization becomes one of the key issues during a recession. In addition, it is even relatively easy for companies to quit their long-term development projects and concentrate on projects in which the revenues are expected to come in the near future. However, those companies who have the ability to keep up long-term and risky innovation projects may be in good market positions as the next upswing becomes real.

5. Testing new ideas by energy and cost effective ways

Simplification almost always reduces costs. Simpler-to-make products are also less costly to make. Moreover, they are typically more reliable as there are fewer parts to break down. Simple operational structures are less costly to run. Simple-to-use products keep customers happy. In addition, piloting and prototyping can be more effective in these times to tune, calibrate, learn and advance innovation ideas in the works. This minimizes the cost, helps to manage risks likely on larger





initiatives, and positions company for the upturn.

A good piece of advice for innovators could be “fail cheaply”. If companies are truly innovative, they will fail. If companies do not fail, they are playing it safe. Therefore, if companies are going to fail, they should learn how to fail cheaply. This is not the same as failing fast. To fail cheaply, companies must embrace the “build, test, and learn - cheaply” mentality. This means that ideas should be built out as a small experiment, then implemented, and after that learnt from the experience. When resources get scarce, companies have to be even more creative about how to test critical assumptions. Fortunately, it has never been easier to develop and test an idea quickly and cheaply, using tools such as employee focus groups, low-resolution mock-ups, simulations, and “good enough” beta tests. (Anthony, 2009)

Testing new ideas by energy- and cost-effective ways is generally easier for companies which are operating in a bulk business. We asked our CEO respondents to evaluate the importance of testing new ideas by energy- and cost-effective means today and during the next two years. According to the results, SMEs see it to be relatively important to “fail cheaply”, whereas large firms have rather the opposite view on this topic. One explanation for these different opinions could be the money spent on R&D. According to one rule of thumb from the real world, today’s companies can survive only two product failures in a row. If more, the risk of bankruptcy is almost unavoidable. Particularly in SMEs, two product failures in a row could be the end of business, whereas in large firms with large R&D budgets, there might still be some possibilities to survive.

6. Embracing open-source innovations

Open source software has a number of advantages over proprietary software. It is inexpensive, shared, and creates alternatives to monopolistic proprietary software. Up until recently, however, it has not been greatly technically innovative. Most packages so far have copied the basic functionality of pre-existing proprietary software. This situation appears to be changing. The question is that how can companies use open source software in a new and better way to reach and help clients?

One possibility is to look for opportunities beyond firm’s walls to continue R&D, but at a lower cost and lower risk. This can be done by sourcing R&D talent from low-cost countries such as China, India, and Eastern Europe, or using various services that enable companies to submit their idea challenge to a large community of expert problem solvers. Partnering with other firms who provide complementary products and services is another way to share costs and risks, and maintain companies R&D momentum through the downturn.

According to the survey, there are not significant differences between SMEs and large firms when it comes to open-source innovations. CEOs judged that the importance of embracing open-



source innovations has no importance for companies today. This item scores the lowest values of all, which is an interesting result keeping in mind for example the history of Linux with its Finnish origin. A possible explanation for this result could be the Finns' willingness to develop new software solutions to match their existing organizational operations and structures, as opposed to the other way around. Another explanation could be the fact that open-source innovations are not well known in Finland. As new generations gradually overtake the top positions in companies, the exploitation of open-source innovations may take a major leap forward.

7. Extending your products by "creative" ways

There are several ways to generate innovative ideas about deriving additional value from new and existing products. Running ideas campaigns or brainstorming events to generate ideas on new product features can generate lots of ideas. But a better approach might be to run an ideas campaign to explore innovative uses for companies products. Companies just have to make it sure that participants understand that ideas may incorporate any product changes they wish.

In other cases, modest changes to companies' products enable them to deliver significant additional value at a minimal additional cost. For those companies that do find themselves financially pinched, there is an opportunity to refocus some of their innovation efforts. Innovation is most often associated with growth, but that is an incomplete assessment. Innovation can be just as easily applied to cost cutting efforts. In fact, "reductive innovation" is an emerging term that refers to using innovation tools to come up with ways to get more out of less without compromise. In areas like energy efficiency, ICT and services, there are a large number of growth possibilities to be achieved by using creative thinking. (Silverstein, 2008)

The CEOs felt that extending products by creative ways is not so important today, but will increase its importance during the next two years. This could mean that companies are learning to search for new implementation and extension possibilities for their products. During the next two years, the importance of this topic seems to increase, particularly in large companies. The positive issue of this item is that it is relatively cheap for companies. There is no need for development of new infrastructure and equipment for this search process. All you need is an open mind, enough time and a good place that supports creative thinking.

8. Role of suppliers in the value-chain of your company

Many companies habitually undervalue their suppliers. When the market gets tight, suppliers may struggle more than the parent company. But if parent companies help suppliers be successful





they may find that together these companies become even more successful. In a recession companies can improve the efficiency of collaboration, logistics, and other elements of their supply chain. Strengthening these relationships may help companies to recover faster when the market upturn comes. During a recession it could be beneficial to brainstorm other potential partnerships that could increase companies value to their key customers.

