

Managing Innovation Activity in Peripheral Regions and its Contribution to Entrepreneurial Success

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Abstract

Objectives

First, it is analyzed whether enterprises in peripheral regions having defined and implemented innovation managing system effectively contributes to entrepreneurial success and second, it is examined whether they have higher innovation output (new products and services) if they cooperate with other stakeholders.

Prior Work

So far existing surveys analyze innovation through a quantitative set of input and output factors, whereas we try to build up on these studies and to open the black box between both. Moreover most studies are focusing on large corporations or new ventures in the sole context of product and process development. In contrast to this our study includes not only large corporations and is not limited to product and process innovations but we too consider SMEs as well as service and organizational innovation.

Approach

To answer the research question a survey is conducted in which SMEs as well as big companies are asked regarding their innovation management system. The survey contains 1200 enterprises located in south eastern Switzerland which corresponds to 10% of the population. Method used to analyze the data is simple regression analysis, with entrepreneurial success (sales, number of employees, profit and improvement of the competitive position) as dependent variable and a dummy variable for cooperation and one for the management system as independent variable.

Results

The better the innovation process fits with the business strategy, the higher is the innovation output. As long as strategy, structure and culture are synchronized, a well trained project management team is in charge, a well fitting incentive system is implemented companies possess a better innovation routine. Cooperation with universities, other companies and associations lead to better resource allocation, helps detecting missing knowledge and qualified labour forces and it results in a significant higher innovation output.

Implications

A higher amount of new ideas in the innovation pipeline guarantee a higher innovation output, which contributes positively to the increase of sales. In 75% of all cases these ideas come from outside of the company. Innovative enterprises seek for cooperation with universities and foster actively the relationship with other stakeholders.

Value

Semi-peripheral and peripheral regions in Europe could profit from our results and foster their activities within its regional innovation system to locate and support such innovative enterprises. At the end of the day regions with above-average amount of these kind of companies have positive employment effects and higher wage level.

Keywords: innovation strategy, structure, culture, process, entrepreneurial success,

JEL classification: M20; O32; O31; R12

Introduction

Companies operating in south eastern Switzerland as a purely alpine region face a lot of different challenges comparing to companies in other more prospering parts of the country. They have for example less or even no choice to relate with knowledge driven institutions, longer distances to markets, bad access to resources and partially heavy dependency on seasonal fluctuations (Wagner, Becker, Isler & Kirchen, 2008). For these entrepreneurs often the last opportunity to remain competitive and foster growth is to innovate in new and better or cheaper products and services. A lot of the firms in this area are service oriented, so not only product innovations but also innovations of services or processes and organizational innovations must be comprised into this study in order to promote corporate survivability within this region. This approach is even more important as the patenting activity in this region is, at best, below average compared to the rest of Switzerland (Gassmann & Huerzeler, 2009).

In all, we know there is life out there. We know we have a respectable number of high-potential small and middle sized firms (SME), which are willing to create new jobs and value and strive for it.

Against this background, it is necessary to establish a tool, i.e. carry out a study, to determine the companies' innovative power and activities. Based on the results of this survey appropriate measures must also be made available to the companies to enhance their innovation behaviour – including operative, strategic and regulatory measures. As leading source of job growth (Glaeser & Kerr, 2010, 26) SME have to be accentuated.

Long-term studies in the USA (Acs & Parsons, 2008) clearly show that the majority of companies that have sufficient innovative power to influence economic growth are older, well-established businesses. Therefore, the focus should not only be on establishing and fostering new companies, but also on the support of companies that are already well established on the market.

For the purposes of the study entrepreneurship represents organizational behaviour and entrepreneurial orientation. It is a collection of distinct practices and attitudes, processes and decision-making methods entrepreneurs use (Covin & Slevin, 1991, Miller, 1982; 1983), which should be reflected in strategy, structure, culture and capabilities (Ireland & Webb, 2007).

As far as we understand, entrepreneurial behaviour within established companies should be focused on business activities - new to the firm or industry - through product, service, process or organizational innovations, as well as the promotion of market development and/or a new strategic orientation. Hence talking about innovation is talking about growth and the important role of entrepreneurship.

It is the organizational culture that supports entrepreneurial initiatives in a firm. Research associates entrepreneurial culture with emotional commitment, remorseless attention to details and high-class standards, respect as well as the willingness to accept responsibility for outcomes (Cornwall & Perlman, 1990; Timmons 1999) and readiness for change. Seen as a competitive process, innovation management embraces these initiatives (Hauschildt, 2006) but also includes the discovery and recognition of opportunities, information search and the acquisition and accumulation of resources (Collis & Montgomery, 1997; 1998). Therefore the dimensions of intelligence creation and diffusion (in a discontinuous and dynamic environment) are emphasized, whereas intelligence creation in particular focuses on organizational routines (i.e. implemented processes). These dimensions combined with responsiveness to the market are strong indicators for effective market orientation as crucial factor of viable organizational outcome of innovative capacities (cf. Bhardwaj et al. 2007, Teece, 1997, Christensen, 2007). It is crucial to understand, what factors and configurations truly determine innovation management in practice and its contribution to entrepreneurial success.

Research problem

Measuring innovation management is a critical discipline as the innovative capacity of a firm is determined by a multitude of factors that relate to both the internal organization and the market environment (cf. Rothwell, 1974). So far, there is no single systematic and scientifically robust method for the optimization of the innovation process - especially on an organizational and regional level - that has gained general acceptance.

There are, however, many different indicators and measuring concepts on regional (RIS Western Switzerland – Platinn; www.innoscore.de), national ("Innovation Test" of the Business cycle Research Group (KOF) at ETH Zurich) and European levels (EIS and CIS). On a regional level, however, quantitative "monitors" in the form of long-term studies are hardly found.

Existing empirical studies mostly cover major companies and focus on input and output values as the best known determining factors of regional innovation intensity: F&E expenses, F&E staff, patent applications, sales-related ratios and global indicators ([Arvanitis & Hollenstein, 1994, 523ff.](#)). The processes as the dimension in between, the so-called "throughputs", are mostly ignored ([Adams, Bessant & Phelps, 2006, 22](#)). Exceptions from this include studies that cover this process, which is understood as transformation (e.g. [Kleinknecht, 1996](#), [Geroski, 1995](#) or [Brouwer & Kleinknecht, 1999](#)). The efficiency and effectiveness of innovative activities and their impact, mapped in a general set of rules for the parameters to be measured that considers and maps the systemic nature of the firm ([Rüegg-Stürm 2003, 17](#)) does therefore have potential ([Ireland & Webb, 2007; 2009](#)). On the one hand, it can serve as a useful basis for the regular monitoring and evaluation of innovation and therefore also of transformation processes; on the other hand, it might be used to implement "diagnoses and remedies", i.e. targeted measures for improvement ([Cebon & Newton, 1999](#)).

