Determinants of Innovation Performance

Strategic insights for the Dutch printing industry

S. J. Chang

March 2010

MASTER THESIS

UNIVERSITY OF TWENTE.

Determinants of Innovation Performance

Strategic insights for the Dutch printing industry

S. J. Chang

Master thesis Business Administration

University of Twente

Author

S. J. (Steven) Chang

s.j.chang@alumnus.utwente.nl

Place and date

Enschede, March 31st 2010

Supervisors

Dr. A.M. (Ariane) von Raesfeld Meijer

Dr. P.A.T.M. (Peter) Geurts

UNIVERSITY OF TWENTE.

Abstract

Social networks have been portrayed as a driver of innovation, but little is known about their role for innovation in the Dutch printing industry. This sector is threatened by commoditization and consists mainly of small companies. Much prior innovation research has involved multinationals, while SMEs are becoming increasingly important for development due to the fast pace of technological changes. Therefore, this study investigates the extent to which social capital explains differences in innovation performance.

Our empirical examination of Dutch printing companies is based on data from a cross-sectional survey about a comprehensive set of company characteristics, including social networks, strategy, finances and culture. Regression analysis was applied to test the research model.

The results do not confirm the proposed positive effects of structural network density and relational tie strength on innovation performance. However the control variables for strategy and culture do show a positive relationship with innovation performance as expected. Consequently, directions for future research include extending the measures for social capital and further investigating the effect of other company characteristics.

Acknowledgements

After a few nice and entrepreneurial years at the University of Twente, it is now time to finish my master study Business Administration. I have greatly enjoyed setting up the project and visiting the companies that were part of this study. During the final project's process I was supported by many people, which I hereby want to thank for their great help.

First, I wish to thank my university supervisors, Ariane von Raesfeld-Meijer and Peter Geurts, for their enthusiasm and many suggestions to improve the thesis, and Peter's insights on research methodology.

My sincere thanks go to Thiel, who was very interested and supported me during a period in which I had to keep my motivation on the right track. Moreover I would like to thank Timon, my parents, Bram, my family and friends. Throughout this period of growth and change, they were there for me, and always remained helpful, cheery, and dedicated to see my journey finish in Twente and be ready for a new future.

Contents

1 Introduction 1
1.1 Problem area 1
1.2 Research question 2
1.3 Subjects 2
1.4 Research approach 3

2 Theoretical framework 4
2.1 Introduction 4
2.2 Innovation 4
2.3 Innovation performance 4
2.4 Innovation performance measures in context 5
2.5 The 4S model 7
2.6 Hypothesis development 11

3 Methodology 12
3.1 Introduction 12
3.2 Sampling methods and response 12
3.3 Data 13
3.4 Measures 14

4 Data Analysis and Results 18
4.1 Introduction 18
4.2 Model 19
4.3 Hypothesis testing 19
4.4 Regression model validation 20

5 Conclusions and Discussion 21
5.1 Introduction 21
5.2 Conclusions about research issues 21
5.3 Limitations 23

6 References 25

7 Appendix 32
7.1 Questionnaire (Dutch) 32

1 Introduction

The printing industry has been around for ages, and while new technologies provide opportunities for printing companies to offer new products, at the same time new communication channels and changing media consumption patterns of consumers have lead to declining revenues of printed media and advertising (GOC, 2009a). In the remainder of this introduction we describe the problem area and formulate the research questions this study addresses. Subsequently, we explain the approach to answer these questions and the scope of the study.

1.1 Problem area

Small and medium sized enterprises (SMEs) make up the majority of companies in the Dutch printing industry (GOC & KVGO, 2008), i.e. 98% has less than 100 fulltime equivalents (fte). It is a dynamic environment characterized by technological- and market changes, such as the digitization of production processes and extensive optimization of conventional production processes (Boczkowski & Ferris, 2005; Cox & Mowatt, 2003; EuropeanCommission, 2007; Hardstone, 2004; Nijhof & Streumer, 1998). In the current situation, printing products are indistinguishable commodities to a buyer, which sets off price competition (Anderson & Narus, 1998; Matthyssens, Vandenbempt, & Berghman, 2006).

As the sector makes most of its revenue from traditional print products (GOC, 2009b), which are based on mature technology, it is no surprise that all their products and services reach a commodity status sooner or later. Most companies have difficulties offering new products and services with distinctive customer value, which is the difference between the benefits perceived and costs paid by the customer (Khalifa, 2004; Lindgreen & Wynstra, 2005). Basically, opportunities provided by offering products based on new technologies such as digitization, translate to only a fraction of the sectors total revenues (GOC & KVGO, 2009). Even though companies aim to maintain healthy profit margins by optimizing their production processes and enhancing their offered services, this is not easy to achieve. Ultimately, many SMEs in the Dutch printing industry are struggling to differentiate themselves and to enhance their value propositions, as they need to cope with commoditization in their industry.

The problem of commoditization is recognized in current research as a process that diminishes the competitive differentiation potential (Matthyssens & Vandenbempt, 2008; Ulaga & Eggert, 2006) and consequently deteriorates the financial position of any organization. On the whole, it is the result of market dynamics in which buyers perceive products and services to be homogeneous across suppliers, and price becomes their prime-buying criterion (Rangan & Bowman, 1992).

Innovation in general is seen as a remedy to overcome the problem of commoditization (Matthyssens et al., 2006; Sood & Tellis, 2005), by achieving sustained competitive advantages and renew mature businesses (Stopford & Baden-Fuller, 1994). A commoditized market, as the printing industry in particular, calls for a a non-price differentiation strategy based on product or service innovation (Matthyssens & Vandenbempt, 2008), because not all the (small) companies can simultaneously pull off a price leadership strategy: only companies that are devoted exclusively to a low-price strategy may be able to achieve the necessary scale efficiencies and cost reductions. Moreover, increasing operational efficiency is not an option when production processes are already mature across the industry (Porter, 1996).

Although innovation is generally agreed upon to contribute to business performance (Tsai, 2001), there is little known about the drivers of innovativeness (Hult, Hurley, & Knight, 2004) and managing the innovation process is complex (Faems, Van Looy, & Debackere, 2005). While much innovation research has involved multinational companies that use patents to protect their technological inventions, it is assumed that similar innovation enhancing principles apply to small companies.

For SMEs however, developing innovations is a risky activity, because resources supporting innovation are relatively scarce in small firms compared to large firms (Rammer, Czarnitzki, & Spielkamp, 2009). Basically, SMEs do not enjoy the benefits of an established reputation when marketing new products, furthermore in-house R&D activities incur particular financial liabilities due to high fixed costs and high minimum investments, and many do not engage in any R&D activity at all (Rammer et al., 2009).

Nevertheless, small companies are crucially important for innovation in general. Currently it is shown that on the one hand technological innovations increasingly involve multiple organizational aspects (Groen, De Weerd-Nederhof, Kerssens-van Drongelen, Badoux, & Olthuis, 2002), while on the other hand companies specialize to cope with the fast pace of technological developments. As a result, development activities are being carried out in heterogeneous networks of both large and small firms (Groen et al., 2002). In view of these developments and the need to minimize cost as mentioned above, companies must strategically cooperate with each other, even though this involves risk and complexity (Hanna & Walsh, 2002). Ultimately, small companies rely on social networks, external sources of information and new technology to manage their human resource and network assets to achieve innovation success (Rammer et al., 2009).

Although social networks have been portrayed as a way to drive innovation, little is known about their role and importance for innovation in the Dutch printing sector. Therefore, this study investigates the role of social networks for the innovation performance of small companies. Especially in the current market situation of Dutch printing companies, it is crucial that they address the complexities and challenges associated with managing for higher innovation performance.

1.2 Research question

In order to approach the innovation performance of Dutch printing companies, we first need to know what valid measurements of innovation performance are. Subsequently we can investigate which organizational factors genuinely determine innovation performance. The chosen scope of the final analysis is one category of determinants, which relate to the social network capital of a firm. Our research question is thus:

To what extent does social capital explain differences in innovation performance?

Answers to this research question allow us to better explain related theories with data from the empirical setting of the Dutch printing industry. Incidentally the study could shed light on what type of innovation performance factors are needed to support the management of SME's in the Dutch printing companies.

1.3 Subjects

The target population for our innovation performance study holds companies from the printing sector in The Netherlands, of which there were 2.578 in 2009. While the average company size is 15 fte, almost two-thirds of the companies have less than 10 employees[1], and only 45 companies have more than 100 fte (GOC & KVGO, 2009). Figure 1 shows on the left the percentage of all the companies that falls in to the size classes indicated by the number of fte. Interestingly, while two-thirds of the companies are smaller than 10 fte, these companies employ only 15% of the sector's total workforce of 39.574, as shown in the right pie chart of Figure 1: The blue and green area represents 15% of the sector's total workforce, and is employed by companies of 9 fte or less. The main activity of a company refers to a specialization in the printing production process: prepress is the main activity at

[1] In 2009, about 970 companies, or 38% of the sector were larger than 9 fte (GOC &

9% of the companies, 7% specialize in finishing, 11% do other print-related activities and 73% have print production as their main activity. These print production companies generated 92% of the sector's total 7.7 billion Euro revenues in 2008 (GOC, 2009b).

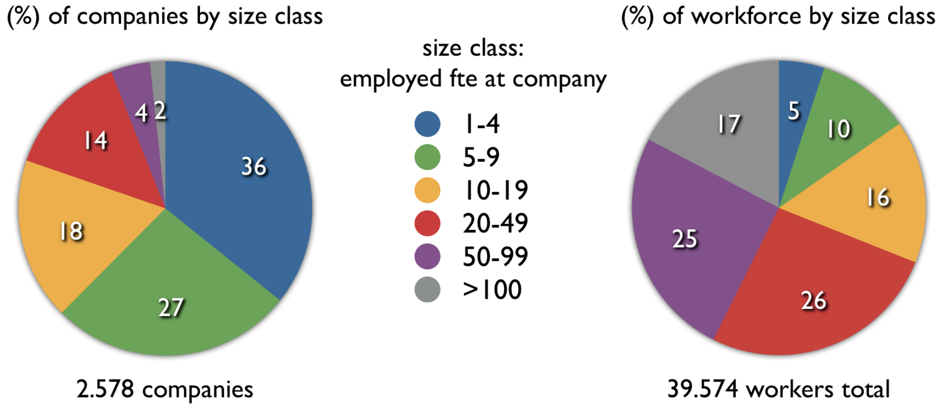


Figure 1 Number of companies and workers by company employment size class
Source: Own analysis, data from GOC & KVGO (2009)

The growth of new services relates to the degree of innovation in the sector. The five fastest growing innovations in the sector include, in ascending order, the introduction of digital printing systems, communication design consultancy, new distribution services, large format plotters and printing-on-demand applications (GOC & KVGO, 2009). Regarding geographical location, most companies are found in Noord-Holland, Noord-Brabant, Zuid-Holland, and Gelderland (20, 16, 14 and 13% resp.), followed by Utrecht and Overijssel which each have almost 10% of the companies (GOC, 2009b). Now that we have an impression of the population we turn to our sample and sampling procedure.

1.4 Research approach

To answer the research question we started with a study on literature about firm-level innovation and organizational determinants that is relevant for the empirical analysis, while taking into account the scope of our study. From there a model was specified that relates the effect of organizational characteristics to innovation performance. The model was constructed to test explanations from theory by a regression analysis.

The basic data used in this study was collected from a cross-sectional survey, which was previously developed for benchmarking companies in the Dutch printing industry. The measures in the questionnaire concern company characteristics from topics that included a company's social network, strategy, culture, finances and new products introduced in the last three years. A particular subset of this data was available for our analysis. The questionnaire itself is included in the appendix. We obtained 31 observations from a total population of more than 2500 companies using convenience sampling methods. Checking the instrument validity was excluded from the scope of this study, because it was stated by the developer of the questionnaire, that it consists of already verified concepts (Habets, 2008). Due to the convenience sampling the results of this study can not be generalized for the whole population, and it should be used only cautiously in management practice, i.e. decisions can not be based on these results alone.

2 Theoretical framework

2.1 Introduction

This chapter introduces the theoretical prerequisites to examine the relationship between social capital and innovation performance in the Dutch printing sector. To that end the concepts should be sufficiently concrete to serve as a research instrument, and also sufficiently broad to include the multidimensional aspects of an active business. For this purpose the 4S model (Groen, 2005) will be explained because it provides a framework for organizational determinants. Furthermore it will be explained how the selection of innovation performance variables is appropriate for this study.

2.2 Innovation

Innovation is widely acclaimed, in industrial marketing as well as strategic management literature, to lead to sustained competitive advantages and to renewal of mature businesses (Stopford & Baden-Fuller, 1994). From a firm-level perspective, innovation leads to new products, processes and services, and allows a firm to reduce its production costs, access new markets or develop new ways of doing things. In other words, innovation performance is critical to the survival of companies in a changing industry.

The process of innovation adoption encompasses the generation, development and implementation of new ideas or behaviors (Damanpour, 1991). Taking this further, Garcia and Calantone (2002) stress the essential combination of a technology-based invention leading to a market introduction. In line with these scholars, this study defines innovation as "the process that results in a product- or service offering on the market that is new to the organization".

2.3 Innovation performance

The characterization of the innovation variable is a recurring problem in the existing body of research (Hoffman, Parejo, Bessant, & Perren, 1998). In the aim to understand innovation performance issues, progress in understanding will primarily come from the quality, relevance and scope of our data and the efforts to improve them (Mairesse & Kremp, 1993; Mairesse & Sassenou, 1991).

To get a grip on indicators of innovation output performance, possible starting points are the literature on process innovations measures, new product development or entrepreneurship. In the literature on key success factors associated with new product development, several useful reviews can be identified, such as Montoya-Weiss and Calantone (1994) and Cooper and Kleinschmidt (1995); their studies develop conceptualizations of output performance, which include financial, temporal, market and product related factors. Literature indicates that there are a considerable number of measures recognizing the strategic importance of innovation, from the position of either the product or the firm, as for example in Kleinschmidt and Cooper (1991). The way customers perceive a product's superiority in relation to competitive products, noted as product advantage by Song and Parry's (1996), is also indicated by recent SME related innovation performance studies (Oke, Burke, & Myers, 2007). In the same way process-related cost measures are also among the frequently used performance indicators (Driva, Pawar, & Menon, 2001).