With the advent of specialization, companies have increasingly focused on the management and further development of their own technologies. The result of this is, for example, the increased importance of subcontractors in production during the past few decades. Recent international studies have found that in Finland the role subcontractors play in a company's innovation functions is considerably more important than in other European countries. With the coming of the 21st century, the status of subcontractors has been put to the test. Even though the level of professional skills in Finland is high, large corporations have increasingly shifted their subcontracting functions abroad in search of cheaper labor costs. One example of this is the Vaisala Group, which announced in 2006 that it would be transferring its production operations to subcontractors in Malaysia.

The professional skill of subcontractors and suppliers has generally been strong in Finland. When CEOs were asked to rate the importance of suppliers in the value-chain, we got different answers depending on the size of firms. SMEs see the role of suppliers as somewhat important today, with an increasing importance in the future. In real life, SMEs find themselves closer to the suppliers' role, which may have some impact in the answers. Large firms instead are using suppliers more as production capacity, which could mean that they are not so aware of the reality of suppliers. However, the results illustrate that suppliers are important for large firms today, but will lose their importance in the near future. If large firms are willing to overcome the downturn, the attitude towards suppliers has to change. In order to overcome the recession different parties have to come closer to each other and to find a beneficial way to work together.

9. Updating your competitor and market analysis

Competitor and market analysis provides both an offensive and defensive strategic context through which to identify opportunities and threats. Competitor profiling coalesces all of the relevant sources of competitor analysis into one framework in the support of efficient and effective strategy formulation, implementation, monitoring and adjustment. Given that competitor analysis is an essential component of corporate strategy, it is argued that most firms do not conduct this type of analysis systematically enough. Instead, many enterprises operate on what is called informal impressions, conjectures, and intuition gained through the tidbits of information about competitors every manager continually receives. As a result, traditional

environmental scanning places many firms at risk of dangerous competitive blind spots due to a lack of robust competitor analysis.

Companies need to identify any emerging competitors who may see your firm's current weakness as an opportunity to advance. They should remember Christensen's (2003) advice in *The Innovator's Solution*: incumbents tend to ignore new entrants because their products and business models are too basic to be taken seriously. But many incumbents are already providing products and services that have already "overshot" the needs of their core customers, who may be looking for more basic, inexpensive options during the recession.

With regard to updating competitor and market analysis, the CEOs of SMEs gave highly neutral answers, whereas CEOs of large and R&D intensive firms saw the importance of this topic as less important. This result is quite surprising, but sheds some light on recent developments in Finnish industry. Companies are dealing with same problems and issues as their competitors, and new technological solutions are developed and produced for the markets, where the competition is already high and growth possibilities are relatively low. One indication about this "double-job" is the share of patent applications, which are rejected because of overlapping technological solutions with some pre-existing technology. In Finland, this number is still pretty high.

10. Versatile exploitation of innovative operation models

A comprehensive approach to innovation is the best way to innovate. But in times like these, when economies are slowing down and the future is uncertain, a comprehensive approach to innovation is critical to companies survival. Companies should not just think about innovation in terms of products, services, and business models. Why not spend some time brainstorming with a cross-functional team on how to identify and reduce areas of waste, which can uncover huge opportunities for cost savings?

One possibility is to use open innovation to reduce R&D costs. Sometimes it can be less expensive to have others do the innovating for companies. There are organizations, which are able to define the "value" of a new idea and then post company's request to a large community of expert solvers. This moves innovation from an unpredictable cost (infrastructure, the cost of researchers, and other hidden costs) to a predictable cost (the posting fee and reward). This is just one way to reduce costs while growing the business. (Shapiro, 2008)

During the last 60 years, innovation processes have witnessed some major changes. One of these changes has been the increase in the openness of innovation, or in other words the "open innovation paradigm". This can be seen as a huge increase in customers' involvement, collaboration, and number of technology programs. The



“ The current business models do not always encourage innovativeness in networks. Networks are usually project-based and without any longer continuation”

question that still remains is that whether open innovations are just one minor step in the evolution of innovation processes of companies, or whether there are some other factors, such as technology policy, that have directed innovations towards more openness. The follow-up question is, has the involvement of public authorities and new legislations made innovations more open, or can we still talk about a “closed innovation paradigm” in Finland?

According to the survey, CEOs of large firms rate the importance of versatile exploitation of innovative ideas as quite important, whereas CEOs of small firms see their importance more moderately. In the future, there may be a huge increase in the importance of this topic, particularly among the large firms. They see the versatile exploitation of new ideas as important as focusing on real customer needs. This result is of particular interest as it could indicate a huge increase in e.g. open innovation type of thinking. Today, the number of firms who are daily using open innovation business models is rather limited. There are only a couple of large companies, who have some experience of this type of activities.