Research question and objective

The survey will close the gap within the existing European and Swiss innovation controlling instruments as described below. Therefore the study considers companies as of 0 employees, uses a broad definition of innovation, comprises all industries, and has a strong focus on intra-company factors (throughputs). This paper contributes to following two research questions:

- 1) How do enterprises in semi-peripheral and peripheral regions manage their innovation activity and does having defined and implemented innovation strategy, structure, culture and process contribute to entrepreneurial success?
- 2) Do they have higher innovation output (new products and services) if they cooperate with other stakeholders?

This study attempts to widen the common questions on how, through whom and with what effects entrepreneurial opportunities are identified, evaluated und utilized (cf. [Shane & Venkataraman, 2000](#)) and proposes a catalogue of measures. In this regard the management of innovation activity by individuals, teams and organizations is focused on combining unique packages of resources to exploit marketplace opportunities ([Ireland et al., 2001](#), [Mintzberg, 1973](#)), to successfully commercialize products, services or business innovations as well as to optimize procedures and processes (i.e. [Schumpeter, 1934](#); [Drucker, 1985](#); [Shawney & Mohanbir, 2006](#)). In particular managing innovation activity is quite important for corporations in semi-peripheral and peripheral regions as access to inside and outside knowledge, technology, resources and capacities are limited.

The aim of this paper is to describe the entrepreneurial innovation management system of these disadvantaged companies by dividing them into groups, and to describe its impact on growth and competitive advantage, hence entrepreneurial success.

Based on a full population survey it will deliver empirically proven measurements and success factors to improve the innovation outcome as measured by total sales, number of employees, profit, and improvement of the competitive position. This findings lead into clear and pragmatic recommendations for all other geographically handicapped companies in comparable regions as well as implications for policy makers.

Following a disambiguation of the concepts used herein, we will describe the research model (Innovation Spinner) including its individual elements. Then, the empiric part will outline the survey design and the relevant results. And finally, we will derive recommendations and show where we see new fields for research open up.

Literature review – Theory

Innovativity

Behrends defines "innovativity" (2001, 96) as the "continuous capacity, possibility and readiness of social systems to create and sustain innovative behaviour". According to him, an organisation should only be called innovative if the organisational logic of action supports innovative behaviour. Inside of a business enterprise, this holistic and thus complex task is the responsibility of innovation management (cf. Brockhoff, 1999; Hauschildt, 2006). For the purposes of organisational innovativity, Frank (2006, 127ff.) suggests three basic interacting conditions:

1. *Readiness through stress*: Initiators of individual and organisational processes of change are, as a rule, perceived states of stress¹. The sources of these states of stress can be exogenic in nature (e.g. crises, changes in law), but may also be internally arranged processes of change. Kaplan (2000) and Yukl (2002) see the active creation of an internal (in-company) "sense of urgency" as an initiator. The stress created thereby is deemed to serve as the basis for innovation readiness – be it for the initiation of innovation processes or changes in the organisational system of action (McCall & Kaplan, 1990 61f.; Schröder et al., 1989, 123ff.).
2. *Ability through slack*: If there is the condition of stress, an innovative social system must also be able to develop appropriate problem solutions (cf. Frank, 2006, 127). The quality of these problem solutions is, after all, an expression of the ability to innovate (innovative capacity) and strongly depends on the available resources and the way, in which they are used. "Slack" means material, time and human resources and information that are isolated from the operational side of the business and may be used for innovation plans or learning processes (128; Cyert & March, 1995, 40ff).
3. *Possibility through loose coupling*: The third element defined by Frank is the so-called "loose coupling". What he means by this is the scope for action required by the actors and subareas of a social system for the development and implementation of innovation. This scope is determined by existing structures and serves as a buffer for unforeseen circumstances. A loose coupling of the organisational processes grants the actors a certain scope of autonomy or fault tolerance for experiments and thus undertakes a "buffer function" for innovative changes (cf. Senge, 1996, 349ff; March, 1999, 197ff).

The purpose is not to maximise these three elements. Their innovation-fostering effect is rather depending on the ability of the social systems to find the proper amount of each element to allow learning processes to take place at all (see Frank, 2006, 130).

Innovation

The ability to innovate is one of the most complex and yet most important management tasks (Brockhoff, 1999; Hauschildt, 2006). Rising economic pressure as a result of shortened product life cycles and delivery times, as well as a simultaneous increase in the quality and functionality demanded in the face of permanently falling market prices points to the necessity of innovative ability and capacities in companies (Eversheim & Krah, 1998, 31).

However, innovation does not just mean the development of innovative products. Rather, the understanding of innovation must be expanded in the sense of the implementation of novel *technical* (products and processes), *organisational* (structures, cultures, processes, systems), *economic* (industrial and market structures, rules) or *social* (politics, lifestyles, social technology) problem solutions (Hauschildt, 2004; Moss Kanter, 2006, 79; Shawney, Wolcott & Arroniz, 2006, 77). Bessant and Tidd define this comprehensive point of view with the four Ps of innovation (Bessant & Tidd, 2007, 13f.; Francis & Bessant, 2005, 172). This approach is widely used in Switzerland (i.e. RIS Western Switzerland, 2008) and therefore makes the results of the study comparable:

¹ According to McCall and Kaplan (1990, 61f. as well as Schröder et al., 1989; 123ff.) the pressure to act caused by stress also influences the possibilities to implement innovations.

Product innovation	Change or renewal of products and services offered by the company or organisation.
Process innovation	Change or renewal of the way, in which the products and services are developed and delivered.
Position innovation	Change or renewal of the context, in which the products and services are marketed.
Paradigm innovation	Change or renewal of the mental models, on which the products and services are based and that represent the framework for the activities of the company or organisation.

New markets can be developed with product innovations and as a result rising sales and employment growth realised. Normally new products bring higher returns. By introducing new procedures, productivity increases can be facilitated and the quality of products improved. However, higher productivity can also lead to job losses in the company departments affected.

Schumpeter already pointed out the destructive power of innovations (Schumpeter, 1934). As a rule, the creation of new innovations brings about sectoral, social and regional changes. New industries arise while old industries, existing products and production procedures lose importance and existing organisational patterns become outmoded (Maier, Tödting & Trippl, 2004).

Innovation management

Hauschildt (2004, 30; also: Brockhoff, 1999) describes innovation management as "arranging the structure of innovation processes", and Edward Hess describes it more general as a system "(...) encompassing consistent strategy, culture, structure, execution processes, people policies and accountability, measurement and reward policies" (2007, 182). It is a targeted management function (...) "the task of which consists in the resource-optimised management of the innovation activities within the company with the aim to achieve competitive advantages in the long term" (Vahs & Burmester, 2005; Gerybadze, 2004). The basic relation between economic success and innovation management has been empirically shown by several works in the past. (cf. Rothwell 1992; Cooper, 1979; Rosenbusch, Brinkmann & Bausch, 2010).