According to Garcia and Calantone (2002), an innovation must have been diffused into the marketplace, and consequently it must have received contributions from production, marketing and other parts of an organization, as well as information exchange with various sectors of the external environment. This implies the necessity of a multidimensional research approach to organizational determinants of innovation performance (Frishammar & Åke Hörte, 2005). In other words, it is relevant to study multiple internal aspects of an organization, as well as the characteristics of the network in which the information exchange occurs.

Many companies realize the potential benefits of innovation investments and are keen to develop indicators to measure the extent of their investments and their innovation capability (Tin, 2005). A comprehensive study about measuring innovation at businesses indicated that a division can be made between two types of innovation measures (Kuczmarski & Shapiro, 2000): first, the innovation performance metrics that measure growth, and second the innovation program metrics that measure program management and control. The performance measures include return on innovation investment, new product success rate, the growth impact (revenues from new products in the last 3 years), and the success rate (the total number of new products commercialized in the last 3 years). The innovation program metrics include the innovation-portfolio mix, innovation revenues per employee, the number of full time equivalent employees devoted to innovation and the time to market.

2.4 Innovation performance measures in context

SMEs can have advantages over larger companies in the innovation process such as rapid response to external opportunities and efficient internal communication, but they also face challenges such as the inability to spread risk over a portfolio of new products or acquiring the financial resources to enter new markets and sustain longer term R&D. SMEs can particularly suffer from disadvantages in establishing the appropriate network of contacts that can link them with important sources of scientific knowledge and technological expertise (Hoffman et al., 1998).

Literature shows some common features of SMEs regarding their innovative activities. For example in the review by Hoffman et al. (1998) it is pointed out that they:

- are more likely to involve product innovation than process innovation;
- are focused on producing products for niche markets rather than mass markets;
- will generate incremental as well as radical innovations;
- will frequently involve some form of external linkage;
- are likely to be associated with "growth in output, turnover and employment — thus implying that weak firms (little or no growth) are either not successful innovators or are overcome by their weakness in other aspects of the competitive struggle."; and
- will often not translate directly into improved firm performance, or specifically greater profitability.

The latter is supported by for example Hall (1991) and Oakey, Rothwell, and Cooper (1988), who found no evidence of a correlation between R&D investment and firm growth or patenting activity at the firms who performed development activities. Similarly, Rammer et al. (2009) pointed out that patents in itself do not indicate whether a company capitalized the new technological knowledge by a successful market introduction.

Measures and indicators are a key component of any innovation performance model irrespective of the type of company. From an academic standpoint, an appropriate selection of metrics is a process governed by purpose and context (Kerssens-van Drongelen, 1999). Many studies on innovation in the SME context fall short in measuring innovation performance comprehensively, and lack to explore the link between innovative inputs (observed either directly or by proxy) to innovative outputs or even firm performance (Hoffman et al., 1998). As indicated by the research question it will be explained what makes an innovation performance measure useful in our setting. The following criteria were used while selecting the initial SME innovation performance indicators from literature.

First, the measures should distinguish between more and less successful innovations, as argued by Rammer et al. (2009). They should indicate whether a firm has introduced a certain type of innovation during a given period of time and capture the significance of these innovations in a firm's total activities (Rammer et al., 2009). Second, the measures must match or reflect the characteristics of the innovation activities found at SMEs. For example when few SMEs have patents, then tracking patent submissions would ignore the majority of their innovations. Also when only larger SMEs may have clearly determined procedures and processes then the measures should not focus on process innovations. Subsequently, given the large relative differences in size between SMEs, a measure has to be neutral to firm size or needs to match with firm size (Rammer et al., 2009). Furthermore, it will be considered whether the cost/benefit relationship is sensible in terms of data availability or resources needed to collect data. It is not within the scope of this study to create a completely new questionnaire for example. The measures should be specific, understandable by the respondents and measurable. Finally the variables to use in this study are in practice constrained by the limited resources and data available. As a result the following measures were considered in respect to our research question.

The number of commercialized innovations in the last three years: Basically, when aiming to uncover the organizational characteristics that determine innovation, we want to minimize the influence of different types and attributes of an innovation itself, relative to the weight of organizational characteristics such as social capital. To this end, not just the details of a single innovation are studied, but we incorporate a number of innovations realized over three years into the innovation performance measure (Damanpour, 1991). The measure reflects the quality of planning the innovation activities and provides insight about the amount of innovation output.

The time to market these innovations: Empirical studies on innovation performance typically use output indicators such as patents or sales with new products (see Kleinknecht, Montfort, & Brouwer (2002)). Yet small firms seldom have patents due to high costs of registering and defending their intellectual property rights (Soete, 1979; Acs & Audretsch, 1988, 1991)). The time to market however reflects the efficiency of the R&D process (Kuczmarski & Shapiro, 2000), and proxies for the relative complexity and importance of the innovations.

The share of new product sales vs. total sales over the last 3 years: In many studies the share of sales generated by new products is used as a performance indicator (see e.g. Ahuja, 2000; Belderbos, Carree, & Lokshin, 2004; Lööf & Heshmati, 2002). It relates to the contribution to firm growth (Kuczmarski & Shapiro, 2000). The main drawback of this metric, brought up by Rammer et al. (2009), is that it only focuses on product innovation, while cost-saving process enhancements can be of importance when following a price differentiation strategy. However, it is unlikely that there is room for such a strategy in our research setting because processes are already efficient and small companies lack the size required to achieve economies of scale, as we argued in chapter one. Hence, we include the share of new product sales with respect to total sales in our study because it meets our criteria and it is a good indicator to distinguish firms by innovation performance (Lööf & Heshmati, 2002).

The related value addition for customers, as perceived by the respondent: The premise is that innovative firms are able to create sufficient added value for customers, which originates from efficient production and good profit margins. This captures the significance of the innovations.

Labor productivity: Another measure selected as an innovation output indicator is the level of labor productivity expressed as the value added per fte. The variable was proposed by Lööf and Heshmati (2002) and Faems et al. (2005). This quantitative measure is neutral to firm size and can be derived from annual reports.

Work force growth: With regard to innovation performance, the growth of the workforce is a prevalent measure of firm performance according to Audretsch and Feldman (2004). Therefore data was collected on this variable, which was measured as the rate of change in the number of employed full time equivalents (fte) over the last 3 years. At very small companies, an entrepreneur usually knows exactly who recently worked for him, and larger companies tend to have detailed accountant reports or social security administration data.

To summarize, the following six quantitative innovation performance measures are identified from literature to measure innovation performance at Dutch printing SMEs.

- The number of commercialized innovations in the last three years.
- The time to market of these innovations.
- The share of new product sales vs. total sales over the last 3 years.
- The related value addition for customers, as perceived by the respondent.
- Labor productivity.
- Work force growth.

2.5 The 4S model

Given the need for a social network component in order to answer our research question, we selected the 4S model of Groen (2002), who based his work on Parsons (1951), for our study. This model specifically addresses organizations as actors and the effects of the interactions with other actors, in which the level of analysis depends on the research questions at hand. Primarily, the 4S model is useful for analyzing concrete streams of actions in an organizational context. The underlying assumption is that the sustainability of a business over time depends on processes and organizational capabilities that can be categorized into four major capitals: i.e. strategic, economic, cultural and social capital. Because the model does not preclude potential factors of influence, the 4S model is useful for research on innovativeness by analyzing actions in the full organizational context. Also, the 4S model is informative because it offers the possibility to investigate what types of capitals are present in the firms.

2.5.1 Strategic capital

Strategic capital is “the set of capacities that enables actors to decide on goals and to control resources and other actors to attain them” (Groen, Wakkee, & De Weerd-Nederhof, 2008), through power, authority and influence, e.g. that a company has in its network. In order to be innovative an organization needs a supporting strategy. The strategic dimension considers an organizations orientation towards attaining its goals. The business strategy contains the long-term goals that are the basis for all decisions on the short term. Different innovation activities form the innovation strategy, of which empirical studies have demonstrated its significance to determining innovation performance (Cassiman & Veugelers, 2006). A high strategic capital is associated with more success in creating and exploiting opportunities. Accordingly, we propose a positive relationship between the strategic dimension and innovation performance using the constructs of market orientation and entrepreneurial orientation.

Market Orientation

This capability is “the organization culture that most effectively and efficiently creates the necessary behaviors for the creation of superior value for buyers and thus, continuous superior performance for the business” (Narver & Slater, 1990). It leads to well adapted products and fosters gradual innovation. Radical innovations however are less likely because competitors or customers lack full technology awareness and complete information about the latest market trends. Market orientation comprises the following three items that are considered to be equally important (Narver & Slater, 1990):

- *Customer orientation* is the most fundamental aspect of business as stated by Han, Kim, and Srivastava (1998). The rationale behind the customer orientation is the marketing concept that always puts the interest of customers first.
- *Competitor orientation* could lead to incompleteness of the business strategy. As competitors also aim to add value and gain market share through the introduction of new technologies. Monitoring competitor’s moves is crucial, because threatening moves should be answered as soon as possible by a reactive strategy.
- *Inter-functional coordination* is where customer and competitor orientation come together. The benefits derived from the information should consequently be shared with others within the organization and lead to action. It relates to the process that transforms a company into a solid competitive team.

Entrepreneurial orientation

This capability determines the level of ambition and the reach of entrepreneurial actions aimed at exploiting business opportunities. The concept recognizes differences in ambition level and action orientation, by characterizing several processes: innovativeness, risk taking, pro-activeness and competitive aggressiveness (Groen, 2005; Lumpkin & Dess, 1996, 2001).

- *Innovativeness* reflects engagement in and support of new ideas, novelty, experimentation and creative processes that may result in new products services or technological processes.
- *Risk taking* can be defined as the degree to which managers are wiling to make large resource commitments, and keep in mind the chance of failures. All businesses concern risks only entrepreneurs perceive the same risk lower than others.
- *Pro-activeness* reflects the ability of the entrepreneur to anticipate on coming problems. Pro-activeness is for early stage firms more important than for firms in mature industries were an abundance of new business opportunities is unlikely.
- *Competitive Aggressiveness* refers to the challenge a firm conducts to outperform its rivals and secure their position on the market. This is a typical behavior of US firms and might therefore not always apply to companies in the Dutch printing industry. Rivalry in mature industries is usually more intense, thus in such a case a higher score could bring better prospects.

2.5.2 Economic capital

Economic capital is a "set of mobile resources that are potentially usable in exchange relationships between the actor and its environment in processes of acquisition, disposal or selling" (Groen et al., 2008). Money makes up the most general economic capital, being not directly linked to a specific goal. The businesses can use it for example to increase efficiency or to make investments in new technology. It general, economic capital is a resource that is not in itself directly tied to a particular goal (Kraaijenbrink, Wijnhoven, & Groen, 2007).

Central to the economic dimension is the set of resources, which are typically measured in monetary terms that can be used in 'exchange relationships between the actor and its environment in processes of acquisition, disposal or selling' (Groen et al., 2008). The resources in themselves are however not tied to one particular goal. The economic dimension relates to a firm's capability of optimizing its processes to become efficient (Groen, 2005). Companies seek the most efficient scale of production of goods, services and R&D outputs, thereby attempting to beat the competition by using money (Groen et al., 2008). Groen (2005) implies that a minimum level of economic capital is required to sustain innovation performance. One could consequently reason that an efficiently operating company is likely to have the means available that can be devoted to innovation. The companies that deliberately invest in innovation are expected to score better on innovation performance indicators than those who don't. Therefore we propose a positive relationship between the economic dimension and innovation performance.

We contemplated the inclusion of an efficiency variable for exploratory purposes, but a causal relationship between financial efficiency and innovation performance is ambiguous due to interplay of the different dimensions, see e.g. Parsons (1951). *The average value added per employee (fte)* could be used as an efficiency indicator relating to labor productivity. The advantage of added value instead of sales per employee is that value added is less cost sensitive than sales (Cooke, 1994). "Value added is the difference between total operating results and the costs of the goods and services, which are necessary to achieve results" (Sels et al., 2006). Measuring the correct added value at the companies was difficult because the questionnaire had not clearly defined how it should be calculated, and companies had different accounting practices, diminishing the usefulness of the data obtained through this single question. Combined with the ambiguity in theory and lack of data, this variable could not be analyzed.

2.5.3 Cultural capital

Cultural capital is “the set of values, norms, beliefs, assumptions, symbols, rule sets, behaviors and artifacts that define the actor in relation to other actors and environment” (Groen et al., 2008). This capital determines the ability, values, and methods to adapt to a changing environment in an efficient way and therefore the capacity to innovate and reach the goals set by the company (Groen, During, & Weaver, 2002).

Knowing how to do things effectively and efficiently leads to a fixed pattern of skills, and certain behaviors, values and methods of dealing with certain situations that are supported whereas others are not in terms of the goals set by the firm (Groen et al., 2002). The cultural dimension thereby involves the ability to maintain patterns of actions in a system, which includes adapting to new opportunities developed in the firm as well as changes in the environment. The resources that support the cultural dimension are knowledge, experience, technology and climate (Shane, 2000; Ekvall, 1996).

Innovation performance depends on the extent to which the cultural dimensions are aligned with the goals of the company and the network it is in. This is related to the social network dimension, because learning and the transfer of know-how usually occurs in relationships between people. The role of trust and knowledge exchange is further discussed in the section of the social network dimension.

2.5.4 Social capital

Social capital is “the set of network relations through which actors can utilize, employ or enjoy the benefits of capital that is controlled or owned by other actors” (Groen et al., 2008). In other words, social capital is the network, through which all the necessary capitals can be obtained.

The principle of social capital is that goodwill in the fabric of social relations between people, allows them to access resources via others, and can result in performance benefits (Adler & Kwon, 2002; Granovetter, 1992). In academic literature, there is increasing consensus that a firm’s position in a network of inter-firm relationships matters for its innovative performance (Ahuja, 2000; Gilsing, Nooteboom, Vanhaverbeke, Duysters, & van den Oord, 2008; Hansen, 2002; Gabbay & Zuckerman, 1998; Tsai & Ghoshal, 1998; Rogers, 1995; Burt, 1987). However, there is an ongoing discussion in literature about the most beneficial network structure (McEvily & Zaheer, 1999; Gilsing et al., 2008; Gilsing & Duysters, 2008). The validity of the arguments by Burt, favoring structural holes, is put against the views of Coleman (1988), favoring dense, closed networks (McEvily & Zaheer, 1999; Gilsing et al., 2008) and the tie strength concept of Granovetter (1973).