5 Innovation policy

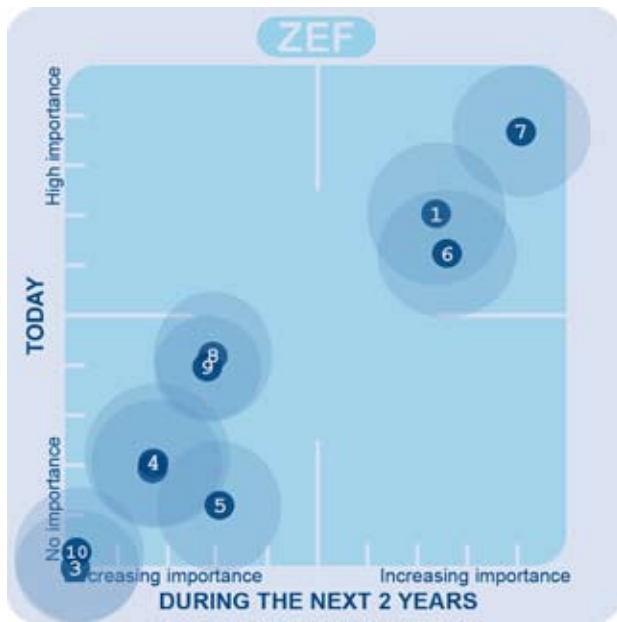
In Finland innovation policy drove the need to increase technological innovations beginning in the 1990s. It was one of the main tools for pulling Finland out of the recession, and it did so exceedingly well. Innovations are, however, also accelerators of social and cultural development, and this particular implication has received greater appreciation in the 2000s. Technological innovations are necessary for social development, but these are accompanied by the need to produce successful social innovations in all social sectors. (Science and Technology Policy Council of Finland, 2002.)

Innovation policies are about creating incentives for enterprises to innovate more quickly in all fields. Innovation can take place in all sectors, industries and enterprises. Innovation does not happen of its own accord, as only people can innovate. It is therefore the task of innovation policies to improve the ability of enterprises to create innovation by developing initiatives which will increase innovative thinking and innovative action. Innovation policies break down barriers to innovation, and also prevent new barriers emerging.

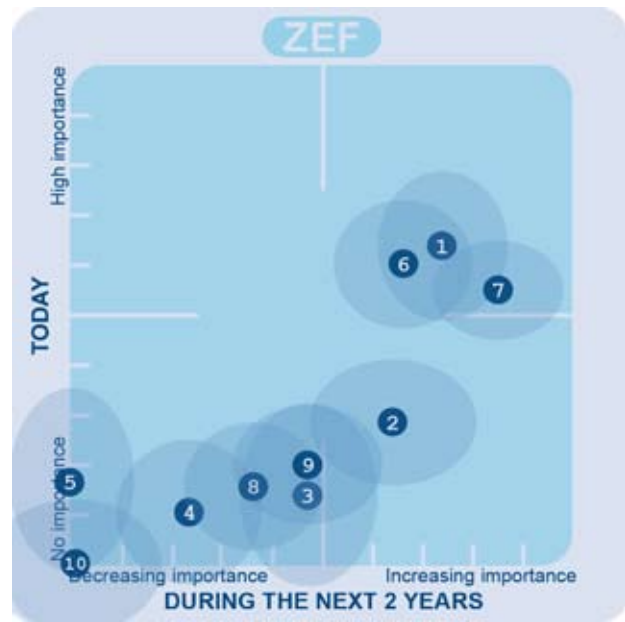
The core feature of any future innovation policy would be adopting a broad innovative approach, emphasizing the perspective of benefiting from innovations. Such an approach would be vital to any demand-oriented innovation policy emphasizing the implementation of innovations, in contrast to a traditional, technology-driven innovation policy. Innovation itself is more extensive than technological development and covers a greater number of single themes and actors. In particular, the role of the public sector as an 'innovator' is regarded as one of the basic elements of any broad-based innovation policy.

In our survey, technology and innovation policy-related factors did not score highly in general. Innovation and technology policy specifically did not receive unconditional support from our survey respondents. As can be seen in the figures below, the majority of circles are located in the lower left quadrant. Only a couple of circles receive high scores from the respondents. Compared to other sections such as innovation environment and innovation strategies, innovation policy-related items are considered less important by the respondents.

SMEs



Large firms



1. Public R&D-funding
2. Public- and university research in your innovation activity
3. R&D investments abroad
4. Attractiveness of foreign R&D investments in Finland
5. Attractiveness of Finland to foreign experts
6. International competitiveness of Finnish innovation system
7. Birth of new growth-oriented companies
8. Public procurement (e.g. construction, medical and health care, etc.)
9. Protection of immaterial rights
10. Location of business

1. Public R&D-funding

In the economic literature, there exists a large number of studies in which the role of public intervention has been analyzed. In general these studies deal with the following hypotheses. First, that expenditures on R&D generate a positive effect on economic growth and social welfare; second, that public intervention generates an additional growth of investments in R&D; third (following on from the second), that public support for R&D will have an additional positive effect on economic growth and social welfare. In general it is believed that it is the government that has the responsibility to invest in the basic infrastructure of education and knowledge generation for science and technology, particularly in universities and research institutes.