Generally speaking, innovation management is characterised by a dilemma that Hauschildt described as the classic decision-making problem of innovation management: The balancing act between innovation and growth, on the one hand, and optimisation and efficiency, on the other (cf. Kirner et al., 2006, 13). Approaches to solve this ambivalence finally lead to the "Strategic Entrepreneurship" branch of research, which is described in the following.

Exploration and Exploitation

Shane and Venkataram subsume the strategic renewal or strategic re-orientation as "processes of discovery, evaluation, and exploitation of opportunities (...)" (2000, 218). However, what is in between the exploitation of opportunities and the functional final situation, Van den Ven and Huber in 1990 still described as "black box". In their much-noticed conceptualisation, Stevenson and Jarillo introduced this subarea as "entrepreneurial management" (1990, see also Sahlman & Stevenson, 1996, 1) and outline a process "(...) about individuals who create opportunities where others do not, and who attempt to exploit those opportunities through various modes of organizing." By saying that "Entrepreneurship is a context-dependent social process through which individuals and teams create wealth (...)", Ireland, Hitt, Camp and Sexton (2001, 51ff.) suggest a dimensional extension. Already in the 1990s, Van den Ven (1993, 226) argued that the entrepreneurship process is a "collective achievement". This changed the historical concept of the individual that searches his environment for business opportunities to the act of actively creating such opportunities. For this purpose, the entrepreneur uses an interactive process of action and interaction (e.g. Bruyant & Julien, 2000) with his immediate and extended environment. This social component is thus transferred from "organising to realise opportunities" to "creating the opportunities" (cf. Choi & Shepherd, 2004, Jack & Anderson, 2002).

This transformation process (cf. Gartner & Brush, 2006) is therefore obviously responsible for the development of opportunities and their managed implementation by means of organisation. Stevenson and

Jarillo furthermore suggest a dichotomous process, which we identify as follows: reaching and/or maintaining operative efficiency accompanied by simultaneous strategic renewal. This "two-handed approach" includes "all management actions and decisions concerning the creation of new businesses and the related development of innovations from new or reconfigured resources, regardless of the scope of such development efforts (i.e. from start-ups to large, established firms)" (Stevenson & Jarillo, 1990, 26). Ireland, Hitt, Camp and Sexton in 2001 coined the term "Strategic Entrepreneurship" (SE) representing a still not coherent, but nevertheless substantial theory as it is already used as an umbrella term for subject areas at the interface between entrepreneurship and strategic management. Recent publications do not identify this fusion of the management and entrepreneurship theories as a contradiction, but as a source of complementary strategy of action (Frank, 2006, 19; Stevenson, 1999). According to Frank, entrepreneurship follows the logic of renewal and the maximisation of opportunities, while management strives for the minimisation of losses and the creation of competitive advantages. The type of logic that is implemented is a question of strategic orientation, availability of resources and the existing competitive forces (cf. e.g. Porter, 1985). "However, to create the most value entrepreneurial firms also need to act strategically. This calls for an integration of entrepreneurial and strategic thinking" (Ireland et al., 2001, 479). Ireland and Webb (2007, 50ff.) assume that companies in today's competitive environment cannot afford to exclusively rely on only one approach. The change pressure coming from external sources virtually forces today's companies to create and sustain competitive advantages via a "stream of innovations". This makes it for a business enterprise necessary "(...) to learn how to simultaneously exploit today that which it does well relative to rivals, while also exploring to determine what it needs to do to be successful in the future". Thereby Ireland and Webb describe the challenges for companies that have and want to transform because of exogenous factors (cf. Tidd, 2006, 4 or Griffiths & Kickul, 2008, 253ff.), which are - above all - represented by the market, or on the basis of consciously developed strategic initiatives. For these authors, SE is the recipe for a constant competitive edge that results from the continuous balancing of efficiency (exploitation) and effectiveness (exploration) targets and requires an optimised allocation of resources. This edge is based on abilities that are to be newly developed in order to anticipate and properly respond to changes in the environment.

The bottom line of "exploitation" is the innovation routine (cf. Nelson & Winter, 1982; Burr, 2004, Tidd, Bessant & Pavitt, 2005), i.e. a bundle of company-specific activity patterns or organisational abilities (Grant, 1996, 2002), which is decisive for the production and successful diffusion of innovations and based on knowledge. The basis is made up by specific mechanisms within the *operative* (internal development and adequate availability of resources, alliances and M&A), *structural* (standardised procedures, formalised processes) and *cultural* (need for security, minimisation of risk, quick wins, commitment to focus) elements of order of the business enterprise (Ireland & Webb, 2007).

The "Exploration" defines - according to Ireland and Webb - a learning process, in which the firm tries to significantly extend, change and deepen its knowledge stock to increase the probability of radical innovation leaps². This definition corresponds to the concept of dynamic capabilities (Eisenhardt & Martin, 2000). It includes abilities that are perceived as routines that are running the company and enable the development of organisational capabilities. This is done through the deliberate transformation of the existing base of resources (cf. Barney, 1991; Collis, 1994). The dynamic capabilities thus facilitate the development and renewal of the organisational capabilities. The basis is again made up by specific mechanisms within the *operative* (M&A, strategic alliances, corporate venture capital), *structural* (partly standardised procedures and processes) and *cultural* (experiments, risk-taking propensity, fault tolerance) elements of order of the business enterprise (Ireland & Webb, 2007).

² Tidd gives a detailed description of the phenomenon of innovation in a discontinuous environment and its sources: new markets, new technologies, new political rules, change of behaviour or paradigm shifts (2006,5). Griffiths and Kickul predominantly write about the entrepreneurial environment with "information asymmetries, intense competition and changing market conditions". They say, that the debate about what factors nevertheless allow for innovation and growth is omnipresent and a subject of current research.

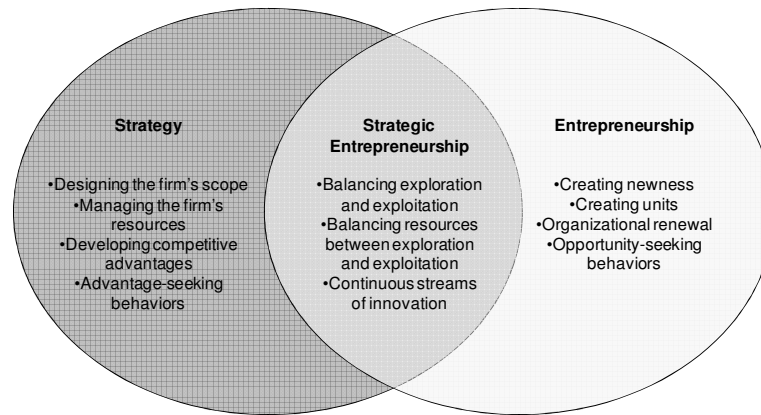


Fig. 1: Strategic Entrepreneurship as overlap of management and innovation (Ireland & Webb 2007)

Thereby, SE and the concept of dynamic capabilities principally assign the same complex tasks to entrepreneurs: On the one hand, they must have outstanding skills to initiate and efficiently utilise existing resources and organisational abilities. On the other, they directly compete with each other concerning their capacity to adapt and renew these abilities. In this context, the concept of the learning organisation (Winter, 2000; Zollo & Winter, 2002) is of significance.