Empirical findings suggest that social capital is multifaceted and both structural and relational dimensions are necessary for innovation performance (Moran, 2005). The structural embeddedness engenders the variety of resources within an actor’s reach, while the strength of ties influences the extent to which they are utilized (Moran, 2005). At the individual’s dyad level, Moran (2005) finds considerable advantages from relational embeddedness, while studies at the network level have shown that the configuration of an alliance network also affect innovation (Ahuja, 2000; Gilsing et al., 2008; McEvily & Zaheer, 1999). These have however not lead to an universally optimal network structure (Gilsing & Duysters, 2008; Burt, 2005; Coleman, 1994).

In recent work, Burt (2005) somewhat settles the tension by introducing the structural autonomy model, which predicts that individual performance depends on both closure within group and brokerage beyond group. Even so, Burt and others take a strong universalistic tone, generalizing assertions without really testing it on a variety of firms in different environmental contexts (Gilsing & Duysters, 2008; Comet, 2007; Ahuja, 2000). In relation to performance, Rowley, Behrens, & Krackhardt (2000) concur that the industry context matters, but additionally argue that relational and structural embeddedness have been treated as independent constructs in past literature.

Structural embeddedness

The structural perspective on social capital is about the advantages arising from the configuration of an actor's network of contacts. Granovetter (1992) early on distinguished between the aggregate configuration of relations and the concrete personal relations. Nahapiet and Ghoshal (1998, p. 244) provide a refined definition of structural embeddedness as: 'the impersonal configuration of linkages between people or units' and include several structural features. Burt's (2005) argument deals with the empty spaces that separate clusters: the *structural holes*. These are formed by having *non-redundant* contacts in a focal firm's advice network, which means that the contacts are not linked to one another (McEvily & Zaheer, 1999).

Relational embeddedness

Alongside the benefits and costs of a certain network structure stands the issue regarding the quality and nature of one's relationships. *Relational embeddedness* is defined as the 'personal relationships people have developed with each other through a history of interactions' (Nahapiet & Ghoshal, 1998). Granovetter (1973) introduced the concept of relational embeddedness as tie strength. He states that the tie strength of a relationship is a combination the amount of time, the emotional intensity (mutual confiding), and the reciprocal services. *Strong ties* are characterized by relationships that are intensive, frequent and possess informational resources that one already has.

Granovetter also links strong ties to the structural embeddedness concept: they are associated with a dense cluster of actors who are mutually connected. Information circulating in such a densely connected cluster between people that interact frequently is likely to be *redundant* (Granovetter, 1973; McEvily & Zaheer, 1999). *Weak ties* are formed between people who are loosely connected, and usually operate in different networks. When one's contacts are themselves unacquainted, they are likely to offer access to heterogeneous and thereby non-redundant sources of information and resources.

Network structure implications for innovation performance

It is relevant to investigate the mechanisms through which social capital influences innovation performance, as organizations that use their collective expertise and knowledge are likely to be more innovative, efficient and effective in the marketplace (Grant, 1996).

Ahuja (2000)shows that a focal firm's network structure enhances innovation performance by providing *resource sharing benefits* and *knowledge spillover* benefits. Actors who are integrated in dense clusters or multiplex relations face different sets of resources and constraints (Moody & White, 2003). Embeddedness provides variation in acquisition of competitive capabilities (McEvily & Zaheer, 1999). Embedded ties provide the greatest access to the benefits circulating in the network and are characterized by a high level of information exchange, trust, and joint problem-solving arrangements, which allow firms to rapidly capitalize on the opportunities afforded by the network (Uzzi, 1996; Romo & Schwartz, 1995). At a firm's network level, alliances between companies facilitate the sharing of information, through which firm's can obtain complementary know-how. The speed of knowledge diffusion and efficiency of cooperation is higher if partners have a good understanding of the relevant issues at hand (Gilsing, 2005). The underlying assumption is that the extent to which firms can learn from external knowledge depends upon the similarity of the partners' knowledge bases, which is the concept of *absorptive capacity*, as established by the influential Cohen and Levinthal (1990). Burt (1995) extensively developed the advantages conferred by having *structural holes*. People who bridge these holes are supposed to have access to more new opportunities and ideas. Additionally, their brokerage position is a source of timing, referrals and control. Greater autonomy and control helps managers execute the tasks required for innovation, as both Bower (1970)and Burgelman (1983) pointed out. Burt (1995) considers the efficiency of network structures and highlights that there are costs associated with maintaining contacts, which has implications for the most efficient network structure. To summarize, a network structure engenders resource sharing, information and control advantages that contribute to innovation performance.

Network relationship level implications for innovation performance

Broadening the view beyond network structure, to what extent does the quality of relationships (ties) matter? Literature shows that strong ties have two primary advantages (Rowley et al., 2000).

First, strong ties have a positive effect on the exchange of useful knowledge (Levin & Cross, 2004). Although an actor could access several information sources within the reach of his network, personal experience and the quality of past interactions will establish which sources are likely to be approached and how much of their potential may be realized (Moran, 2005): 'strong ties have greater motivation to be of assistance and are typically more easily available' (Granovetter, 1983).

Second, strong ties support the development of relational trust and cooperation (Uzzi, 1996; Granovetter, 1985; Ahuja, 2000). Partners with strong ties are more likely to develop joint problem-solving arrangements and abandon individual short-term interests (Uzzi, 1996). Levin and Cross (2004) point out that trust mediates the link between strong ties and knowledge sharing. Moreover, the presence of trust is a precondition to uncover the benefits from the receipt of useful information through weak and strong ties (Levin & Cross, 2004; Ahuja, 2000). Trust can on the other hand also be linked to the structural network concept through closure: In closed, densely structured networks with many connections, opportunistic behavior of other firms will be detected more quickly than in networks with many structural holes (Coleman, 1988). Summarizing, strong ties and relational trust contribute to performance.

2.6 Hypothesis development

We formulate hypotheses for the setting of this study, in which innovation performance is considered the past result of successfully bringing new products and services on the market and exploiting them. When innovations need to be exploited, then strong tie strength is beneficial. At an individual actor's level, empirical work shows that 'relational embeddedness plays a stronger role in explaining innovation-oriented tasks' (Moran, 2005). At a firm level, cooperation between parties in a network enables them to effectively develop and market new products and services, thus resulting in a higher innovation performance. A core of strong ties enhances the dynamic innovative capability of firms by increasing the probability of firms participating in knowledge-intensive networks (Uzzi, 1997). Regarding structural embeddedness, a structurally dense network composed of relationships with many redundant ties would facilitate the development of trust and cooperation (Coleman, 1988; McEvily & Zaheer, 1999).

To answer the research question two hypotheses regarding social capital and innovation are tested in this study:

H1: The higher the density of the firm's network, the better the innovation performance.
H2: The greater the firm's tie strength, the better the innovation performance.

3 Methodology

3.1 Introduction

In this chapter the theoretical model, as proposed in the previous chapter, will be tested using data collected with a cross-sectional survey. Furthermore, we discuss certain issues that could have an impact on the results of the research. For example, as this study started in 2009, I started the project marketing and data collection phase for the Innovation Performance Benchmark research project at NIKOS, University of Twente, in which Dutch printing companies are benchmarked by innovation performance. Considering the limited scope of my thesis project however, this lead to leaving the project eventually. A small subset of the IPB data that was collected was made available for my thesis project. In the following sections the sampling procedures and measures are described. The regression analysis results will be presented in the next chapter.

3.2 Sampling methods and response

In this section we describe the technique that we used for collecting data. We collected data in accordance with the sampling approach used in the IPB project. A sample was taken from all the companies in the Dutch printing industry, because it was not possible to survey all the companies with the resources available. Our data collection consisted of several parallel activities and the sampling methods can be characterized as convenience sampling.

Companies were pro-actively approached to participate in our survey. We used out-bound phone marketing and presentations at seminars for graphics industry professionals to generate leads and make an appointment for a visit by a researcher. More importantly, many companies were included in our sample through referrals from initial subjects or from the researchers own social network.

Initially, our data collection started by calling companies that were conveniently, thus non-randomly, selected from a data file that contained 229 companies that were member of the industry's trade organization KVGO. All of them were located in postal code area 7000-7999, which includes most parts of Overijssel and Drenthe.

In addition, a few companies were selected from a data file that contained 725 customers in The Netherlands of the company 'Dienstencentrum', which offers consultancy services for printing companies. Due to the use of referrals and other leads the sampled companies were mostly, but certainly not exclusively sourced from these data files.

When calling companies to make an appointment for a visit, we imposed the following restrictions for our convenience. First, to qualify for follow-up and inclusion in the sample, companies had to have a minimum of eight fte. Second, companies had to be active in business for at least five years, because most of the measures are about growth or changes over the past three years and larger companies tend to have more detailed (accounting) data available. Nevertheless these restrictions were not binding for the all the collected data or for our analysis, because the obtained dataset contained very few cases. In our sample, 39% of the companies are smaller than 11 fte, based on the original data we could analyze. As shown in chapter 1, about two thirds of all the companies in the target population have 9 fte or less.

After the data collection we estimated the response rate for the period during which data was being collected for this thesis. During one month 50 companies were approached. At least 21 responses were collected, bringing the response rate to at least 42%. Furthermore, at the end of that period there were 10 qualified leads (20% of the contacted companies) that would almost certainly result in an appointment after the next follow-up: e.g. the exact date and time for an appointment was not set, but the companies were qualified and interested to participate. Only 40% of the contacted companies were either not qualified or did not want to participate. All in all these efforts resulted in an estimated response rate of 62%. Even though these estimates provide an impression of the response during our data collection, the response in regard to the whole population is lower.

In conclusion, the way data collection activities were performed is likely to have introduced bias based on region, company size and personal preference. More importantly the use of trade organization member lists, as well as customer lists of a consultancy company that specializes in enhancing printing businesses, comes with the risk of introducing more bias related to innovation in particular: companies that have received such advice in the past could already have a propensity towards enhancing their innovation processes.

3.3 Data

As described in the previous section we obtained the data from a cross-sectional survey from 32 respondents who were asked to fill out the survey for their own business unit. They represented 3 females and 29 males. The number of company (co) founders versus non-founders was 9 to 23. The number of owners versus non-owners was 23 to 9. The number of directors to managers was 25 to 7 and 11 out of 32 subjects were part of a larger holding company or group. Founder involvement, ownership and management function may lead to an overestimation of innovation performance because this reflects positive on the respondent.

The average company size in our sample is 33 fte ($\sigma = 47$) and the average company age is 57 years ($\sigma = 32$), which is different from the target population. In addition, more than two thirds of the companies in the sample are located in Overijssel, while less than 10% of the Dutch printing companies are located in this province.

3.3.1 Quality of data

This section discusses considerations regarding the quality and fitness of the data to be used in regression analysis to explain our theory. The structured questionnaires are a widely used data-gathering technique in quantitative research. However, to be able to answer the detailed questions about various aspects of the company a certain level of involvement is necessary, yet a too high level of involvement may decrease the validity of the results (Schuman & Presser, 1996, chap. 10). The questionnaires were self-completed by the entrepreneurs or managers, which makes the data a subjective source, because their involvement, experience, expertise and possible ownership of the company may create a bias (Celsi & Olson, 1988).

Given that companies that were approached to participate in the survey were customers of a consultancy company, and moreover they were invited to be benchmarked against others in the sector, therefore it is likely that just the innovative companies were eager to participate. In addition, the possibility exists that the respondents have overestimated their innovation performance measures in order to rank higher than their competitors.

Especially when companies consider themselves much more innovative than their competitors, they tend to underestimate the responses on (strategic capital) proactiveness and competitive aggressiveness items in entrepreneurial orientation (Lumpkin & Dess, 2001).

Pairwise deletion of cases with missing values can be a problem if the missing values are not randomly distributed over the data set, or if there are many missing values. The variable for tie strength in the regression models was based on the average of 3 questions, and from one of the three, 26% of the 31 cases had missing values. However since the other 2 questions did provide data for tie strength, the missing values are not visible in the results at first. Therefore we checked the robustness by repeating the analysis with a tie strength variable that included only the 2 questions for which there were no missing values, as well as with a dummy variable that indicated whether the first tie strength question was available. The results of the analyses were similar enough to state that it would not change the conclusions of the study.

3.4 Measures

This section presents the measurement of all the variables in the analysis. The operationalization of the concept of innovativeness was narrowed down to focus on the occurrence of innovation performance, ties strength (relational embeddedness) and network density (relational embeddedness). As "innovativeness is a strategic, cultural, social, and managerial issue" (Välimäki, Niskanen, Tervonen, & Laurila, 2004) it leaves a lot of possibilities for different operationalizations. Particularly, as argued by Rogers (1998), innovativeness is such a multifaceted and complex organizational trait that there is no single measure that can capture the concept.

For our analysis we used a reduced dataset. In contrast with the main IPB data set the following company attributes were not involved in our analysis: age, size, structure, activity, location, as well as the respondent characteristics and function together with the data collected of the questionnaire on page 1, 2, 4, 5, 14, 15, 16 section 2, 18 (partly), 19, 21 through 25 and onward, which additionally contain these items: total revenues, innovation priorities, innovation capabilities, amount of innovation personnel, state of technology, the amount of innovation personnel, type of social network contacts, type of cooperation with partners, level of innovation activity in the network, growth of number of employees, the innovations the company completed in the last 3 years, their time to market and value addition, the contribution of network partners to an innovation and other characteristics of a past innovation such as complexity.

3.4.1 Dependent variables: innovation performance

The dependent variable each regression model is a different operationlizations of innovation performance. The dependent variable innovation performance IP1 is based on three items that are adapted and selected from Miller and Friesen (1982). These items are:

- Nr.of.Innov. : The number of innovations in the last three years.
- Time2market : The average time to market of the innovations.
- ValueAdded : The value-added for customers as perceived by the respondent.

One difference is that the respondents were asked about products or services instead of lines of products or services, because the firms in our study were generally much smaller than those studied by Miller and Friesen (1982). Furthermore, a more specific definition of innovation performance was used in our study and survey (see Chapter 2), based on Damanpour (1991) and Garcia and Calantone (2002). More innovations and/ or a longer development time and/ or higher perceived value contribute to a greater innovativeness and innovation performance.