Why do growing economies experience booms and recessions? Traditional answers to this question mainly stress exogenous shocks or non-linearities, whose effects are analyzed in stationary economies. Recently, however, several authors have proposed mechanisms that allow understanding of both short-run fluctuations and long-run growth in a unified setup. A common prediction in these endogenous growth models is a countercyclical allocation of resources to R&D. In periods of high growth of GDP, few resources are allocated to R&D. With low growth, resource allocation to R&D is proportionately high. The model that Finland is implementing during this recession is explained in the following paragraph by the Director General of Tekes.

“During a recession, there is a risk that companies and public-sector organizations cut back on R&D and innovation. This will undermine their competitiveness when the economy picks up again. Therefore, it is extremely important to encourage companies and public entities to stick to their R&D plans during a downswing. When the economy is sluggish, the impact of public incentives in support of innovation is more tangible while at the same time the need for public financing increases. Government incentives help ensure that companies are in full swing when the economy recovers” (Saarnivaara, 2009).

When CEOs were asked about the importance of public R&D funding today and during the next two years, we received strongly positive answers. Today, both SMEs and large firms consider the role of public R&D funding to be important for their businesses. During the next two years, the importance of public R&D funding is expected to increase. The question now is that what is the optimum level of public intervention as it comes to development of innovations. In Finland, public funding plays a significant role in some two thirds of all industrial innovations. Certainly, public funding has helped many companies to achieve their dreams and bring new goods to the markets; however it may have some negative impacts as well, such as decreasing growth rates after the second publicly funded R&D project. (Niininen & Saarinen, 2000).



“ The old domestically-focused R&D funding instruments should be changed towards mechanisms supporting international business”



2. Public- and university research in your innovation activity

Bilateral relations between government and university, academia and industry and government and industry have expanded into triadic relationships among these spheres, especially at the regional level. Academic-industry-government relations are emerging from different institutional starting points in various parts of the world, for the common purpose of stimulating knowledge-based economic development. Older economic development strategies, whether based primarily on the industrial sector or the governmental sector, are being supplemented, if not replaced, by knowledge-based economic development strategies, drawing upon resources from the three spheres. A new institutional configuration to promote innovation, a “triple helix” of university, industry and government is emerging in which the university has a leading role. (Etzkowitz, 2002)

Companies’ resources may be insufficient to succeed in innovation activities. Therefore they are compelled to seek complementing resources from external sources and inter-organizational alliances. These alliances can be created with several types of partners, e.g. customers, suppliers, universities or public sector organizations. Hagedoorn (1993) divides the motives for establishing strategic technology alliances into three groups directed at three different phases in a firm’s innovation activities. Reducing or minimizing the R&D costs and uncertainty are motives for alliance formation in the starting phase of an innovation development. This also includes motives such as acquiring complementary technology and accessing scientific knowledge. This is usually the main motive behind companies’ public- and university collaboration.

In our survey we asked about the importance of public- and university research in companies’ innovation activities. According to the results, Finnish companies consider that this type of research collaboration to be of minor importance for them today. This result indicates that Finnish companies are trying to do basic research related activities by themselves, not with the universities or public research institutes. In case of SMEs, the importance of this particular item is estimated to decrease during the next two years. However, large firms consider the future outlook to be quite positive. Naturally, there are some sectoral differences in collaboration. Lessons from the past indicate that in the R&D-intensive sectors such as chemicals and ICT-related branches such as electrical and electronics sectors, the company respondents assigned greater importance to collaboration with universities and research organizations. In the traditional sectors such as foodstuffs and metal products, where innovations often were induced by competition, as well as by regulations and the environment, collaboration is relatively less important. (Saarinen, 2005)

3. R&D investments abroad

In recent decades globalization has undergone a new phase. On the one hand this has been due to the impact of ICTs and the new knowledge-based paradigm on both economies and societies. On the other hand, the sustained development which large Asian economies have been experiencing since the late 1990s has profoundly shaped globalization dynamics. The shifting of research and development operations to developing countries, such as China and India, has increased rapidly during the last decade. In this new phase, companies' internationalization, and in particular the role and behavior of multinational corporations remain among the main drivers of globalization. In addition, knowledge and innovation have in fact become strategic assets for the success of both enterprises and nations. The balance of economic activities is gradually yet continuously shifting, from tangible manufacturing-based structures to a larger share of intangible knowledge and service-based business models.