Research model

A company's innovative capacity is, as detailed in the foregoing chapters, determined by a variety of factors. In addition, there is currently no generally recognised measurement system that would adequately record a company's internal processes and their networking in relation to innovation management. Therefore, an independent model was developed for this study identifying and structurally interlinking the innovation process in an ideal-typical way as central activity in a company's day-to-day business. How the command of innovation management - shown at the model of the innovation spinner - can positively influence the innovation output and business performance and which control variables are relevant for innovation behaviour is detailed in the following figure and points.

Innovation spinner

The figure visualises the model of the "Innovation Spinner". This model symbolically positions the company in a dynamic structure of internal and external forces. The business enterprise itself is interacting, but at the same time also dependent on its environment and the prevailing actors.

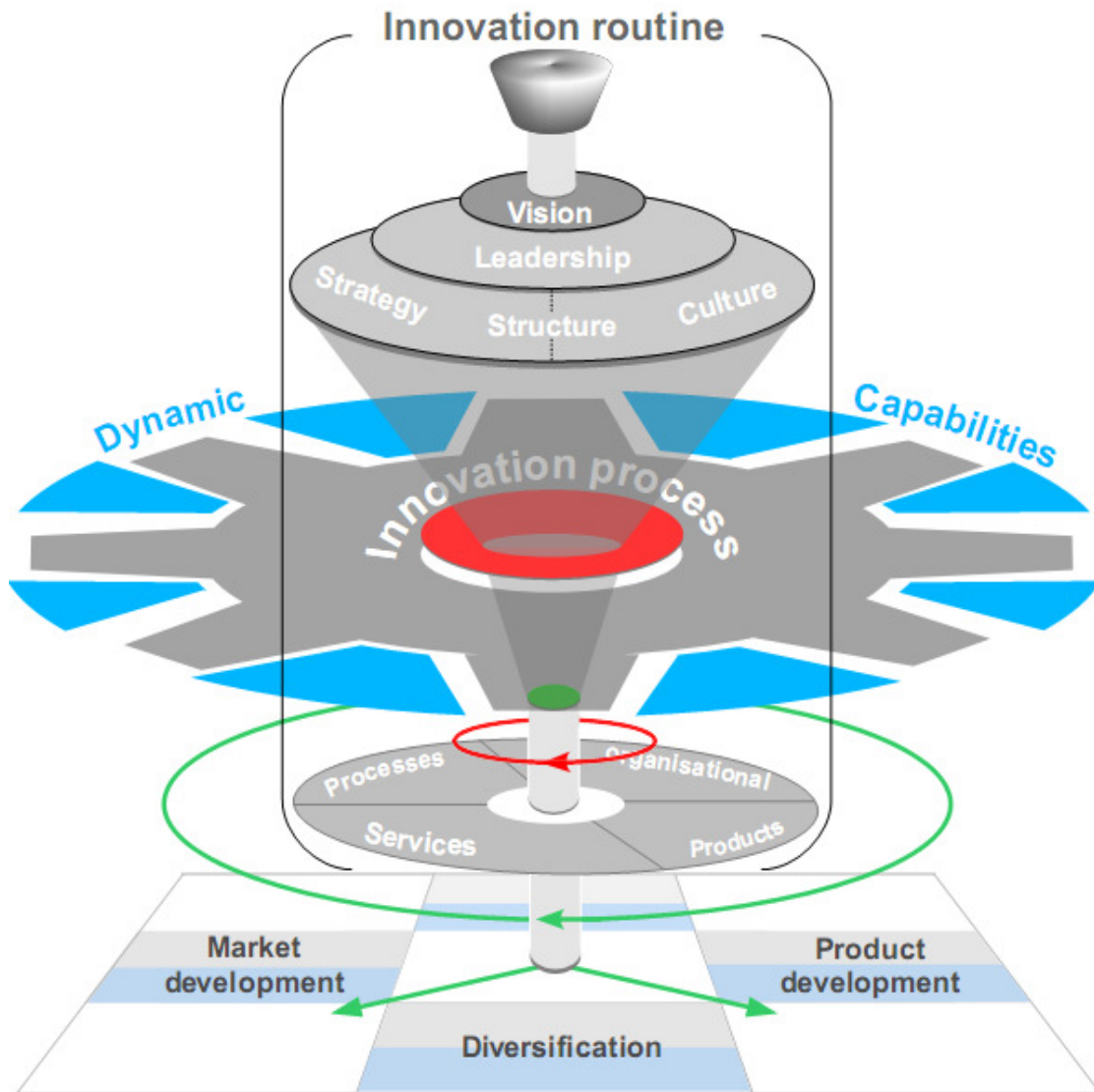


Fig. 2: Innovation Spinner (Forster & Ziltener, 2010)

Innovation routine

General management

The main task of an innovative company management is innovation management. The primary competence of this targeted management task is the anticipatory design of the innovation processes. In terms of content, this is about the resource-optimised control of the innovative activities within the business enterprise to enable it to achieve competitive advantages in the long term. The challenge and the chance is found in the ability to align the strategy, structure and culture - despite the current operative pressure - with the innovation objectives and to bolt them down and provide them with the corresponding resources.

Innovation strategy

Derived from company strategy, innovation strategy defines those activities that must be performed to sustain and extend competitive positions and ensure a company's success by means of proper innovation outputs. In

practice, this means the intention to market new and enhanced products and services and to implement process and organisational innovations.

Innovation process

The innovation process encompasses all stages and supporting measures that serve to systematically implement innovations. It covers both technological developments and the needs and requirements of the market, while it absorbs internal and external knowledge (cf. Kline & Rosenberg, 1986).

The spinner model summarises these elements of innovation management as "innovation routine". This concept covers innovation-specific activity patterns that influence the transformation from the development of a new idea up to its commercialisation. However, this does not include repetitive and inflexible processes, but trained, execution-oriented and adaptable skills and capabilities, thanks to which continuous innovation successes can be achieved.

Dynamic capabilities

Entrepreneurial capabilities as the ability to change or the ability to adapt internal and external resources to changing market conditions open the explorative door to new growth opportunities and affect all areas of a company (Teece, Pisano & Shuen, 1997; Zahra, 2006). These capabilities are the precondition for a better entrepreneurial development and link the company also to the regional innovation system. Specifically, this means:

- research and development, if possible also in cooperation with other entities
- early recognition of strategic needs and trends
- transfer of technology and know-how within the innovation system
- availability of free resources
- high level of learning and changing capabilities

The dynamic capabilities are what can enable a company to identify existing opportunities in a timely manner and commercialise them via the innovation routine thereby increasing effectiveness.