Innovation performance was also measured in a second model (variable IP2) by asking for the share of new product sales to total sales over the last three years. This concerns the share of sales that is related to innovative products partly or totally developed by the firm. The measure is based on the empirical study by Lööf and Heshmati (2002), who argued that it is a good indicator when distinguishing firms by innovation performance and found it to be independent of firm size. It must be noted that due to the accounting practices at the companies in the sample, a precise measure of these revenues was not possible, therefore the respondent would estimate.

Before testing out hypotheses, we performed a principal component analysis on the variables measuring the innovation performance. In the resulting factor, three normalized innovation variables (Nr.of.Innov., Time2market, ValueAdded) have a similar component loading of about 0,8, while the fourth variable (NewProdSales) diverges at a loading of 0,545 (see Table 1). The component had an initial Eigenvalue of 2,37. Using the factor for our regression analysis would make it impossible to compare results to other data sets, because the factor is uniquely created with our data. Three variables loaded well together in the factor analysis; therefore we took their mean as the dependent variable IP1 in the regression analysis. A second model was defined with the fourth variable as IP2.

Table 1 Results of factor analysis - IP component matrix

	Component
	1
Nr.of.Innov	.800
Time2market	.833
ValueAdded	.852
NewProdSales	.545
Eigenvalue	2,37

Two variables that were proposed in chapter 2 were excluded from the analysis. First, regarding labor productivity, serious measurement errors and interviewer bias problems occurred during data collection: from the definition in the questionnaire, it was unclear to the respondents and to the interviewers how the added value should be calculated exactly, which resulted in inconsistent measurements. Second, workforce growth data that we had collected was not available for analysis.

3.4.2 Independent variables: social network capital

An important factor of social capital is tie strength. The tie strength is operationalized by three items that are adapted from McEvily and Zaheer (1999). Respondents were asked to about their five inter-company relationships that they regard the most important for innovation. McEvily similarly asked for five relations of advisors who provide new knowledge. For each relative we captured the level of acquaintance, contact frequency and the duration of the relationship.

More items were indicated by literature for the tie strength concept: we also captured the percentage of persons involved in the relationship at both the company and the partner, and asked for the reciprocal services in the relationship, measured as cooperation or innovation activity (survey page 16 item 2). They were measured on different ordinal scales. However, the data of these items was not available to us.

An important factor of the network factor is: density. Each respondent was asked to list the five most important business partners, not employed by the company, that can add to product- or service innovation. Subsequently we asked which ties there are between each partner. From this data the density of the network was calculated. This type of measurement is adapted from McEvily and Zaheer (1999).

3.4.3 Control variables

The control variables are provided from each of the other three categories of the 4S model.

Strategic capital

Strategic capital was operationalized as entrepreneurial orientation, which was measured with 11 items on a 7 point Likert scale, based on Lumpkin & Dess (1996, 2001).

Economic capital

Studies on the determinants of innovation (e.g. Rogers 2004; Baum et al. 2000) provided evidence that the R&D activities of organizations can positively influence innovation performance. However others have argued that R&D investments at SMEs in particular do not lead to higher firm performance, see for example Hall (1991), Oakey et al. (1988) and Rammer et al. (2009), which means that the theoretical base as a determinant of innovation performance at SMEs is ambiguous. A variable reflecting R&D activities was included in the survey: the percentage of R&D investments to total revenues in the last 3 years. There were however many measurement problems. Almost all of the SMEs did not have any formal R&D process or measurable R&D investments, even when they performed some kind of innovation activities. The numbers were in most cases a lucky guess by the researcher or the respondent. Moreover, the percentage of R&D investments to total revenues correlated significantly (at $p < 0.05$) with firm size. All in all, this variable was excluded from the regression model.

Another variable under consideration was the earnings before interest, taxes and amortization (EBITA). Rogers (2004) found that the level of past profitability has little association with innovation and argues that the ability of a firm to finance innovation by itself is only an issue if there are capital market imperfections that prevent a firm from obtaining external finance. Moreover, asking an entrepreneur or manager for EBITA or revenue (growth) is likely to provoke socially desirable responses. Many of the respondents did not want to provide all their accounting reports to verify the data. All things considered, the variable was excluded from the model.

There were no other financial variables in the dataset that was available for this study. For the economic capital we therefore used the company size in full time equivalents (FTE). This is supported by Rogers (2004) who states that innovation varies across firm size. The measure collected through page one item five in the questionnaire was the exact company size in FTE, and we had available for our analysis the company size on an ordinal scale, ranging from <11, 11-20, 21-30, 31-40 and >40 FTE.

Cultural capital

Cultural capital is operationalized as knowledge level in the company (Shane, 2000). It is calculated as the average of education level, work experience and the percentage of training expenses versus revenues. Knowledge level was the only cultural variable that did not have abundant missing values. Alternative operationalizations for cultural capital had quite a lot of missing values, for example innovation climate had >26% missing values.

3.4.4 Constructs

Table 2 below shows the constructs that were used in the regression analysis, the measurement scale, abbreviation, and sources.

Table 2 Measuring determinants and innovation performance

Construct	Scale	Abbreviation	References
Innovation Performance *		**IP1 and IP2**	
# of commercialized innovations, last 3 years	Scale	Nr.of.Innov	Frishammar & Hörte (2005), Cooper & Edget 2008, Coyne 2001
Time to market of these innovations	Scale	Time2market	Frishammar & Hörte (2005), Cooper & Edget 2008, Coyne 2001
Value-added for the customer perceived by the respondent	Ordinal	ValueAdded	Frishammar & Hörte (2005), Cooper & Edget 2008, Coyne 2001
New product sales/total sales (%), last 3 years	Scale	NewProdSales (IP2)	Lööf & Heshmati 2002
Social capital			
Ego-network density	Scale	SO Density	McEvily & Zaheer (1999)
Tie strength	Scale	SO Tie Strength	Granovetter (1973), McEvily & Zaheer (1999)
Strategic capital			
Entrepreneurial orientation	Ordinal	SC EO	Lumpkin & Dess (1996, 2001)
Economic Capital			
Company size in full time equivalents	Ordinal	EC FTE	
Cultural capital			
Climate: Knlowledge	Ordinal	CC Knowledge	Shane (2000)

(*) The number of innovations was measured as an integer. The development time, or the time to market of these innovations was measured on a five item ordinal scale, ranging from 1-4 weeks, 1-5 months, ½ -1 year, 1-2 years to more than 2 years. The innovation's added value for customers, as perceived by the respondent, was measured on a five item ordinal scale, ranging from: very small, small, substantial, large and extremely large.

Table 3 shows the data that was used for the independent variables and the related pages of the questionnaire.

Table 3 Data for independent variables

Category	Pages	Data / Scale
Strategic	12, 13	Likert 1 – 7
Cultural	6, 7, 8, 18.5	Likert 1 – 7 and (*)
Social networks	14, 15, 16, 17	Scale: 5 x 3 matrix; 4 x 5 matrix; 5 x 3 matrix
Economic data	1, 18	Integer

4 Data Analysis and Results

4.1 Introduction

The results are divided into several parts. First, we explore the correlations of the independent variables, next we specify two regression models to analyze innovation performance, and subsequently we present the results of our regression analysis. The significance of test results is reported by probability level, as suggested by Coolican (1990, p. 174):

- ‘significant': 0.05 > p < 0.01;
- `highly significant': 0.01 > p < 0.001;
- ‘very highly significant': 0.001 > p.

All reported probabilities are based on two-tailed tests, but to test our theoretical model we are only interested in the relationship in a single direction, therefore we should test one-tailed/report significances one-tailed.

Table 4 below gives gives simple summary statistics for our key variables. The original measurement scales are explained in chapter 3, and here all variables are normalized, except for company size (EC FTE). The reliability (Cronbach's alpha) is calculated for SC EO and is 0.67. CC Innov. Climate had 26% missing values and is thus not included in the regression model.

Table 4 Descriptive statistics

Variables	n	Mean	Std.Dev.	Min	Max	Reliability
IP1 Innov. Perform.	31	0,504	0,197	0,000	0,840	
IP2 New Prod Sales	31	0,230	0,237	0,000	0,850	
SO Density	31	0,531	0,265	0,000	1,000	
SO Tie strength	31	0,691	0,093	0,475	0,854	
SC EO	31	0,540	0,120	0,325	0,753	0,67
EC FTE	31	1,548	1,546	0	4	
CC Knowledge	31	0,543	0,077	0,418	0,738	
CC Innov. Climate	23	0,714	0,111	0,460	0,905	

Table 5 shows the Pearson correlation and significance of the independent variables. The only significant correlation at the $p < .05$ level is between company size (FTE) and entrepreneurial orientation (EO) with a regression coefficient of 0,45. There seems to be a relationship between these variables and this result was not predicted by our theory. However given the number of respondents (n=31) and variables we should interpret this result cautiously as it is likely to be attributable to the small sample size and randomness. Controlling for such randomness may be done by replicating the study, or by splitting the data set randomly and then comparing the correlations for consistency, but insufficient data was available to us.

Table 5 Correlations and significance of independent variables

		1	2	3	4	5
1. SO Density	Correlation	1				
	Sig.					
2. SO Tie strength	Correlation	,078	1			
	Sig.	*,677*				
3. SC EO	Correlation	,288	-,191	1		
	Sig.	*,116*	*,302*			
4. EC FTE	Correlation	,125	,021	,450*	1	
	Sig.	*,502*	*,909*	*,011*		
5. CC Knowledge	Correlation	-,105	,202	,106	,115	1
	Sig.	*,574*	*,275*	*,571*	*,538*	

*. Correlation is significant at the 0.05 level (2-tailed).

4.2 Model

The model specification in our regression analysis is based upon our theoretical framework from chapter 2:
Model (1): IP1 = CONSTANT + B_1DENSITY + B_2TIES + B_3EO + B_4FTE + B_5EO + E_i
Model (2): IP2 = CONSTANT + B_1DENSITY + B_2TIES + B_3EO + B_4FTE + B_5EO + E_i
The dependent variables in the models are different operationalizations of innovation performance. IP1 is the mean of the normalized variables Nr.of.Innov., Time2market, and ValueAdded. IP2 is the variable NewProdSales (the percentage of sales from new products versus total sales). DENSITY and TIES are the variables for social capital. There is a control variable for each of the other three capitals, i.e. strategic, economic and cultural capital. E_i is the residual variance. Our analysis aims to fit a linear regression model based on the 4S theory. Therefore we use the direct enter method so that all the variables are included in the model. We treated missing values using pairwise deletion because of the limited sample size (n=31) and profusion of missing values.

4.3 Hypothesis testing

Table 6 presents the results obtained through the linear regression analysis of both models. For model one, the R^2 of 0,44 indicates that a substantial amount of variance of innovation performance is explained, and the F test shows model one is highly significant. The second regression model has a much lower R^2 of 0,15 and was non-significant. Therefore we cannot reject the null hypothesis of no linear relationship of IP2 to the independents.

Table 5 shows that the t value for the SO Density is in the wrong direction and non significant, therefore SO Density does not have enough explanatory power for IP1. There is not enough evidence to accept the density hypothesis.

The results show that the SO TIE STRENGTH coefficient in the wrong direction and non significant in model one, therefore the tie strength hypothesis is not accepted. However the second model shows a positive and significant relationship between tie strength and IP2, but the regression model as a whole was not significant. Based on these results, both hypotheses for social capital are not accepted.

Furthermore, we controlled for the effects of the strategic, economic and cultural capitals. The estimate for strategic capital's entrepreneurial orientation is positive and significant at the $p < .05$ level in model one (SC EO: B= .69 at $p < .05$), and the SC EO estimate is also positive, but non-significant, in model two. These results provide evidence to accept the hypothesized positive effect of strategic capital on innovation performance.

The estimate for economic capital (company size in FTE) is positive in the first and negative in the second model, but non-significant in both models. Therefore this variable does not have enough explanatory power for innovation performance as IP1 or IP2. However, we note that the t-value of EC FTE was 1,185, so perhaps a more significant result might show for this variable, with a better data set.

The proposed positive effect of cultural capital, in this case the variable 'knowledge', is positive and significant in the first model. Therefore we accept the hypothesized positive effect of cultural capital on innovation performance as IP1. The second model however shows a negative, but non significant estimate.

Table 6 Results of linear regression analysis of innovation performance

Dependent variable	IP1			IP2		
	B	S.E.	*t* value	B	S.E.	*t* value
Constant	-,256	,324	-,790	-,559	,482	-1,160
SO Density	-,114	,119	-,962	-,052	,177	-,296
SO Tie strength	-,084	,338	-,249	,978	,503	1,945*
SC EO	,692	,297	2,328*	,544	,442	1,229
EC FTE	,025	,021	1,185	-,012	,032	-,378
CC Knowledge	,856	,399	2,144*	-,247	,594	-,416
R square	,44			,15		
F	3,998**			,880		

Unstandardized coefficients
* $p < .05$ (one-tailed test)
** $p < .01$ (one-tailed test)
IP1: Nr.of.Innov, Time2market, ValueAdded
IP2: NewProdSales

4.4 Regression model validation

All variables were checked for outliers that could have impacted the linear regression results which did not pose a problem.

Multicollinearity can threaten the results of regression analysis. We checked the bivariate correlations of the independent variables, shown in Table 5. The correlation coefficients vary in the interval -0,191 and 0,450, thus there is no value $|r| > 0.9$. A more advanced method is to check the variance inflation factors (VIF), because these build in the regressing of each independent on all the other independents. The variance inflation factors are between 1.1 and 1.5. These results indicate that multicollinearity is not a serious problem.

The regression model is assumed to be linear, therefore the residuals R_i should firstly be normally distributed and secondly have a constant variance. The normal P-P Plot of standardized residuals showed a straight line; therefore no transformation of variables was necessary. We checked for heteroskedasticity, i.e. a violation of the second assumption that the variance of R_i is not a constant, using a scatterplot of the regression standardized predicted value by the regression standardized residuals. The assumption of homeskedastiscity was satisfied because the points were randomly distributed around zero.

5 Conclusions and Discussion

5.1 Introduction

This study attempts to explain the innovation performance of Dutch printing companies. It has been investigated whether differences in their innovation performance can be explained by differences in their social capital. In our literature study, we elaborated on innovation measurement, organizational determinants and the 4S model, which suggested that social networks are a crucial factor for innovation. In this chapter the analytical findings are summarized and the conclusions regarding the research questions are presented and related to the theoretical framework. Moreover this chapter discusses the contributions to theory, implications for practice, the studies' limitations and further research.