In recent discussions in Finnish domestic newspapers, globalization in general and globalization of R&D in particular has raised concerns about the high-technology status of Finland in the future. As companies have moved or established their R&D laboratories abroad, various comments about the attractiveness of Finland in the global markets have been made. It has been stated that in the global economy of the future, the competitiveness of Finland will decline as new players take part in the race. However, what is believed is that despite of continuous investments made by Finnish companies abroad, and despite large Asian economies entering the markets, Finland could still be competitive in the future. As has been stated by large number of CEOs of large Finnish firms, the investments made abroad are beneficial for the Finnish economy in the longer run, because these are expected to generate inward foreign direct investments as well.

According to the survey, R&D investments abroad are not seen as important for Finnish firms. This is a particularly interesting result, because as we have seen in chapter 2 the share of R&D investments in abroad is 45% today and is expected to rise during the next two years time. If R&D investments abroad are seen as less important, it raises a question about the motives behind these investments. Namely, is it really so that the main argument behind R&D investments abroad is closeness to the markets, or are there other factors, such as cost effectiveness, which still play a major role in the decision-making process? Nonetheless, for large firms the importance of R&D investments abroad is expected to increase during the next two years. Before we can say whether this is positive or negative phenomenon for the Finnish economy, we need more information about the type of R&D that is actually relocated, its scope, the host countries FDIs are directed to and the type of R&D investments made.





4. Attractiveness of foreign R&D investments in Finland

Technology and innovation policy measures seek to contribute to enhancing the competitiveness of Finnish industry and the well-being of society, with the aim of making Finland capable of providing companies with a top-flight innovation environment internationally. In this respect, emphasis is put on the need to promote the attractiveness of the innovation environment for foreign R&D investments. This reflects well the tendency in Finland to interpret the concept of competitiveness in terms of attractiveness. (Pelkonen, 2008)

In the previous chapter there was discussion about the outflow aspects of globalization. In this chapter we concentrate on the other side of the coin, namely inflow aspects. Inflow refers to such issues as how attractive the national innovation system is to foreign enterprises considering making investments in production and other operations in Finland, including R&D. The challenge for the country in being successful in inflow is the same as in being attractive enough for domestic enterprises, i.e. to develop an attractive world class science and technology system (education, universities, science and technology organizations, intermediate organizations, etc.) and to increase the absorptive S&T capacity of national organizations. In the future the challenge for Finland is to be attractive not only to enterprises from the developed economies, but also to those from developing economies, for example high tech Chinese and Indian companies with their own R&D labs.

According to the survey, CEOs do not see it as important to attract foreign R&D investments in Finland. This result is of interest as it differs totally from the opinions of politicians. While politicians and public authorities emphasize the importance of foreign R&D investments in Finland and make efforts to bring those investments into Finland, CEOs see the situation totally differently. One explanation that CEOs raise is their concern over losing competent personnel to international competitors. This view has not raised any major discussions yet, but could be taken into the agenda over the next few years.

5. Attractiveness of Finland to foreign experts

In Finland's National Innovation Strategy (2008) it is stated that special challenges for Finland include increasing researchers' international mobility. International companies' research and development activity is minor in Finland, and this country does not attract enough international innovation investments in other respects. Not enough international experts find their way to Finland, nor are Finns sufficiently able to exploit the diversified expertise and multiculturalism of people with foreign backgrounds who reside here, in the development of our innovation environment. As a solution for this challenge it is proposed in the strategy that new incentives and operating models

will be developed for the procurement of international expertise and participation in open innovation activities. In addition, national research financing will be made available for foreign participants on a reciprocal basis in connection with international joint programs and application processes.

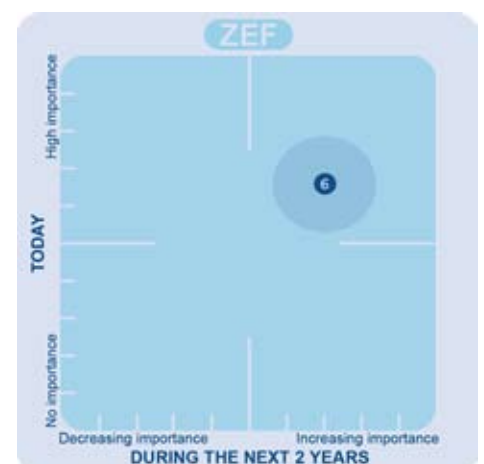
In 2005, the Academy of Finland and the National Technology Agency Tekes launched a new funding program with a view to attracting top foreign researchers to Finland. The idea was to recruit high-level international researchers for a fixed period who are committed to closely integrating themselves into the Finnish research community. The funding program for visiting science and technology top researchers allows Finnish universities and research institutes to hire top foreign names or foreign-based Finnish scientists back to Finland. It provides an effective tool for raising the level of scientific and technological know-how in Finland and for adding a stronger international element to the country's research system.

We asked our CEO respondents to evaluate the importance of attractiveness of Finland to foreign experts today and during the next two years. According to the results, companies do not see this item to be important at all. In addition, the importance of foreign experts is expected to decrease in the future. Particularly in large firms, this item scores the lowest results of all where it comes to estimations about the future. This result is quite in line with the previous results about the importance of foreign R&D in Finland. It would be interesting to know the real reasons behind these answers.