Interactions

The picture of the company as a rotating spinner has been deliberately chosen: The company is put into motion by the management through strategic impulses and kept on track through an optimised allocation of resources to finally navigate accurately on the strategic playing field (Ansoff, 1965). The management's manoeuvring room is limited by the internally and externally acting forces.

Efficiency = rotating speed of the spinner

The efficiency depends on the level of the innovation routine and results in the innovation output, i.e. new and enhanced products and services, process innovations or organisational innovations. The extent of the transformation is the result of the level of balance between strategy, structure and culture of the development direction targeted at by the management. The management has to optimise the rotating speed with respect to its environment. If the company rotates slower than its environment, there is a growing risk that it cannot keep up with the market dynamics or is pressured by its competitors. If the company rotates faster than its environment, it might be ahead of the market and produce innovations, for which the market is (still) not ready. However, this can be also the source of radical innovations.

Effectiveness = Navigation of the spinner

If the management is able to perfect the innovation routine and combine it with the matching dynamic capabilities, there is an increasing probability of effectiveness gains. These gains include sales, profit and labour growth through innovations that are new to the company and might even be new to the whole industry. Depending on the strategic objective the spinner can move along the desired development modes. However, this requires capabilities that are able to absorb disturbing external impulses within the company or are open to a re-combination of the company's internal resources or an adaptation of the company's strategy.

Methodology and empirical work

First, it is analyzed whether and how enterprises in semi-peripheral and peripheral regions manage their innovation activity. Second, it is examined whether they have higher innovation output if they cooperate with other stakeholders. To answer the research question a survey is conducted with start-ups, micro enterprises, SMEs as well as big companies. For the purpose of this study we focus on SMEs.

- Form:** First, a cross-sectional study (retrospective for the years 2006 – 2008) and afterwards a long term study which is conducted every three years (expected 2012).
- Response Rate:** The survey contains 1159 enterprises located in the Swiss Alpine region which corresponds to 10% of the population (ca. 15'000 companies within south eastern Switzerland).
- Sample:** Randomized proportional sample (ca. 5800 companies) weighted according to a) number of employees in each industry, b) size of companies, and c) different alpine sub-regions.
- Dependent variables:** Sales, profit, number of employees and improvement of competitive position
- Independent variables:** About 70 items which are collected to 7 components of the whole model (strategy, structure, culture, type of innovation, innovation process, innovation routines and dynamic capability).
- Data analysis:** Descriptive statistics and analysis of correlation and variance, with innovation output (new and improved products and services) and entrepreneurial success (profit, sales, number of employees, competition position) as dependent variable. Therefore a distinct set of sub-questions guides the analysis:
- Are there differences between groups with regard to innovation management and its impact on innovation outputs?
 - Which characteristics do help to distinguish between these groups resp. what elements can be identified to differ?
 - Are there differences of groups with regard to innovation output and entrepreneurial success?
 - Are there direct routes from innovation management towards entrepreneurial success?
 - Finally, what implications toward practitioners and policy makers can be derived from our findings?

To resolve the research questions and associated the need to establish an survey model that is applicable, a systematic review (e.g. [Tranfield, Denyer & Smart, 2003](#)) has been performed.

The selection, interpretation, synthesis and operationalization of the relevant measures - towards appropriate and focussed dimensions of investigation - have been made in cooperation with scientific experts from many different fields including innovation management, statistics and corporate development (review panel). To assert appropriate participation from external practitioners a standardised Delphi method (cf. [Ammon, 2005](#)) was applied. This makes up for an important limitation of reviews of this kind. According to [Adams et al. \(2006\)](#) the consultation of proper experts is an essential source when it comes to finding the appropriate literature and making a selection ([McManus et al., 1998](#)) more robust. The precondition "when performing a systematic review in a developing field that does not have a clearly defined specialist literature" is – as already outlined – given in the field of research at hand. The terms of reference clearly show that we did not work towards a complete list of indicators. The purpose was the comparison and synthesis of measurable and repeatable variables of innovation management that map the needs of practitioners as adequate as possible.

This examination of innovation behaviour is the starting point of a long-term study on the development of innovation in Southeast Switzerland. This shall serve as a basis to develop and adequately implement appropriate economic measures, in particular for the direct promotion of innovation. The Innovation Monitor shall close a gap Switzerland's existing innovation monitoring and is characterised by:

- the questioning of business enterprises starting from 0 employees;
- the application of a holistic innovation concept;
- the inclusion of all industries;
- its consistent orientation at internal aspects of companies.

Based on a sample proportionally stratified by industries and regions, one third of all companies of the canton of Graubünden was contacted and questioned with respect to their innovation behaviour. In the period from December 2009 to January 2010, about 1,200 CEOs and/or owners participated in the online survey.

Results

Innovation management – Research Question 1

The first results of the innovation survey in the canton of Graubünden suggest that the spinner model provides a suitable framework. To answer the first research question the following results were calculated using correlational and variance analysis:

Strategic fit

The better the *innovation process* is aligned with the *innovation strategy* and then the both again with the *company strategy* the bigger is the innovation output. For the expansion of the competitive position, it is additionally advantageous if the innovation strategy is an integral part of the general strategic agenda.

Innovation strategy

Two thirds of all innovations are enhancement innovations. Both in the service sector and in the manufacturing sector, service innovations are more frequent. Besides this, it revealed that *service innovations* compared to R&D-based product innovations, organisational innovations or process innovations positively correlate with *sales growth*. Another important finding was that the companies that stated they have *no innovation strategy*, show *negative correlations* with the entrepreneurial success factors "Sales growth", "Employee growth" and "Expansion of the competitive position".

Innovation structure

We identified *no relation* between the different manifestations of entrepreneurial success and a continuously existing and organisationally integrated *innovation department*. Instead, there is a relation between structures and methods of the *project management* and sales growth, employee growth and the competitive position. If the project and innovation teams are additionally granted sufficient *autonomy for fast decisions* the probability of an improved competitive position additionally increases. The basis for this is the prospective development of knowledge, skills and qualifications through systematic personnel recruitment and development.

Innovation culture

Concerning the innovation culture, the two descriptive features *fault tolerance* and *openness of the management* to innovations in particular positively influence entrepreneurial success. Additionally, employees must be aware of the fact that the *innovation culture* and *readiness to change* are of high importance, and appropriate amounts of time must be available for *personal continuing education*. Finally, we could determine that companies that are explicitly promoting *entrepreneurial spirit* (which was used as a separate item in the survey) have a significantly higher growth measured against the number of employees and that this spirit has also a positive influence on the competitive position.