5.1.1 Validity

In retrospect, it is conceivable that the statistical conclusion validity of this study can be affected by factors such as the small sample size and the reliability of the measures. Straub (1989) proved that confirmatory findings will be strengthened when instrument validation precedes both internal and statistical conclusion validity. In our study the instrument in the IPB project from which we got the small data sample, was constructed by adapting previous instruments from literature. As stated by Straub (1989), the only conceivable gain from this procedure is to save time of developing a wholly new instrument, but from a methodological standpoint it is dubious. Straub (1989) points out that the more the selected items, format, order, wording and procedural setting of the original instrument are changed, the more likely it is that the derived instrument will lack the validated qualities of the original instrument.

Given the available data and considering the research scope, it was not the intention to verify the internal validity of the questionnaire in this study. Nevertheless, we tried to assess internal consistency by calculating the reliability of the entrepreneurial orientation scale. The C*ronbach's alpha* of strategic capital (entrepreneurial orientation) was 0,67. Given that an alpha value of .85 is considered good for confirmatory purposes, the reliability was poor. This has likely been induced by the small sample size, but also by translating and adapting the original scale of Lumpkin & Dess (2001).

It is recommended that the internal validity should be well-established before the questionnaire is put to use as a tool to advise managers of printing companies about business practice. For the aim of explaining theory as in this study, there were different validity requirements.

5.2 Conclusions about research issues

The extent to which social capital explains innovation performance was explained the hypotheses concerning network density and relational tie strength.

H1: The higher the density of the firm's network, the better the innovation performance.
H2: The greater the firm's tie strength, the better the innovation performance.

To explain the results of this study we selected determinants from the four categories of the 4S model and analyzed them against two innovation performance measures. The data covered four aspects: strategic, economic, cultural, and social capital.

As this study considers commercialized innovations, it was expected that control benefits stemming from network structure, as argued by Burt (2005), would contribute to performance, because a dense network supports good cooperation to develop and exploit opportunities. Nevertheless, our results have not confirmed this theory.

Although high density and high tie strength may both be important to innovation performance, the regression analysis suggests otherwise. DENSITY (H1) shows a negative relationship to both measures of innovation performance. TIE STRENGTH (H2) shows a negative and non significant relationship to the innovation measure of the first model, but a positive and significant relationship to the innovation measure in the second model, the percentage of new product sales to total sales. The second model as a whole however was not a valid estimate due to the low F value.

The positive relationship between tie strength and innovation performance as the percentage of new product sales to total sales in the second model is as expected by theory. Strong ties increase mutual trust, which is beneficial for cooperation with partners that you need to bring a product to the market. This includes for example the business development, marketing, as well as the operations and logistics to get the product to the customer. The percentage of sales from new products is thus a very immediate result of successful market introductions, and actually selling a new product.

The negative relationships at social capital are contrary to our expectations that both structural and relational embeddedness would contribute to performance. These expectations were based on the premise that access to a variety of resources and by increasing the potential to which those can be used, as suggested by e.g. Granovetter (1983, 1985, 1992), and supported by the findings of McEvily & Zaheer (1999), Ahuja (2000) and Moran (2005).

5.2.1 Discussion and implications

A possible explanation is that companies might be more interested in building and leveraging their social network when they are not performing well. When business is declining, companies tend to search harder for solutions. Small companies tend to start investing in social networks only when they can not keep up with market dynamics through their traditional or existing means. In addition, many of the companies in Overijssel that were visited focused only on their own area, as it did not seem part of the culture in that region to act very competitively.

The social network variables did not follow the expected relationships from the theoretical model, could also be due to shortcomings in the (omission of) control variables. The theoretical framework and 4S model in itself might be broad enough, but more measures might be necessary to cover it all comprehensively. For instance, the type of contacts in the network could matter for the performance outcome. For example, working intensely (i.e. through strong ties) with technology partners and developers on innovations might have a negative impact on performance, as research and development requires investments. The type of contacts in the networks was obtained through the questionnaire, but this data was not made available for this study, therefore this remains a direction for future research. Groen (2002) also points out that it is no easy task to develop network metrics and assess their value in a quantitative way.

Taking the discussion further to the 4S model, Groen (2002) points out that the relevance and outcome of innovation performance indicators greatly depends on the interaction of the four capitals at a firm. The basic premise in the social system theory is that the system only lasts if all four capitals are developed to a certain level. Up to a point, they do not all have to be at the same level to achieve performance, which implies that innovation performance achievable also if e.g. a strong capital could compensate for an underdeveloped capital. Social networks might only lead to performance if a company also has a minimum of e.g. economic, cultural or strategic capital. Regardless of the fact that we cannot test this theory with our data and linear regression model, the negative relationships between social capital and innovation performance might be explained in this manner.

In future research, more questions could be asked about the operationalization of the 4S model. This is a challenging task because choices need to be clarified in literature and the system has a high complexity (Groen, 2005). This study therefore contributes to the theory by operationalizing the 4S model and testing it in the context of the organizational determinants and innovation performance in an industry that is challenged by commoditization.

5.2.2 Discussion on control variables

The results indicate a positive and significant effect of entrepreneurial orientation on innovation performance, as was expected by our theory. The strong relationship between strategic capital and innovation in this study may not be surprising, given the fact that these are SMEs and we measured only commercialized innovations: SMEs are well capable of creating new products but they do face serious difficulties in commercializing their products in the marketplace (Pratten, 1991); likewise, market access variables far outranked technology factors as market entry barriers in the work cited by Barber, Metcalfe, & Porteous (1989), as pointed out by Hoffman et al. (1998). However, there are limitations to the Lumpkin and Dess scale on entrepeneurial orientation. The scale only concerns opinions given by the respondent itself, which therefore might not fully reflect the firm's actual activities.

The positive effect of economic capital on innovation performance was not significant in our results. Since in the model one the company size had a large positive standardized coefficient, it seems that larger companies have higher innovation performance, although there is not enough evidence to accept this proposition. Researchers often use company size as control variable. Particularly the findings of model one, while not yet significant, are in line with Rogers (2004) who found that the determinants of innovation vary across firm size. Regarding the influence of economic indicators on innovative sales (which is similar to dependent IP2), Loof & Heshmati (2002) state that this relationship varies by firm size. Their findings show a significant negative relationship for small firms (10-49 fte) with labor-intensive production technology, as well as for all (SME) sizes aggregated, but a positive correlation for larger firms (100-249 fte). This could be a starting point for further research.

In regard to cultural capital, the results show that a high level of knowledge and experience had a positive and significant effect on innovation performance in our first model. Although the second model showed the opposite effect, this outcome was not significant. A high level of knowledge in an organization increases it absorptive capacity (Cohen and Levinthal, 1990) which facilitates the exchange of knowledge with others in the social network and allows an organization to take actions that support the business strategy and thus enhances innovation performance.

5.3 Limitations

Future research should be designed to overcome some of the limitations of this study that are discussed here. The first limitation is the cross-sectional nature of the data; therefore no firm conclusions about the causality of relationships can be made from the data. Furthermore, the research neglects dynamic effects of changes in the environment or in the companies over time. Consequently, important directions for future research are longitudinal studies, since these can provide an insight into the organizational determinants of innovation performance over time.

Second, the conclusions are based on self reported data, thereby introducing a variety of possible biases including social desirability bias. Further research should also use objective measures to evaluate innovation performance. In the same way the research might suffer from single informant bias, because one person per company filled out the survey and there was no time to interview more. As a result the reliability of the answers could not be checked with others from that company. A certain level of involvement is necessary to know about the various aspects of a company, yet a too high level of involvement may decrease the validity of the results (Schuman & Presser, 1996, chap. 10). The questionnaires were self-completed by the entrepreneurs or managers, which makes the data a subjective source, because their involvement, experience, expertise and possibe ownership of the company may create a bias (Celsi & Olson, 1988). Although data was collected on the function of the respondents, company ownership and founders, there was no data available to us to control for the respondents function and involvement. Therefore this study suffers from single informant bias at the company level.

Third, the data collection method might have introduced bias, because the researcher did a face-to-face interview and helped the respondents fill out the questionnaire. While filling out the questionnaires it appeared that even the researchers present did not have a clear definition of some of the variables, in particular variables involving financial data. During this study the respondents happened to invent or estimate their financial data, and sometimes the researcher would make a calculated guess for them. As a result there is a possibility of interviewer bias and measurement error.

This study might also suffer from processing errors, i.e. mistakes in data coding, because several inconsistencies were encountered within the data set, particularly in the data related to network density. This could be due to the necessary merging of conflicting data files, and furthermore because some of the data was pre-processed. Mistakes in the preprocessing of the data could have occurred without our knowledge. Moreover, not all the questions were available to us, thereby making it impossible to compare outcomes with redundant information. Additionally, the small amount of variables available limited the possible operationalizations of the constructs. For further research, the data file should be checked more thoroughly against the original raw data.

Finally, the generalizability of the results may be limited because the sampling methods were biased, and the sampled companies are not representative of the total population of printing companies in The Netherlands.

6 References

Acs, Z. J., & Audretsch, D. B. (1988). Innovation in Large and Small Firms: An Empirical Analysis. *The American Economic Review*, *78*(4), 678-690.

Acs, Z. J., & Audretsch, D. B. (1991). R&D, firm size and innovative activity. *Innovation and technological change: An international comparison*, 39–59.

Adler, P. S., & Kwon, S. (2002). Social Capital: Prospects for a New Concept. *The Academy of Management Review*, *27*(1), 17-40. doi:10.2307/4134367

Ahuja, G. (2000). Collaboration Networks, Structural Holes, and Innovation: A Longitudinal Study. *Administrative Science Quarterly*, *45*(3), 425-455.

Anderson, J., & Narus, J. (1998). Business Marketing: Understand What Customers Value. *Harvard Business Review*, *76*(6), 53-65.

Audretsch, D. B., & Feldman, M. (2004). Knowledge Spillovers and the Geography of Innovation. In *Handbook of Regional and Urban Economics: Cities and geography* (pp. 2713-2735). Amsterdam: Elsevier.

Barber, J., Metcalfe, S., & Porteous, M. (1989). Barriers to growth, the ACARD study. In *Barriers to Growth in Small Firms* (J.). London: Routledge.

Baum, J. A. C., Tony Calabrese, & Brian S. Silverman. (2000). Don't go it alone: alliance network composition and startups' performance in Canadian biotechnology. *Strategic Management Journal*, *21*(3), 267-294. doi:10.1002/(SICI)1097-0266(200003)21:3<267::AID-SMJ89>3.0.CO;2-8

Belderbos, R., Carree, M., & Lokshin, B. (2004). Cooperative R&D and firm performance. *Research Policy*, *33*(10), 1477-1492. doi:10.1016/j.respol.2004.07.003

Boczkowski, P., & Ferris, J. (2005). Multiple Media, Convergent Processes, and Divergent Products: Organizational Innovation in Digital Media Production at a European Firm. *The ANNALS of the American Academy of Political and Social Science*, *597*(1), 32-47.

Bower, J. (1970). *Managing the Resource Allocation Process: A Study of Corporate Planning and Investment*. Boston Massachusets: HBS Division of Research.

Burgelman, R. A. (1983). A Process Model of Internal Corporate Venturing in the Diversified Major Firm. *Administrative Science Quarterly*, *28*(2), 223-244. doi:10.2307/2392619

Burt, R. (1987). Social Contagion and Innovation: Cohesion Versus Structural Equivalence. *The American Journal of Sociology*, *92*(6), 1287-1335. doi:10.1086/228667

Burt, R. (1995). *Structural Holes, The Social Structure of Competition*. Cambridge & London: Harvard University Press.

Burt, R. (2005). *Brokerage and Closure*. Oxford University Press.

Cassiman, B., & Veugelers, R. (2006). In Search of Complementarity in Innovation Strategy: Internal R&D and External Knowledge Acquisition. *Management Science*, *52*(1), 68-82. doi:10.1287/mnsc.1050.0470

Celsi, R. L., & Olson, J. C. (1988). The Role of Involvement in Attention and Comprehension Processes. *The Journal of Consumer Research*, *15*(2), 210-224. doi:10.1086/209158

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive Capacity: A New Perspective on Learning and Innovation. *Administrative Science Quarterly*, *35*(1), 128-152. doi:10.2307/2393553

Coleman, J. (1988). Social Capital in the Creation of Human Capital. *The American Journal of Sociology*, *94*, S95-S120.

Coleman, J. (1994). A rational choice perspective on economic sociology. In *Smelser, N., Swedberg, R. (Eds.), The Handbook of Economic Sociology.* (pp. 166-180). Princeton: Princeton University Press.

Comet, C. (2007). Ronald S. Burt: Brokerage and Closure: An Introduction to Social Capital. *European Sociological Review*, *23*(5), 666-667. doi:10.1093/esr/jcm030

Cooke, W. N. (1994). Employee Participation Programs, Group-Based Incentives, and Company Performance: A Union-Nonunion Comparison. *Industrial and Labor Relations Review*, *47*(4), 594. doi:10.2307/2524660

Coolican, H. (1990). *Research Methods and Statistics in Psychology*. Hodder & Stoughton.

Cooper, R., & Kleinschmidt, E. J. (1995). Benchmarking the firm's critical success factors in new product development. *Journal of Product Innovation Management*, *12*(5), 374-391. doi:10.1016/0737-6782(95)00059-3

Cox, H., & Mowatt, S. (2003). Technology, Organisation and Innovation: The Historical Development of the UK Magazine Industry. *Enterprise and Innovation*, *1*.