6. International competitiveness of Finnish innovation system

The Finnish innovation system has garnered extensive international praise, and ranked very well in numerous international comparisons. Finland's R&D investments relative to gross domestic product, for example, continue to be the second-highest among OECD countries. Providing the right incentives for R&D, international expansion, growth, and entrepreneurship are still major challenges, however. In the future, a small country such as Finland needs to specialize and focus on areas of specific excellence if it is to be competitive in the global marketplace. This entails being successful in commercializing the right products at the right time, and marketing them to the right people in the right places worldwide.

The beginning of the twenty-first century has already brought new challenges for Finnish innovation and its success in business. Competition is worldwide both in well-established areas such as the metal and engineering industry and the forest products industry, as well as in the third major engine of today's Finnish economy, the information and communications technology sector. The pace of development can also be expected to continue accelerating in younger sectors such



“ Finland has good possibilities to be a forerunner in the future, but it requires common efforts, as well as neighborly help in innovation activities”

as new materials, biotechnology, pharmaceuticals, virtual and mobile attractions, health care, fitness, social innovations, e-commerce, and other service sectors. There is also a continuous need for new innovations for certain groups of consumers, for instance, senior citizens or active fitness enthusiasts.

According to the survey, there are not significant differences between SMEs and large firms when it comes to the international competitiveness of the Finnish innovation system. CEOs judged that the importance of international competitiveness of Finnish innovation system is important for companies today and during the next two years. This could mean that Finnish firms understand and acknowledge the value of domestic infrastructure for their businesses. Some respondents mention that an internationally competitive innovation system is a good platform to stretch for international markets. When the homebase is working properly, it is relatively easy to concentrate the major part of efforts into relevant and demanding business issues. In the free-form answering section there was one question which asked whether Finnish companies are able to utilize the domestic innovation system in the best possible way. This is an important question that could be worth more detailed analysis in the future.

7. Birth of new growth-oriented companies

For Finland, growth entrepreneurship is a brand new policy area. There has been much research into entrepreneurship generally and individual studies have also been conducted on business growth factors and its obstacles. The studies show that the majority of new jobs are created in growth companies. At the same time, they show that the willingness of Finnish companies to grow and their actual growth is at a low level compared internationally. Therefore, Finns need to truly understand why growth ventures matter, how they are promoted elsewhere, and how should Finnish national policy be designed.

In spite of significant investment, the Finnish innovation system produces fewer new companies aiming at rapid growth and internationalization, and there is little desire among active companies to grow when compared internationally. However, there are examples and mechanisms available from other countries, in which the growth ventures have really become a success story of the whole nation. For example, growth can be encouraged by changing the taxation of growth companies and other forms of regulation that affect them; by increasing the amount of financing available for growth and internationalization; by tailoring public business services and business incubation projects based on the needs of growth companies; and by improving training and guidance in growth entrepreneurship. The aim should be to build an 'ecosystem' that encourages growth.

The CEOs felt that the birth of new growth-oriented companies is of great importance today and will further increase its importance during the next two years. In fact, this item scores the highest future values in



this innovation policy section. This could be interpreted to mean that the existing firms are not expected to be able to grow endlessly, and thus there is a significant demand for new growth-oriented companies. Currently, the problem for growth-oriented companies has been the non-existence of support mechanisms. However, in the near future this situation is expected to change. An idealistic future scenario could be that Finland starts to produce growth-oriented firms to serve world markets and global venture capitalists. These firms would be able to rely on the best possible models, instruments and tools, which have been developed for the express purpose of enabling firms to grow.

8. Public procurement

Public contracts are supply, service or public works contracts, into which the state, municipalities or federations of municipalities, state enterprises and other contracting authorities as defined in the purchasing legislation, enter with external suppliers. Public contracts are established through means stipulated in the procurement legislation. The purpose of this regulation is to increase the efficiency of the use of public funds. The fundamental principles of the public procurement regulation include transparent and efficient tendering and equality and non-discriminatory treatment of participants.

About 15 percent of GDP in 2008 (EUR 22,5 billion) in Finland is spent by the government, municipalities and congregations on the procurement of goods, services and public works. Finnish public procurement is subject to national procurement legislation which derives from the European Community directives on public procurement. Under these rules public sector procurement must follow transparent open procedures ensuring fair and non-discriminatory conditions of competition for suppliers. When CEOs were asked to rate the importance of public procurement, we received rather negative answers. Both SMEs and large firms see the role of public procurement as less important today, with a decreasing importance in the future. Despite large investments made by public authorities, companies do not see this important for their business, not even during a recession.