Innovation process

We could prove the existence of an *innovation funnel*, which leads to the conclusion that creative companies have better chances for success with business innovations. In this, the amount of new and processed ideas is critical: The more ideas are in the pipeline the more of them will be processed and the bigger is the output – which has a positive impact on the share of innovative products and services in total sales and profit figures.

Performance

Innovation is expensive, but can pay off for both the company and the development of the region. Innovative companies invest in R&D, are oriented towards customer benefit, implement the ideas of their employees and promote their qualifications, they are open to external trends and continuously extend their know-how by actively participating in the transfer of expertise and technology. In this, a big market share is very advantageous for a positive *return on investment* (ROI).

Rotating speed

An appropriate *innovation routine* can be achieved if innovation is integrated into the company's strategy, structure and culture and is part of the strategic agenda, and if an experienced project management is in place and, and beyond this, the management and incentive systems are adapted to the company's innovation behaviour. A systematic generation of ideas with a simultaneous analysis of the financial and technical risks, e.g. by means of portfolio and SWOT analyses, supports the innovation routine and has a correspondingly positive effect on all four factors of entrepreneurial success.

Cooperation – Research Question 2

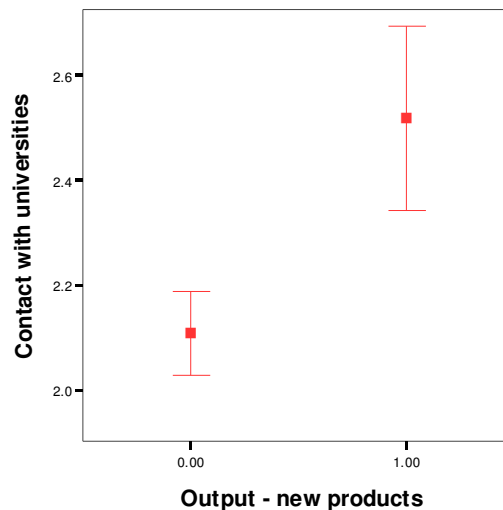
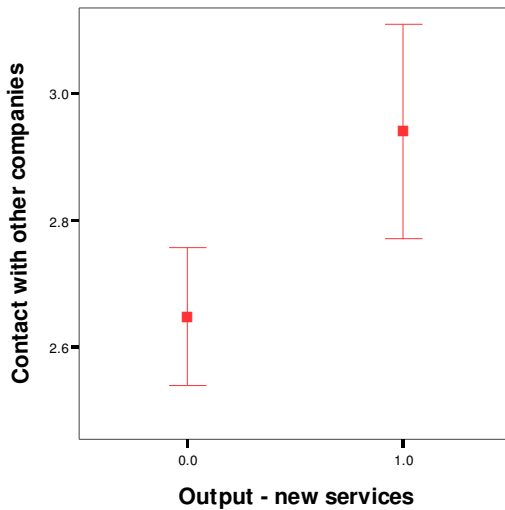
For the time being, we would like to answer the second research question with a correlation calculation between the contact and cooperation frequency and the innovation output. The calculation clearly shows that – even if it is only weak – there actually is a correlation between the contact frequency and the number of new and enhanced services.

	Innovation Output →	New products (< 3 years)	New services (< 3 years)	Improved products	Improved services
Contact with	Inter-Trade Organisation	0.062	.123(*)	-0.002	.125(*)
	Other companies	.121(*)	.135(**)	.113(*)	.227(**)
	Universities	.197(**)	.262(**)	.124(*)	.228(**)
Cooperation with	Inter-Trade Organisation	-0.075	0.105	-0.041	0.053
	Other companies	-0.042	0.087	-0.001	.204(**)
	Universities	.148(**)	.123(*)	.116(*)	0.063

** Correlation level at 0,01 (2-sided) significant

* Correlation level at 0,05 (2-sided) significant

To describe the existing interdependencies even more clearly we used the different output variables to build classes or groups and then compared them in a t-test. By doing so we could determine that the contact frequency significantly differs in the different groups. The following two examples illustrate that the average values of different output classes (here: new products yes/no, new services yes/no) significantly differ from each other with respect to the different frequency in contacts (the confidence interval is 95%).



In a next step, we examined whether there is a correlation between the contact and cooperation frequency and the command of different topics as contemplated by the concept of dynamic capabilities. Also in this case, we initially looked into the correlations.

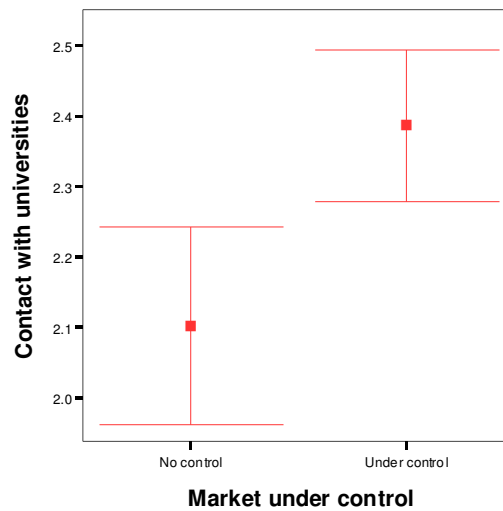
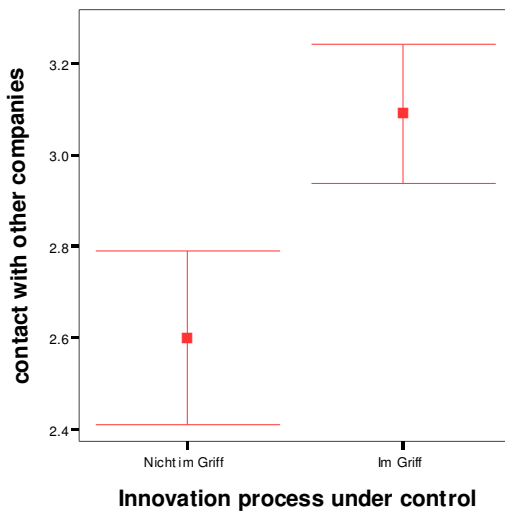
	Topics under Control →	Strategy	Organisation	Qualification	Market	Finance	Innovation Process	Innovation Culture	Innovation Protection	Readiness for Change
		In contact with	Inter-Trade Organisation	.260(**)	.242(**)	.247(**)	.226(**)	.172(**)	0.035	0.139
	Other companies	.141(*)	.167(**)	.229(**)	.192(**)	.173(**)	.276(**)	.215(**)	0.045	.225(**)
	Universities	.222(**)	.176(**)	.182(**)	.200(**)	0.105	.261(**)	.209(**)	0.14	0.097
Cooperation with	Inter-Trade Organisation	0.032	0.003	-0.029	0.077	-0.024	0.069	0.061	-0.033	0.122
	Other Companies	0.082	-0.044	0.034	.132(*)	-0.01	0.043	0.049	0.038	0.028
	Universities	0.076	0.009	0.053	0.038	-0.124	0.098	0.054	0.029	-0.027

** Correlation level at 0,01 (2-sided) significant

* Correlation level at 0,05 (2-sided) significant

Obviously, only the contact frequency correlates to the control of the nine topics shown above. Concerning cooperation, no correlation could be identified (except for one case).