Damanpour, F. (1991). Organizational innovation: A meta analysis of effects of determinants and moderators. *The Academy of Management Journal*, *34*(3), 555-590. doi:10.2307/256406

Driva, H., Pawar, K. S., & Menon, U. (2001). Performance evaluation of new product development from a company perspective. *Integrated Manufacturing Systems*, *12*(5), 368 - 378. doi:10.1108/EUM0000000005714

Ekvall, G. (1996). Organizational Climate for Creativity and Innovation. *European Journal of Work and Organizational Psychology*, *5*(1), 105-123. doi:10.1080/13594329608414845

EuropeanCommission. (2007). Competitiveness of the European Graphic Industry: Prospects for the EU printing sector to respond to its structural and technological challenges. Retrieved December 1, 2009, from http://ec.europa.eu/enterprise/sectors/wood-paper-printing/files/graphic_study_summary_en.pdf

Faems, D., Van Looy, B., & Debackere, K. (2005). Interorganizational Collaboration and Innovation: Toward a Portfolio Approach. *Journal of Product Innovation Management*, *22*(3), 238-250. doi:10.1111/j.0737-6782.2005.00120.x

Frishammar, J., & Åke Hörte, S. (2005). Managing External Information in Manufacturing Firms: The Impact on Innovation Performance. *Journal of Product Innovation Management*, *22*(3), 251-266. doi:10.1111/j.0737-6782.2005.00121.x

Gabbay, S. M., & Zuckerman, E. W. (1998). Social Capital and Opportunity in Corporate R&D: The Contingent Effect of Contact Density on Mobility Expectations, , *Social Science Research*, *27*(2), 189-217. doi:10.1006/ssre.1998.0620

Garcia, R., & Calantone, R. (2002). A critical look at technological innovation typology and innovativeness terminology: a literature review. *Journal of Product Innovation Management*, *19*(2), 110-132. doi:10.1016/S0737-6782(01)00132-1

Gilsing, V. (2005). *The dynamics of innovation and interfirm networks*. Edward Elgar Publishing. Retrieved from http://books.google.nl/books?id=ZUDcHqOl4vgC

Gilsing, V., & Duysters, G. (2008). Understanding novelty creation in exploration networks--Structural and relational embeddedness jointly considered. *Technovation*, *28*(10), 693-708. doi:10.1016/j.technovation.2008.03.004

Gilsing, V., Nooteboom, B., Vanhaverbeke, W., Duysters, G., & van den Oord, A. (2008). Network embeddedness and the exploration of novel technologies: Technological distance, betweenness centrality and density. *Research Policy*, *37*(10), 1717-1731. doi:10.1016/j.respol.2008.08.010

GOC. (2009a). Trends in de creatieve industrie. Retrieved December 28, 2009, from http://www.goc.nl/trends.aspx

GOC. (2009b). *Grafimediabranche feiten en cijfers 2009*. Retrieved from http://www.goc.nl/Grafimediabranche-feiten-en-cijfers-2009.aspx

GOC, & KVGO. (2008). Grafimedia in cijfers [Printing industry in figures]. Retrieved from http://www.goc.nl/uploads/pdf/GOC%20Grafimedia%202008%20WEBVERSIE.pdf

GOC, & KVGO. (2009, July). Grafimedia in cijfers [Printing industry in figures]. Retrieved December 28, 2009, from http://www.goc.nl/Grafimedia-in-cijfers.aspx

Granovetter, M. (1973). The Strength of Weak Ties. *The American Journal of Sociology*, *78*(6), 1360-1380. doi:10.2307/2776392

Granovetter, M. (1983). The Strength of Weak Ties: A Network Theory Revisited. *Sociological Theory*, *1*, 201-233. doi:10.2307/202051

Granovetter, M. (1985). Economic Action and Social Structure: The Problem of Embeddedness. *The American Journal of Sociology*, *91*(3), 481-510. doi:10.1086/228311

Granovetter, M. (1992). Problems of explanation in economic sociology. In *N. Nohria & R. Eccles (Eds.), Networks and organizations: Structure, form and action* (pp. 25-56). Boston Mass.: Harvard Business School Press.

Grant, R. M. (1996). Prospering in Dynamically-Competitive Environments: Organizational Capability as Knowledge Integration. *Organization Science*, *7*(4), 375-387. doi:10.2307/2635098

Groen, A. (2005). Knowledge Intensive Entrepreneurship in Networks: Towards a Multi-level/Multi Dimensional Approach. *Journal of Enterprising Culture*, *13*(1), 69-88. doi:10.1142/S0218495805000069

Groen, A., De Weerd-Nederhof, P., Kerssens-van Drongelen, I., Badoux, R., & Olthuis, G. (2002). Creating and Justifying Research and Development Value: Scope, Scale, Skill and Social Networking of R&D. *Creativity and Innovation Management*, *11*(1), 2-16.

Groen, A., During, W., & Weaver, K. (2002). Alliances Between HTSF's and their Partners: A Multidimensional Process Approach. In *New Technology Based Firms in the New Millenium* (pp. 197-217). Oxford: Pergamon.

Groen, A., Wakkee, I., & De Weerd-Nederhof, P. (2008). Managing Tensions in a High-tech Start-up: An Innovation Journey in Social System Perspective. *International Small Business Journal*, *26*(1), 57-81. doi:10.1177/0266242607084659

Habets, M. (2008). Complementors and Innovation (p. 8). Presented at the HTSF, Enschede, The Netherlands. Retrieved from http://www.utwente.nl/nikos/archief/htsf2008/htsfpapers/

Hall, G. (1991). *Factors associated with relative performance amongst small firms in the British instrumentation sector*. Working paper no. 213, Manchester Business School.

Han, J., Kim, N., & Srivastava, R. (1998). Market Orientation and Organizational Performance: Is Innovation a Missing Link? *Journal of Marketing*, *62*(4), 30-45.

Hanna, V., & Walsh, K. (2002). Small firm networks: a successful approach to innovation? *R&D Management*, *32*(3), 201.

Hansen, M. T. (2002). Knowledge Networks: Explaining Effective Knowledge Sharing in Multiunit Companies. *Organization Science*, *13*(3), 232-248.

Hardstone, G. (2004). Capabilities, Structures and Strategies Re-Examined: Incumbent Firms and the Emergence of Complex Product Systems (CoPS) in Mature Industries. *Technology Analysis & Strategic Management*, *16*(2), 173-196.

Hoffman, K., Parejo, M., Bessant, J., & Perren, L. (1998). Small firms, R&D, technology and innovation in the UK: a literature review. *Technovation*, *18*(1), 39-55. doi:10.1016/S0166-4972(97)00102-8

Hult, G., Hurley, R., & Knight, G. (2004). Innovativeness: Its antecedents and impact on business performance. *Industrial Marketing Management*, *33*(5), 429-438. doi:10.1016/j.indmarman.2003.08.015

Kerssens-van Drongelen, I. (1999). *Systematic design of R&D performance measurement systems*. University of Twente, Enschede, The Netherlands.

Khalifa, A. S. (2004). Customer value: a review of recent literature and an integrative configuration. *Management Decision*, *42*(5), 645 - 666. doi:10.1108/00251740410538497

Kleinknecht, A., Montfort, K. V., & Brouwer, E. (2002). The Non-Trivial Choice between Innovation Indicators. *Economics of Innovation and New Technology*, Economics of Innovation and New Technology, *11*(2), 109-121.

Kleinschmidt, E. J., & Cooper, R. G. (1991). The impact of product innovativeness on performance. *Journal of Product Innovation Management*, *8*(4), 240-251. doi:10.1016/0737-6782(91)90046-2

Kraaijenbrink, J., Wijnhoven, F., & Groen, A. (2007). Towards a kernel theory of external knowledge integration for high-tech firms: Exploring a failed theory test. *Technological Forecasting and Social Change*, *74*(8), 1215-1233. doi:10.1016/j.techfore.2006.12.003

Kuczmarski, T. D., & Shapiro, T. (2000). Measuring your return on innovation. *Marketing Management*, *9*(1), 24–32.

Levin, D. Z., & Cross, R. (2004). The Strength of Weak Ties You Can Trust: The Mediating Role of Trust in Effective Knowledge Transfer. *Management Science*, *50*(11), 1477-1490. doi:10.1287/mnsc.1030.0136

Lindgreen, A., & Wynstra, F. (2005). Value in business markets: What do we know? Where are we going? *Industrial Marketing Management*, *34*(7), 732-748. doi:10.1016/j.indmarman.2005.01.001

Lööf, H., & Heshmati, A. (2002). Knowledge capital and performance heterogeneity: : A firm-level innovation study. *International Journal of Production Economics*, *76*(1), 61-85. doi:10.1016/S0925-5273(01)00147-5

Lumpkin, G., & Dess, G. (1996). Clarifying the Entrepreneurial Orientation Construct and Linking it to Performance. *Academy of Management Review*, *21*(1), 135-172.

Lumpkin, G., & Dess, G. (2001). Linking two dimensions of entrepreneurial orientation to firm performance: The moderating role of environment and industry life cycle. *Journal of Business Venturing*, *16*(5), 429-451.

Mairesse, J., & Kremp, E. (1993). A look at productivity at the firm level in eight French service industries. *Journal of Productivity Analysis*, *4*(1), 211-234. doi:10.1007/BF01073474

Mairesse, J., & Sassenou, M. (1991). R&D Productivity: A Survey of Econometric Studies at the Firm Level. In *Science-Technology, Industry Review* (Vol. 8, pp. 9-43). Paris: OECD.

Matthyssens, P., & Vandenbempt, K. (2008). Moving from basic offerings to value-added solutions: Strategies, barriers and alignment. *Industrial Marketing Management*, *37*(3), 316-328. doi:10.1016/j.indmarman.2007.07.008

Matthyssens, P., Vandenbempt, K., & Berghman, L. (2006). Value innovation in business markets: Breaking the industry recipe. *Industrial Marketing Management*, *35*(6), 751-761.

McEvily, B., & Zaheer, A. (1999). Bridging Ties: A Source of Firm Heterogeneity in Competitive Capabilities. *Strategic Management Journal*, *20*(12), 1133-1156.

Moody, J., & White, D. R. (2003). Structural Cohesion and Embeddedness: A Hierarchical Concept of Social Groups. *American Sociological Review*, *68*(1), 103-127. doi:10.2307/3088904

Moran, P. (2005). Structural vs. relational embeddedness: social capital and managerial performance. *Strategic Management Journal*, *26*(12), 1129-1151. doi:10.1002/smj.486

Nahapiet, J., & Ghoshal, S. (1998). Social Capital, Intellectual Capital, and the Organizational Advantage. *The Academy of Management Review*, *23*(2), 242-266. doi:10.2307/259373

Narver, J., & Slater, S. (1990). The effect of a market orientation on business profitability. *Journal of Marketing*, *54*(4), 20. doi:10.2307/1251757

Nijhof, W., & Streumer, J. (1998). New roles and training models for managers in the printing and communications industry in the Netherlands. *International Journal of Training & Development*, *2*(3), 215.

Oakey, R., Rothwell, R., & Cooper, S. (1988). *The Management of Innovation in High Technology Small Firms*. London: Printer.

Oke, A., Burke, G., & Myers, A. (2007). Innovation types and performance in growing UK SMEs. *International Journal of Operations & Production Management*, *27*(7), 735-753. doi:10.1108/01443570710756974

Parsons, T. (1951). *The Social System*. New York: The Free Press.

Porter, M. (1996). What Is Strategy? *Harvard Business Review*, *74*(6), 61-78.

Pratten, C. (1991). *The Competitiveness of Small Firms*. London: Cambridge University Press.

Rammer, C., Czarnitzki, D., & Spielkamp, A. (2009). Innovation success of non-R&D-performers: substituting technology by management in SMEs. *Small Business Economics*, *33*(1), 35-58. doi:10.1007/s11187-009-9185-7

Rangan, V. K., & Bowman, G. T. (1992). Beating the commodity magnet. *Industrial Marketing Management*, *21*(3), 215-224. doi:10.1016/0019-8501(92)90018-O

Rogers, M. (1995). *Diffusion of Innovations, Fourth Edition* (4th ed.). Free Press.

Rogers, M. (1998). The definition and measurement of innovation. *Melbourne Institute Working Paper No. 10/98*.

Rogers, M. (2004). Networks, Firm Size and Innovation. *Small Business Economics*, *22*(2), 141-153. doi:10.1023/B:SBEJ.0000014451.99047.69

Romo, F. P., & Schwartz, M. (1995). The Structural Embeddedness of Business Decisions: The Migration of Manufacturing Plants in New York State, 1960 to 1985. *American Sociological Review*, *60*(6), 874. doi:10.2307/2096431

Rowley, T., Behrens, D., & Krackhardt, D. (2000). Redundant governance structures: an analysis of structural and relational embeddedness in the steel and semiconductor industries. *Strategic Management Journal*, *21*(3), 369-386. doi:10.1002/(SICI)1097-0266(200003)21:3<369::AID-SMJ93>3.0.CO;2-M

Schuman, H., & Presser, S. (1996). *Questions and answers in attitude surveys*. SAGE.

Sels, L., De Winne, S., Maes, J., Delmotte, J., Faems, D., & Forrier, A. (2006). Unravelling the HRM-Performance Link: Value-Creating and Cost-Increasing Effects of Small Business HRM*. *Journal of Management Studies*, *43*(2), 319-342. doi:10.1111/j.1467-6486.2006.00592.x

Shane, S. (2000). Prior knowledge and the discovery of entrepreneurial opportunities. *Organization Science*, *11*(4), 448-469. doi:10.1287/orsc.11.4.448.14602

Soete, L. L. G. (1979). Firm size and inventive activity : The evidence reconsidered. *European Economic Review*, *12*(4), 319-340. doi:10.1016/0014-2921(79)90024-2

Song, X. M., & Parry, M. E. (1996). What separates Japanese new product winners from losers. *Journal of Product Innovation Management*, *13*(5), 422-439. doi:10.1016/0737-6782(96)00055-0

Sood, A., & Tellis, G. (2005). Technological Evolution and Radical Innovation. *Journal of Marketing*, *69*(3), 152-168.