9. Protection of immaterial rights

The expertise in intellectual and industrial property rights of an enterprise or other community, particularly as regards the protection of strategically important know-how, is one of the key success factors in business. Regulations pertaining to the protection of intellectual and industrial property rights have a major influence on how well the operating environment is able to support innovation. The government's new strategy on intellectual and industrial property rights, due for completion towards the end of the year 2008, reviewed several issues, including the national and international development needs of the system of intellectual and industrial property rights, and will present



“ During a recession, public procurement is an effective recovery method”



the measures that have to be taken in order to enhance the level of competence within enterprises concerning these rights.

The patent system is one of the main instruments of public policy that can be used to affect the allocation of resources into innovative activities and the diffusion of the results of those activities. While the role of innovation and technological change in economic development and growth has received increasing attention among economists since the seminal contributions of Schumpeter and Solow, economists have also become increasingly interested in the implications of the patent system for innovation and technological change.

With regard to protection of immaterial rights, the CEOs of SMEs gave highly neutral answers for today, whereas CEOs of large and R&D intensive firms saw the importance of immaterial rights as less important. During the next two years, the importance of this item is expected to decrease slightly in both groups of firms. This could be an indication of the appearance of other forms of protecting the technological edge of companies (such as tacit knowledge, lead times, learning-curve effects, switching costs, etc). It can be seen from the various statistics that traditional forms of immaterial protection are losing their importance somewhat. Those companies who are applying new and effective forms of protection of immaterial rights might become exceptionally competitive in the future.

10. Location of business

Firms' innovative efforts do not proceed in isolation, but are supported by external sources of knowledge. Firms which are located close to these sources will enjoy relative advantages over more distant firms and consequently tend to have higher innovation performance. Significant sources of external knowledge are local universities and public research centers. By operating close to these sources of knowledge, inventors and firms in a specific industry have a greater likelihood of sharing the latest knowledge.

In his book of "The location of economic activity", Hoover (1948) presents the concept "technical maturing of industries". In Hoover's setting, when an industry is young and its problems unfamiliar, it is likely that the actors are located in central areas. As time goes by and the specific industry matures, decentralization of activities takes place. The Finnish innovation data gives strong support to Hoover's model. Innovations, which are based on new and emerging technologies, are commercialized by firms located in larger cities. As time goes by, new innovative companies are established outside the initial clusters. As a result, the number of commercialized innovations becomes more evenly distributed between the geographical areas. Later on peripheries take over the development and production of matured technologies, and a wave of innovations based on new emerging technologies are commercialized by firms located in larger cities (Saarinen & Oksanen, 2005).



In our survey, CEOs of both SMEs and large firms rate the location of business as less important. In fact, it scores the lowest results in this innovation policy section. This result is in line with empirical results presented above. In Finland it appears to be the case that innovations are developed and produced all over the country. The same applies for other business activities. In such a small country as Finland the location of business does not play a significant role for companies.

“ Innovation policy tends to equalize innovation related issues. This hinders the scope for making radical choices. We should have the courage to enact well-focused and radical solutions”

7 Conclusions

As the global economy enters into recession, organizations face new challenges and opportunities. The aim of this study was to gain a clearer picture of how Finnish companies will confront the challenges of global recession, today and during the next two years. We prepared a survey, for which the CEOs of Finland's 100 largest companies, 100 biggest R&D investors and 200 innovative SMEs were selected as respondents. The questions were divided into three sections: Innovation environment, innovation strategies and innovation and technology policy. The response rate was 25%.

The study draws out several interesting results. Firstly, we asked CEOs to estimate the division of their respective company's R&D investments between Finland and foreign countries. According to the survey, 55% of R&D investments are earmarked for Finland today. In two years there will be a 10% reduction in the amount of R&D investments earmarked for Finland, bring the total to 45%. Before we can say whether this is positive or negative phenomenon for the Finnish economy, we need more information about the type of R&D that is actually relocated, its scope, the host countries FDIs are directed to and the type of R&D investments made.

Secondly, in order to get some understanding of innovation environment during the downturn, we asked CEOs the importance of several items. According to the survey, entrepreneurial culture is considered to be highly important in Finland. This has been affected by measures promoting enterprise which have been

realized by the government in recent years. Attention has also recently been given to attitudes. Efforts have been made to create a positive perception of enterprise, particularly in the eyes of students. During the next two years, according to our survey, the importance of entrepreneurial culture will even increase. In fact, it gets the highest scores of all when future scenarios are considered.

Thirdly, we shed light on innovation strategies of Finnish companies during the downturn. Focusing on real customer needs turned out to be the most important innovation strategy related issue. According to the results, Finnish companies consider the real customer needs as the most important issue in their business today and during the next two years. This result indicates that Finnish companies have finally made a transition from pure technology push type of thinking towards the pattern of market demand.

Finally, we were interested in innovation and technology policy-related factors. These policy-related specifically did not receive unconditional support from our survey respondents. However, the CEOs felt that the birth of new growth-oriented companies is of great importance today and will further increase its importance during the next two years. In fact, this item scores the highest future values in this innovation policy section. This could be interpreted to mean that the existing firms are not expected to be able to grow endlessly, and thus there is a significant demand for new growth-oriented companies.