To show the significance of these correlations even better we additionally made a t-test for each topic. The following two examples shall illustrate the differences. The examples show that, based on variance analysis, the differences concerning the two topics "market" and "innovation process" significantly depend on the contact frequency (confidence interval = 95%).



Innovative companies – Addendum

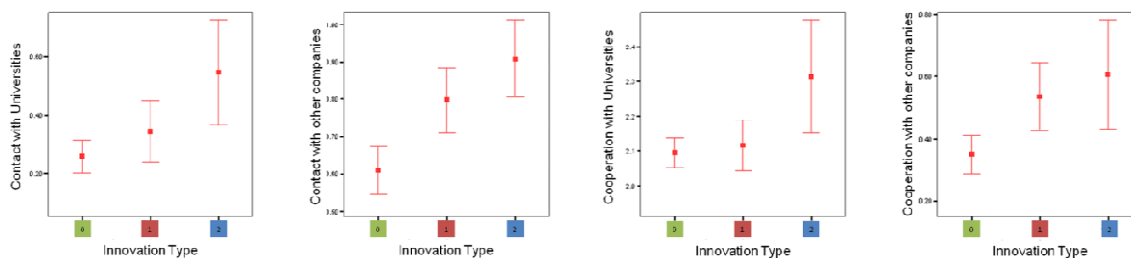
To get an even better understanding of innovative behaviour, on the one hand, and its effect on entrepreneurial success, on the other, we finally made three classes of companies. To do so, we chose the innovation rate (cf. Hauschildt & Salomo, 2007) as a delimitation criterion. Oriented at the basis of proration as it is used in the PIMS project (sales share generated with new products and services that are not older than three years), we used the profit share generated with new products and services that are not older than three years. In this context, we identified the following three types:

Innovation types			
2	very innovative	Profit share of new products and services > 30%	N = 33 (6%)
1	innovative	Profit share of new products and services between 1% and 30%	N = 85 (16%)
0	not innovative	Profit only with products and services that are older than 3 years	N = 414 (78%)

Our analysis revealed that very innovative companies compared to non-innovative companies:

- have a significantly higher innovation output;
- are more often micro-companies (86% have 0-9 employees, while the share of micro-companies among non-innovative companies is only 78%);
- are more often under three years old (24% of the very innovative companies are start-ups, while the share of start-ups among non-innovative companies is only 13%);
- significantly more often expanded their competitive positions;

have a significantly higher export content. Additionally, we could determine that very innovative companies clearly maintain more contacts to universities and other companies and also maintain cooperations.



Conclusion

Innovative companies in semi-peripheral and peripheral regions have a bigger innovation output measured against the number of new and enhanced products and services and therefore also a bigger entrepreneurial success measured in terms of sales and profit growth. Additionally, these companies are more capable to maintain or even extend their competitive position. Also their export capabilities are better. The conditions for this innovativity and the basis for an initial formulation of supporting measures are:

- Link between company strategy and innovation strategy, on the one hand, and an innovation process aligned to these strategies, on the other hand.
- Active use of the innovation funnel that holds as many ideas as possible in the pipeline.
- Consistent market orientation and customer contact.
- Innovation as item on the daily agenda.
- Command of project management for innovation projects.
- Promotion of employee autonomy combined with the targeted development of qualifications & know-how.

The cooperation with universities, other companies and industry associations results in a better allocation of resources, supports the identification of lacking know-how and qualified staff, and leads to a higher innovation output. There is a slight surplus of this effect with service-oriented companies. It leads to a better absorption of market needs, on one side, and the implementation of new technological developments, on the other side.

Outlook

With this study, we were able to show that certain factors of innovation management have an influence on the innovation output as well as on entrepreneurial success. At the same time, we could prove that, in particular, the contact frequency has a significant influence on the innovation output and the control of selected topics. Now, it seems to be of particular interest to find out in how far this is connected to the growth paths of the individual companies.

Studies in the USA and the UK have shown that so-called high-impact firms (HIF), which are also called "gazelles" in the literature, represent a very important type of company with respect to economic growth – measured against both their employees and added value (Acs, 2008). A company is an HIF if it has doubled its turnover or the number of employees within a period of four years. On average, about 2-3% of all companies are "gazelles" (i.e. in the canton of Graubünden this would be between 300 – 500 companies). The latest study of Zoltan Acs also revealed that 1 – 2% were already HIFs before the period under review, 10% die in the following period, 10 – 40% grow further, 60% show no changes before or after the growth phase, and 2 – 8% remain gazelles also in the following period. It can therefore be presumed that this group of companies behaves in a cyclical way with respect to their growth paths and that a new group of HIFs develops after each 4-year period. The EU project Regional Innovation System Western Switzerland (RIS-WS) and the two projects "Gründungsbarometer" and "Innovationsmonitor Graubünden" of the Swiss Institute for Entrepreneurship all prove that there is a clear correlation between the innovation behaviour of companies and the development of employment (Meier, 2007; Becker, Kronthaler & Wagner, 2009; Forster & Ziltener, 2010). This applies to both business growth and regional employment effects.

Against this background, it seems to be of particular interest to find out, in a next step, what the specific innovation behaviour of high-impact firms with respect to innovation routines and dynamic capability looks like or how low-growth companies may adopt stereotype behavioural patterns from high-growth companies thereby influencing their growth paths. Because of the dependency of growth phases (about 4 years) on cycles, it must be additionally found out how it can be ensured that also the respectively new group of potential HIFs can be addressed and supported in a timely manner.

Appendix - Questionnaire

A Company and market data

1. When was your company/plant established? Year of foundation _____
(without consideration of changes of the legal status)

2. How many employees did your company have?
(Including owners, apprentices and temporary workers. Please recalculate part-time employments to full-time.)

2006 _____

2007 _____

2008 _____

3. What were the sales volumes of your company/plant over the last three years?

2006 CHF

2007 CHF

2008 CHF

4. What were the profits of your company/plant over the last three years?

2006 CHF

2007 CHF

2008 CHF

5. What percentage of your sales volume were generated by your biggest customer in 2008?

Sales _____ %

6. What was the distribution of your sales volume between export business and your home market Graubünden in 2008?

(Export business includes all customers with their residence/registered office outside of the canton of Graubünden.)

Export to other cantons _____ %

Export to other countries %

Home market Graubünden

Total sales volume
 %

7. How have the costs of your company/plant developed over the last three years?

a) Cost of materials increased by _____ %

decreased by _____ %

remained unchanged

b) Staff costs increased by _____ %

decreased by _____ %

remained unchanged

8. How has demand on your *sales market* developed over the last few years?

Change in
absolute terms in %*

Period 2006-2008

_____ %

Expected development for 2009

_____ %

*please mark negative changes with (-) and positive changes with (+)

9. What was the development of your company's competitive position (relative market share) compared to the most important competitors over the last three years?