Stopford, J. M., & Baden-Fuller, C. W. F. (1994). Creating corporate entrepreneurship. *Strategic Management Journal*, *15*(7), 521-536. doi:10.1002/smj.4250150703

Straub, D. (1989). Validating Instruments in MIS Research. *MIS Quarterly*, *13*(2), 147-169. doi:10.2307/248922

Tin, K. L. (2005, January). Measuring Innovation Performance. Information Services Division, National Library Board, Singapore. Retrieved from http://www.nl.sg/ShowBinary/BEA Repository/NL/Services/ResearchServices/pdfInnovation

Tsai, W. (2001). Knowledge Transfer in Intraorganizational Networks: Effects of Network Position and Absorptive Capacity on Business Unit Innovation and Performance. *The Academy of Management Journal*, *44*(5), 996-1004. doi:10.2307/3069443

Tsai, W., & Ghoshal, S. (1998). Social Capital and Value Creation: The Role of Intrafirm Networks. *The Academy of Management Journal*, *41*(4), 464-476. doi:10.2307/257085

Ulaga, W., & Eggert, A. (2006). Value-Based Differentiation in Business Relationships: Gaining and Sustaining Key Supplier Status. *Journal of Marketing*, *70*(1), 119-136. doi:10.1509/jmkg.2006.70.1.119

Uzzi, B. (1996). The Sources and Consequences of Embeddedness for the Economic Performance of Organizations: The Network Effect. *American Sociological Review*, *61*(4), 674-698. doi:10.2307/2096399

Uzzi, B. (1997). Social Structure and Competition in Interfirm Networks: The Paradox of Embeddedness. *Administrative Science Quarterly*, *42*(1), 35-67. doi:10.2307/2393808

Välimäki, H., Niskanen, A., Tervonen, K., & Laurila, I. (2004). Indicators of innovativeness and enterprise competitiveness in the wood products industry in finland. *Scandinavian Journal of Forest Research*, *19*(6 supp 5), 90. doi:10.1080/02827580410017898

7 Appendix

7.1 Questionnaire (Dutch)

1 Uw huidige bedrijfskarakteristieken

1 Bedrijfsnaam

2 Maakt het bedrijf deel uit van een groep? Indien ja, aub specificeren.

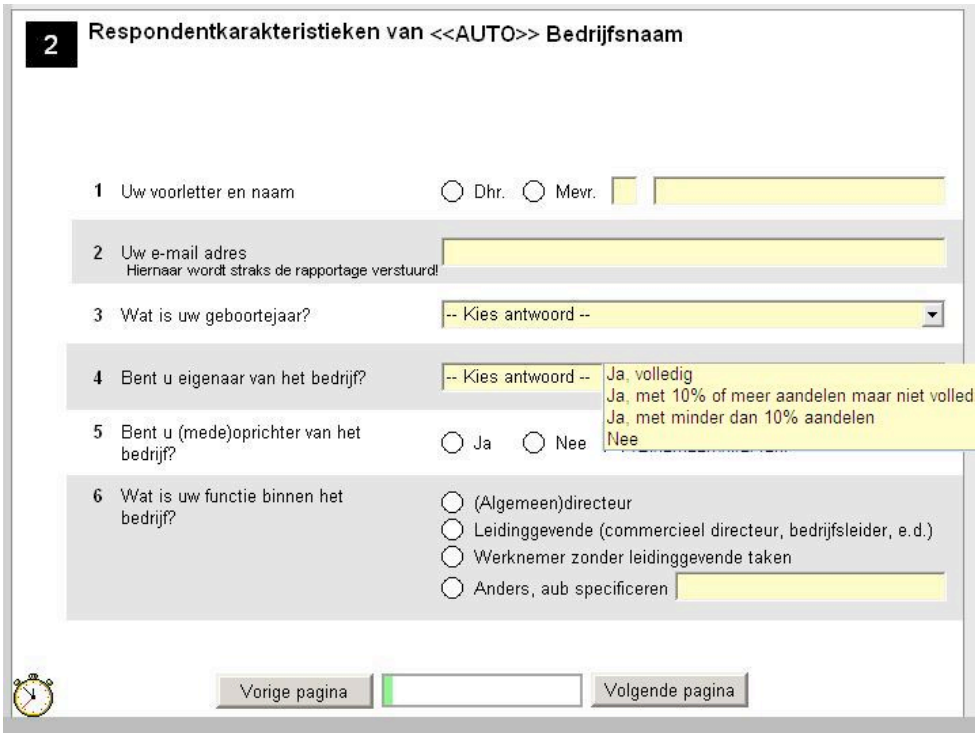
3 Hoofdactiviteit van bedrijf — -- Kies antwoord met grootste deel aan omzet --

4 Oprichtingsjaar van het bedrijf

5 Bedrijfsgrootte (in aantal fulltimerequivalent)

Grafische voorbereiding: (litho's, clichés, zetwerk, DTP etc)
Drukwerk: kranten, inclusief huis-aan-huisbladen
Drukwerk: tijdschriften (familie-, rtv-, vak-, opiniebladen, etc.)
Drukwerk: boeken / jaarverslagen etc. (incl. losbladige systeme
Drukwerk: verpakkingsdrukwerk (etiketten, labels, dozen, etc.)
Drukwerk: reclamedrukwerk w.o. handelscatalogi
Drukwerk: formulieren (inclusief kettingformulieren)
Drukwerk: handelsdrukwerk (div. soorten drukw. in kleine oplage
Drukwerk: anders
Grafische afwerking: boeken en boekachtige producten
Grafische afwerking: tijdschriften en tijdschriftachtige producten
Grafische afwerking: reclamedrukwerk
Grafische afwerking: anders
Geen overheersend drukwerk
Geen overheersende afwerkactiviteit

Vorige pagina



2 Respondentkarakteristieken van <<AUTO>> Bedrijfsnaam

1 Uw voorletter en naam — Dhr. / Mevr.

2 Uw e-mail adres
Hiernaar wordt straks de rapportage verstuurd!

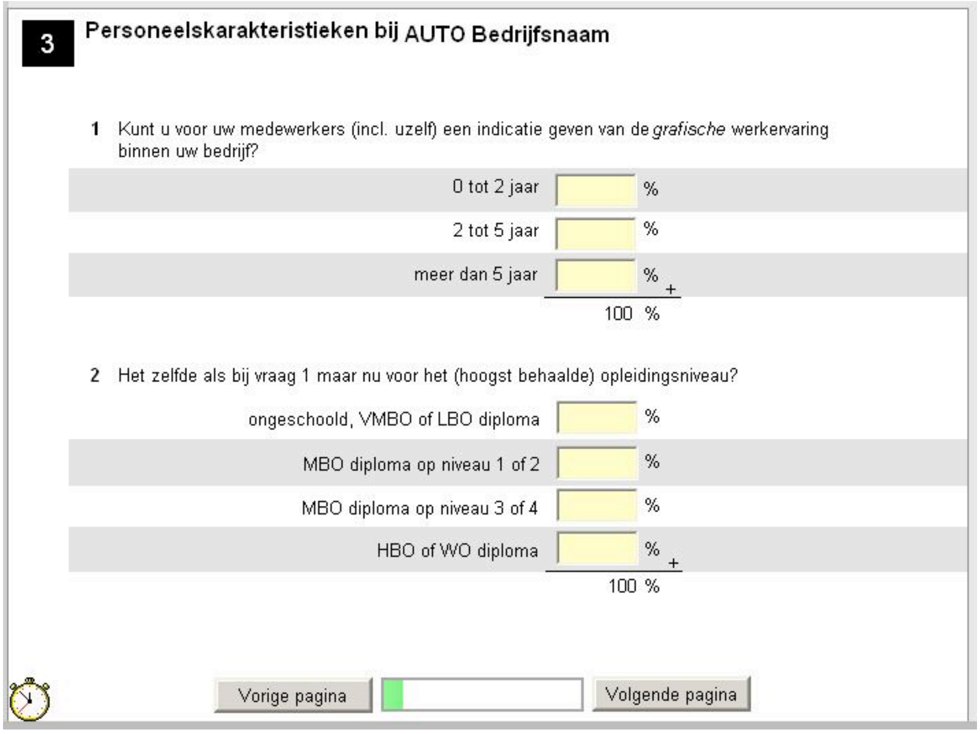
3 Wat is uw geboortejaar? — -- Kies antwoord --

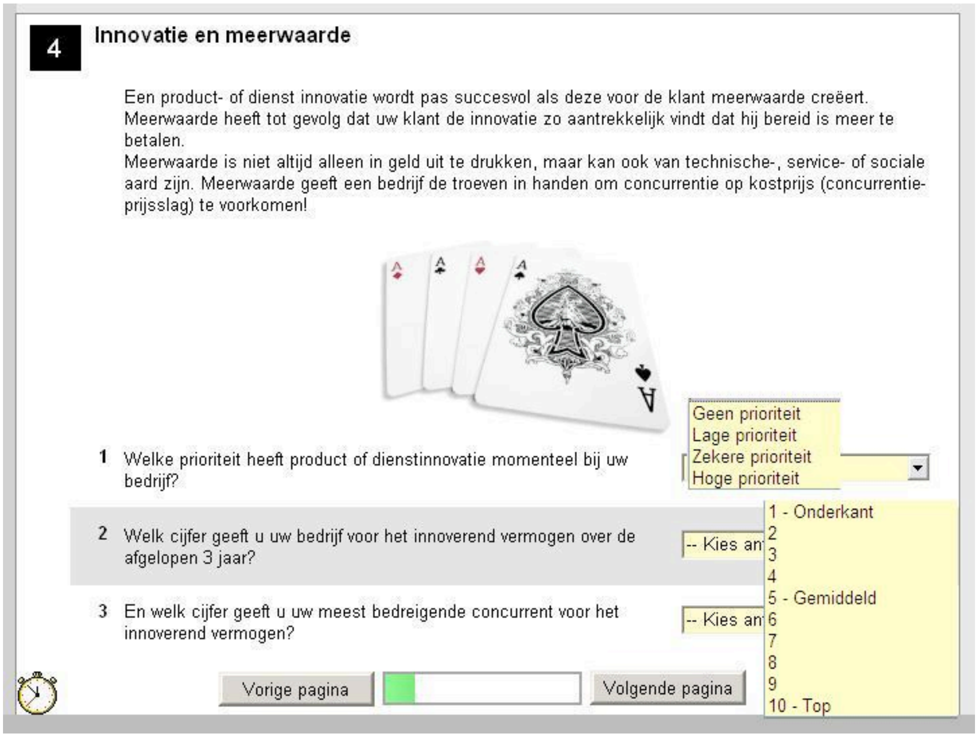
4 Bent u eigenaar van het bedrijf? — -- Kies antwoord --
Ja, volledig
Ja, met 10% of meer aandelen maar niet volled
Ja, met minder dan 10% aandelen
Nee

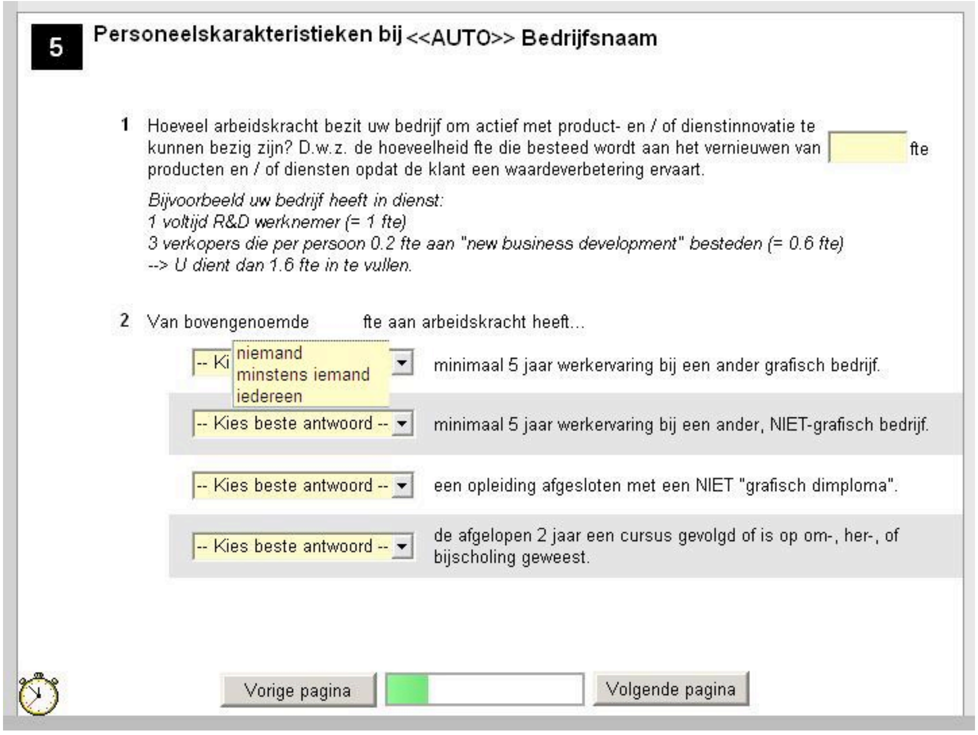
5 Bent u (mede)oprichter van het bedrijf? — Ja / Nee

6 Wat is uw functie binnen het bedrijf?
(Algemeen)directeur
Leidinggevende (commercieel directeur, bedrijfsleider, e.d.)
Werknemer zonder leidinggevende taken
Anders, aub specificeren

Vorige pagina — Volgende pagina


3
Personeelskarakteristieken bij AUTO Bedrijfsnaam
1 Kunt u voor uw medewerkers (incl. uzelf) een indicatie geven van de *grafische* werkervaring binnen uw bedrijf?
0 tot 2 jaar %
2 tot 5 jaar %
meer dan 5 jaar % +
100 %
2 Het zelfde als bij vraag 1 maar nu voor het (hoogst behaalde) opleidingsniveau?
ongeschoold, VMBO of LBO diploma %
MBO diploma op niveau 1 of 2 %
MBO diploma op niveau 3 of 4 %
HBO of WO diploma % +
100 %
Vorige pagina
Volgende pagina


4
Innovatie en meerwaarde
Een product- of dienst innovatie wordt pas succesvol als deze voor de klant meerwaarde creëert. Meerwaarde heeft tot gevolg dat uw klant de innovatie zo aantrekkelijk vindt dat hij bereid is meer te betalen.
Meerwaarde is niet altijd alleen in geld uit te drukken, maar kan ook van technische-, service- of sociale aard zijn. Meerwaarde geeft een bedrijf de troeven in handen om concurrentie op kostprijs (concurrentie-prijsslag) te voorkomen!
1 Welke prioriteit heeft product of dienstinnovatie momenteel bij uw bedrijf?
Geen prioriteit
Lage prioriteit
Zekere prioriteit
Hoge prioriteit
2 Welk cijfer geeft u uw bedrijf voor het innoverend vermogen over de afgelopen 3 jaar?
-- Kies an
1 - Onderkant
2
3
4
5 - Gemiddeld
6
7
8
9
10 - Top
3 En welk cijfer geeft u uw meest bedreigende concurrent voor het innoverend vermogen?
-- Kies an
Vorige pagina
Volgende pagina


5 **Personeelskarakteristieken bij <<AUTO>> Bedrijfsnaam**

1 Hoeveel arbeidskracht bezit uw bedrijf om actief met product- en / of dienstinnovatie te kunnen bezig zijn? D.w.z. de hoeveelheid fte die besteed wordt aan het vernieuwen van producten en / of diensten opdat de klant een waardeverbetering ervaart. fte

Bijvoorbeeld uw bedrijf heeft in dienst:
1 voltijd R&D werknemer (= 1 fte)
3 verkopers die per persoon 0.2 fte aan "new business development" besteden (= 0.6 fte)
--> U dient dan 1.6 fte in te vullen.