8 Literature

- Anthony, S. 2009. *The Silver Lining: An Innovation Playbook for Uncertain Times* (to be published in May 2009 by Harvard Business Press)
- Baumgartner, J. 2008. Interview with Chuck Frey from InnovationTools.
- Christensen, C. & Raynor, M. 2003. *The Innovator's Solution. Creating and Sustaining Successful Growth*. Harvard Business School Press. Boston, Massachusetts.
- Confederation of Finnish Industries. 2008. *Investment Survey – June 2008 (Investointiedustelu – Kesäkuu 2008)*. Helsinki, Finland.
- Etzkowitz, H. 2002. *The Triple Helix of University - Industry - Government Implications for Policy and Evaluation*. Institutet för studier av utbildning och forskning. Working paper 2002•11.
- European Commission. 2005. *Yhteiset toimet kasvun ja työllisyyden hyväksi – Yhteisön Lissabon-ohjelma*. Komission tiedonanto neuvostolle ja Euroopan parlamentille, KOM (2005) 24, 2.2.2005.
- Finland's National Innovation Strategy*, 2008. Ministry of Employment and the Economy. Helsinki.
- Frey, C. & R.H. Callahan, R. 2008. *Innovation Strategies for the Global Recession*. A Special Report from C. Frey of InnovationTools.com and R.H. Callahan of Innosight December 8, 2008.
- Gibson, R. 2008. *Innovating In the 'Perfect Storm'*. InnovationTools, Nov. 14, 2008
- Hagedoorn, J. 1993. Understanding the rationale of strategic technology partnering: inter-organizational modes of cooperation and sectoral differences. *Strategic Management Journal* 14, 371–385.
- Hautamäki, A. & Kuusi, J. 2005. *Suomi innovaatiotoiminnan kärkimaaksi: Kilpailukykyinen innovaatioympäristö -kehittämisohjelman loppuraportti*. Helsinki: Sitra.
- Hoover, E.M. 1948. *The Location of Economic Activity*. New York – Toronto – London, McGraw-Hill Bok Company, Inc.
- Hyvönen, J. & Saarinen, J. 2009. *Changes in Innovation Paradigm*. Forthcoming in Tekes Technology Report. Helsinki, Finland
- Mahroum, S. 2008. *Innovate Out of the Economic Downturn*. BusinessWeek, Oct. 27, 2008
- Niininen, P. & Saarinen, J. 2000. *Innovations and the Success of Firms*. VTT, Group for Technology Studies, Working Papers no. 53/2000. Espoo, Finland.
- Pelkonen, A. 2008. *The Finnish Competition State and Entrepreneurial Policies in the Helsinki Region*. University of Helsinki, Department of Sociology. Research Reports No. 254.
- Phillips, J. 2008. *Critical Factors for Innovation Success*.
- Pohjola, M. and Aro, V. 2006. *The role of markets in innovation –Discussion on a systems approach*. Discussion Note, Institute for Competition Policy Studies, BRDC, TSEBA, Turku.
- Rae, J. 2008. Interview with Chuck Frey from InnovationTools.
- Reddy, P. 2007. *Global R&D in Emerging Economies: Implications for Innovation Systems*. Springer Publishers and IDRC.
- Ruohonen, J. 2007. *VICTA – Virtual ICT Accelerator*. Technology Review 219/2007. TEKES.
- Saarinen, J. 2005. *Innovations and Industrial Performance in Finland 1945-1998*. Lund Studies in Economic History 34, Almqvist & Wiksell International, 2005.
- Saarinen, J. & Oksanen, J. 2005. *Spatial changes in innovation processes over time in Finland*. 4th European Meeting on Applied Evolutionary Economics (EMAE). Utrecht University, De Uithof, Utrecht, The Netherlands 19-21 May 2005.
- Saarinen, J. et. al. 2006. *Innovation Environment Today and Tomorrow*. VTT Working Papers 49. Espoo, VTT 2006.
- Saarnivaara, V-P. 2009. *Taantuma korosti julkisen tutkimus-, kehitys- ja innovaatio-ohjelmien merkitystä*. TEKES News 27.1.2009.
- Science and Technology Policy Council of Finland. 2002. *Knowledge, innovations and internationalisation*. Helsinki, Finland.
- Shapiro, S. 2008. *Podcast: Recession-Proofing Your Business With Innovation*, Front End of Innovation blog, Oct. 28, 2008.
- Silverstein, D. 2008. Interview with Chuck Frey from InnovationTools.
- Statistics Finland, 2005. *Research and development*. Helsinki. www.stat.fi.
- Statistics Finland, 2008. *Research and development*. Helsinki. www.stat.fi.
- Vihma, P. 2006. *Oikea asenne valikoi huippusaajat*. Talouselämä 2/2006.
- Waber, R. 2008. *Financial Pressure and Disruption*, InnoBlog, Oct. 17, 2008

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