- increased
- remained unchanged
- decreased

Employees / Qualifications

10. Please estimate the percentages of the following staff categories in relation to your total headcount in 2008. (Please recalculate part-time employments to full-time.)

- University and university of applied sciences %
- Higher technical education/training %
- Skilled workers (vocational training) %
- Unskilled workers %
- Apprentices %

Total employees %

What percentage of your company's total headcount works in *Sales/Marketing*? _____ %

What percentage of your company's total headcount works in *Research & Development*? _____ %

11. What is the average age in your company? Ø _____ years

12. How many days per year do your employees have at their disposal for personal development and further training? No. of days per year and employee _____

13. What percentage of your total headcount has Swiss citizenship? _____ %

B Details on competitive and innovation strategies

14. What type of strategy matches your company's competitive strategy best?
- Cost leadership (faster, cheaper or for free)
 - Differentiation (better than or different from competitors)
 - Concentration/niche strategy (we are where nobody else is)
 - No strategy
15. Are your employees aware of this strategy?
- Yes
 - No
16. How can your innovation strategy be described? (Multiple answers are possible.)
- R&D-based product innovation
 - Service innovation
 - Process innovation
 - Organisational innovation
 - We don't have an innovation strategy.
17. When you implement innovation projects – who usually communicates or supports this?
- Owner
 - General Manager/CEO
 - Project Head
 - Head of R&D
 - Other: _____
18. What is the common/connecting element in your company?
- Tradition
 - Will to achieve – achievement of objectives
 - Formal rules, clear and smoothly running processes
 - Commitment to innovation
19. What do employees have to achieve to get recognition in your company?
- Win new customers or achieve customer loyalty
 - Development and marketing of innovative products and services
 - Control of the routines
 - Perfect organisation: "Everything in fine order"

C Innovation ratios

20. What percentage of your sales is on average reinvested in R&D per year?

_____ %

of this percentage to third parties/external providers: _____ %

21. What percentage of your sales is on average spent on market/competition analyses per year?

_____ %

of this percentage to third parties/external providers: _____ %

22. Assess the availability of the following resources with respect to your innovation activities?

	not available	short supply	sufficient		
	1	2	3	4	5
1) Staff resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Own capital	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Third-party capital	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) Knowledge and know-how	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

23. How many **novel products** did your company put on the market over the last three years?
 ("novel" means that the product has not existed on the market before!)

Total number _____

What percentage of your sales do you generate with these products? _____ %

What contribution to your current business profits do these products generate in %? _____ %

24. How many **novel services** does your company currently offer that are not older than three years?
 ("novel" means that the service has not existed on the market before!)

Total number _____

What percentage of your sales do you generate with these services? _____ %

What contribution to your current business profit do these services generate in %? _____ %

25. How many **enhanced products** did your company put on the market over the last three years?
 ("enhanced" means that it has been offered on the market before, but the product has now clear advantages over its predecessors.)

Total number _____

What is the share in percent of your current sales volume? _____ %

What contribution to your current business profit do these services generate in %? _____ %

26. How many **enhanced services** did your company put on the market over the last three years? ("enhanced" means that it has been offered on the market before, but the product has now clear advantages over its predecessors.)

Total number _____

What is the share in percent of your current sales volume? _____ %

What contribution to your current business profit do these services generate in %? _____ %

27. Did your company introduce **process innovations** over the last three years?

Yes

No

D Details concerning the innovation process

28. How many new ideas has your company currently in its "pipeline" that have still not been further processed?

Total number _____

29. How many innovative ideas are currently processed at your company? Total number _____

30. Does your company apply certain criteria for the selection of innovative ideas?

Yes, these criteria are

- Easy implementation
- Originality
- Patentability
- Customer benefit
- Strategy compliance
- Process enhancement
- Reputation issues
- Marketing competence
- Core competences

No, our selection is rather random.

31. In the following, we will ask questions about aspects of your cooperation activities.

Within the scope of your innovation activities, how regularly do you maintain *contacts* with the three types of institutions shown in the following, and with which of these partners did you have *cooperations* over the last 3 years?

	Industry associations	Other Companies	Universities, research institutes (FH, UNI; EMPA, ETH, etc.)
Contact	<input type="radio"/> regularly	<input type="radio"/> regularly	<input type="radio"/> regularly
	<input type="radio"/> occasionally	<input type="radio"/> occasionally	<input type="radio"/> occasionally
	<input type="radio"/> never	<input type="radio"/> never	<input type="radio"/> never
Cooperation	<input type="radio"/> Yes	<input type="radio"/> Yes	<input type="radio"/> Yes
	<input type="radio"/> No	<input type="radio"/> No	<input type="radio"/> No

32. Please assess the following topics with respect to their strategic importance and determine whether your organisation has corresponding resources and capabilities.

	strategically important	We don't control this	We control this topic
Strategy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Organisation and structure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Qualifications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Market	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Finance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Innovation process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Innovation culture	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Innovation protection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Changing capabilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

33. Please assess in how far the following statements apply to your company.

Innovation strategy

	Does not apply		Applies
Our innovation strategy is formulated and closely connected to our company strategy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Our innovation strategy is a regular topic of the agenda and is always considered when strategic decisions are taken.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All employees are regularly and openly informed about innovation projects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Innovation process

We systematically and continuously search for new ideas and/or innovative projects.

Does not apply **Applies**

We analyse financial and technical risks e.g. by means of risk or portfolio analyses and SWOT analyses (strengths, weaknesses, opportunities, and threats).

Experiences made are systematically recorded and serve as a knowledge basis for future innovation projects.

Structure/organisation

In our organisation, innovation is performed by a permanent and organisationally integrated department.

Does not apply **Applies**

We use structures and methods of project management.

Our project and innovation teams:

- include members from different hierarchical levels and departments

- dispose of sufficient autonomy to make decisions in a fast and efficient way.

Qualifications

Technical and social qualifications required for innovation projects are systematically developed.

Does not apply **Applies**

When recruiting new staff, we already make sure that know-how that will be required in the future enters the company.

Our employees are characterised by an above-average amount of readiness to change, commitment and personal initiative.

Our employees are offered opportunities for activities promoting innovation within their regular working hours.

Culture

The management's readiness to get involved with new things is high.

Does not apply **Applies**

Entrepreneurial thinking and acting is fostered throughout all hierarchy levels.

We promote innovative ideas of our employees through financial incentives (e.g. bonuses, participations).

We promote innovative ideas of our employees through NON-financial incentives (e.g. awards, time for further training, praise and recognition).

We see faults or failed innovation projects as an opportunity to learn for the future.

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