2 Van bovengenoemde fte aan arbeidskracht heeft...

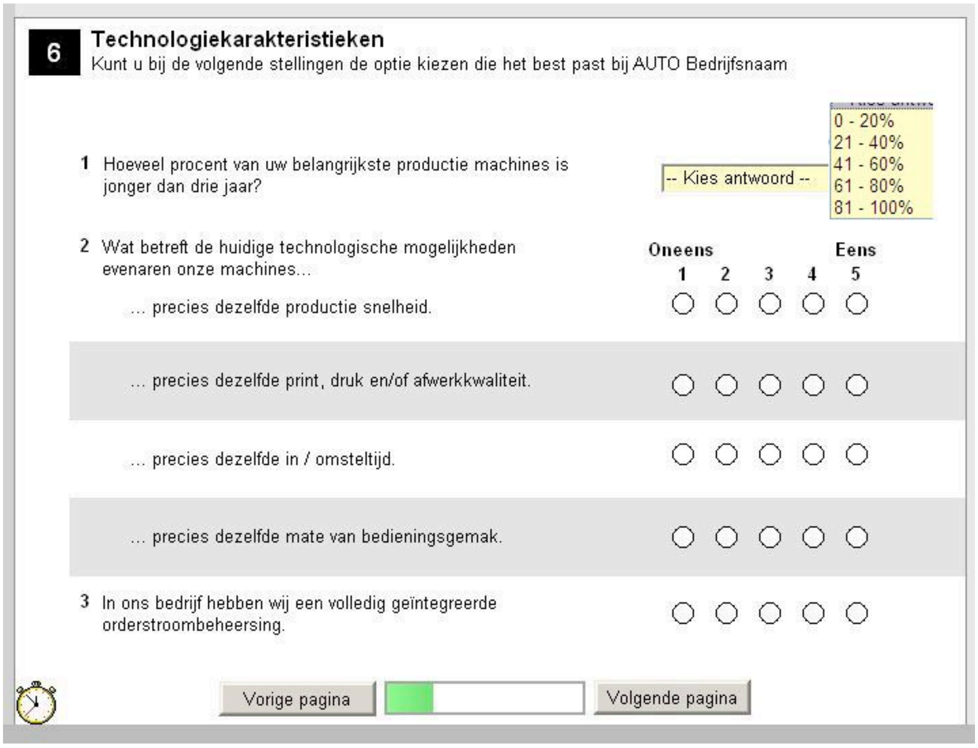
-- Ki niemand / minstens iemand / iedereen — minimaal 5 jaar werkervaring bij een ander grafisch bedrijf.

-- Kies beste antwoord -- minimaal 5 jaar werkervaring bij een ander, NIET-grafisch bedrijf.

-- Kies beste antwoord -- een opleiding afgesloten met een NIET "grafisch dimploma".

-- Kies beste antwoord -- de afgelopen 2 jaar een cursus gevolgd of is op om-, her-, of bijscholing geweest.

Vorige pagina | Volgende pagina


6 **Technologiekarakteristieken**
Kunt u bij de volgende stellingen de optie kiezen die het best past bij AUTO Bedrijfsnaam

1 Hoeveel procent van uw belangrijkste productie machines is jonger dan drie jaar? -- Kies antwoord -- (0 - 20% / 21 - 40% / 41 - 60% / 61 - 80% / 81 - 100%)

2 Wat betreft de huidige technologische mogelijkheden evenaren onze machines...

	Oneens 1	2	3	4	Eens 5
... precies dezelfde productie snelheid.	○	○	○	○	○
... precies dezelfde print, druk en/of afwerkkwaliteit.	○	○	○	○	○
... precies dezelfde in / omsteltijd.	○	○	○	○	○
... precies dezelfde mate van bedieningsgemak.	○	○	○	○	○
3 In ons bedrijf hebben wij een volledig geïntegreerde orderstroombeheersing.	○	○	○	○	○

Vorige pagina | Volgende pagina

7 **Innovatieklimaat**
Kunt u bij de volgende stellingen de optie kiezen die het best past bij AUTO Bedrijfsnaam
(1=Oneens, 7=Eens)

		Oneens 1	2	3	4	5	6	Eens 7
1	Mensen zijn emotioneel sterk betrokken in gestelde doelen.	○	○	○	○	○	○	○
2	Mensen hebben veel vrijheid om hun eigen werk te bepalen.	○	○	○	○	○	○	○
3	Er is zeer veel vertrouwen tussen mensen.	○	○	○	○	○	○	○
4	Men krijgt veel tijd om nieuwe ongeplande ideeën te ontwikkelen.	○	○	○	○	○	○	○
5	De sfeer is erg ongedwongen.	○	○	○	○	○	○	○

Vorige pagina | Volgende pagina

8 **Innovatieklimaat**
Kunt u bij de volgende stellingen de optie kiezen die het best past bij AUTO Bedrijfsnaam
(1=Oneens, 7=Eens)

		Oneens 1	2	3	4	5	6	Eens 7
1	Conflicten komen erg vaak voor.	○	○	○	○	○	○	○
2	Er is sterke ondersteuning voor verdere ontwikkeling van nieuwe ideeën.	○	○	○	○	○	○	○
3	Mensen zijn zeer betrokken in discussies rondom verschillende standpunten.	○	○	○	○	○	○	○
4	Hoog risico nemend gedrag wordt getolereerd.	○	○	○	○	○	○	○

Vorige pagina | Volgende pagina

9 **Markt Oriëntatie**
Kunt u bij de volgende stellingen de optie kiezen die het best past bij AUTO Bedrijfsnaam
(1=Oneens, 7=Eens)

		Oneens 1	2	3	4	5	6	Eens 7
1	Onze verkoop (/-afdeling) maakt binnen ons bedrijf regelmatig informatie bekend over de strategie van de concurrentie.	○	○	○	○	○	○	○
2	Onze zakelijke doelstellingen worden primair bepaald door klanttevredenheid.	○	○	○	○	○	○	○
3	Wij reageren uiterst snel op bedreigende acties van concurrenten.	○	○	○	○	○	○	○
4	Wij evalueren voortdurend het klanttevredenheidsniveau.	○	○	○	○	○	○	○
5	Alle directieleden bezoeken regelmatig de huidige en potentiële klanten.	○	○	○	○	○	○	○

Vorige pagina | Volgende pagina

10 **Markt Oriëntatie**
Kunt u bij de volgende stellingen de optie kiezen die het best past bij AUTO Bedrijfsnaam
(1=Oneens, 7=Eens)

		Oneens 1	2	3	4	5	6	Eens 7
1	Wij communiceren naar iedere afdeling openlijk over succesvolle maar ook onsuccesvolle klantervaringen.	○	○	○	○	○	○	○
2	Onze strategie om concurrentievoordeel te behalen is gebaseerd op het inspelen op klantbehoeften.	○	○	○	○	○	○	○
3	Al onze afdelingen (b.v. verkoop, productie, financiën, etc.) zijn gebundeld om in dienst te staan van onze doelgroep.	○	○	○	○	○	○	○
4	Meerwaarde creëren voor onze klanten is het uitgangspunt van onze bedrijfsstrategie.	○	○	○	○	○	○	○
5	Wij meten de klanttevredenheid systematisch en frequent.	○	○	○	○	○	○	○

Vorige pagina | Volgende pagina

11 **Markt Oriëntatie**
Kunt u bij de volgende stellingen de optie kiezen die het best past bij AUTO Bedrijfsnaam
(1=Oneens, 7=Eens)

		N.V.T.	Oneens 1	2	3	4	5	6	Eens 7
1	Wij schenken veel aandacht aan "after sales".		○	○	○	○	○	○	○
2	De directie bespreekt vaak de (slag)kracht en de strategie van de concurrentie.		○	○	○	○	○	○	○
3	Iedere leidinggevende binnen ons bedrijf begrijpt hoe iedereen kan bijdragen aan het creëren van meerwaarde voor onze klanten.		○	○	○	○	○	○	○
4	Wij richten ons alleen op klanten waar we kans maken op concurrentievoordeel.		○	○	○	○	○	○	○
5	Wij delen onze middelen (=resources) met andere vestigingen.	○	○	○	○	○	○	○	○

Vorige pagina | Volgende pagina

12 **Ondernemerschapsoriëntatie**
Kunt u bij de volgende stellingen de optie kiezen die het best past bij AUTO Bedrijfsnaam
(1=Oneens, 7=Eens)

		Oneens 1	2	3	4	5	6	Eens 7
1	Typerend voor ons bedrijf is dat wij acties initiëren waarop de concurrentie reageert.	○	○	○	○	○	○	○
2	Ons bedrijf is zelden de eerste die innovaties introduceert.	○	○	○	○	○	○	○
3	Wat betreft de introductie van nieuwe producten of ideeën heeft onze directie de neiging om de marktleider te volgen.	○	○	○	○	○	○	○
4	Over het algemeen legt de directie een sterke nadruk op R&D, technisch leiderschap en innovatie.	○	○	○	○	○	○	○
5	Ons bedrijf heeft de afgelopen 5 jaar heel veel innovaties op de markt gezet.	○	○	○	○	○	○	○
6	In ons bedrijf zijn verandering in productlijnen of dienstensoorten meestal erg ingrijpend.	○	○	○	○	○	○	○

Vorige pagina | Volgende pagina

13 Ondernemerschapsoriëntatie

Kunt u bij de volgende stellingen de optie kiezen die het best past bij AUTO Bedrijfsnaam (1=Oneens, 7=Eens)

		Oneens 1	2	3	4	5	6	Eens 7
1	Ons bedrijf heeft de voorkeur voor risicovolle projecten (met de kans op hoge opbrengsten).	○	○	○	○	○	○	○
2	Vanwege de omgeving waarin wij opereren zijn er ingrijpende en risicovolle acties nodig om de doelstellingen van ons bedrijf te halen.	○	○	○	○	○	○	○
3	In onzekere situaties zetten wij alles op alles om er zeker van te zijn dat we kansen benutten.	○	○	○	○	○	○	○
4	Ons bedrijf heeft ook als doelstelling (impliciet of expliciet) om de concurrentie hard aan te pakken.	○	○	○	○	○	○	○
5	In vergelijking met onze concurrenten is ons bedrijf uiterst agressief en intens competitief.	○	○	○	○	○	○	○

Vorige pagina | Volgende pagina

-- Netwerk analyse

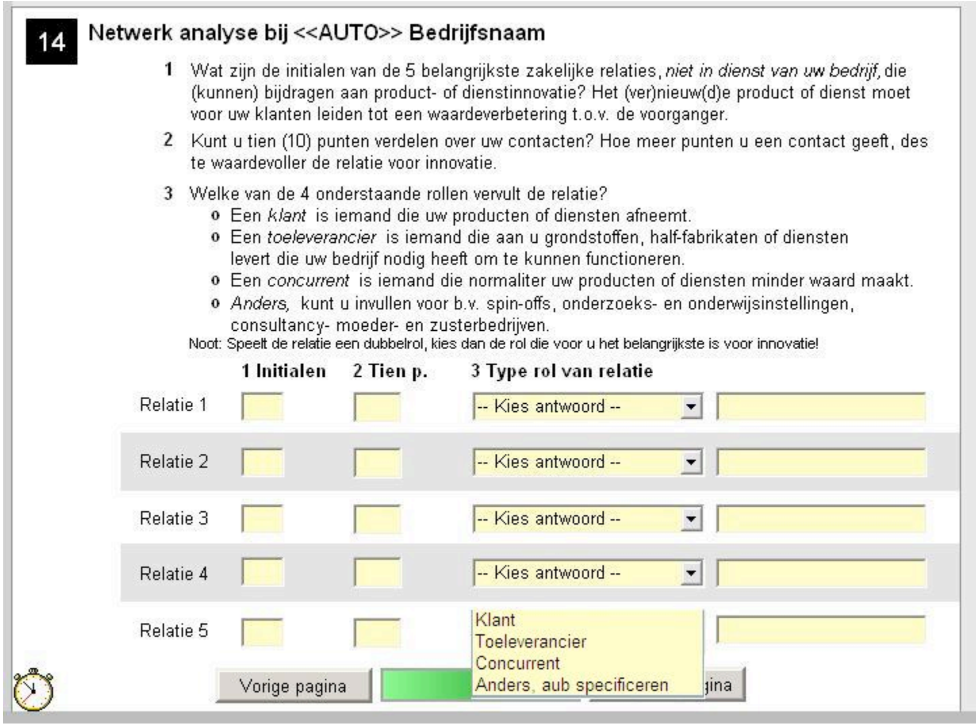
Ideeën voor innovatie komen niet uit de lucht vallen. Onderzoek heeft aangetoond dat ieder bedrijf circa 10 relaties bezit die bijdragen aan innovatie. Voorbeelden zijn:

- Een toeleverancier die het mogelijk maakt dat u beter gepersonaliseerde producten kunt verkopen.
- Een klant die steeds tegen een probleem aanloopt wat u met wat aanpassingen kunt oplossen.
- Een concurrent die zijn en uw verkoopkrachten wil bundelen.
- Of simpelweg een consultant met goede ideeën.

Deze relaties zijn ongezien erg belangrijk. Zij maken het mogelijk uw producten of diensten te vernieuwen en zodoende meerwaarde te genereren voor klanten.

"Vandaag de dag draait het leven niet meer om wie je bent, maar wie je kent"

Vorige pagina | Volgende pagina



14 **Netwerk analyse bij <<AUTO>> Bedrijfsnaam**

1 Wat zijn de initialen van de 5 belangrijkste zakelijke relaties, *niet in dienst van uw bedrijf,* die (kunnen) bijdragen aan product- of dienstinnovatie? Het (ver)nieuw(d)e product of dienst moet voor uw klanten leiden tot een waardeverbetering t.o.v. de voorganger.

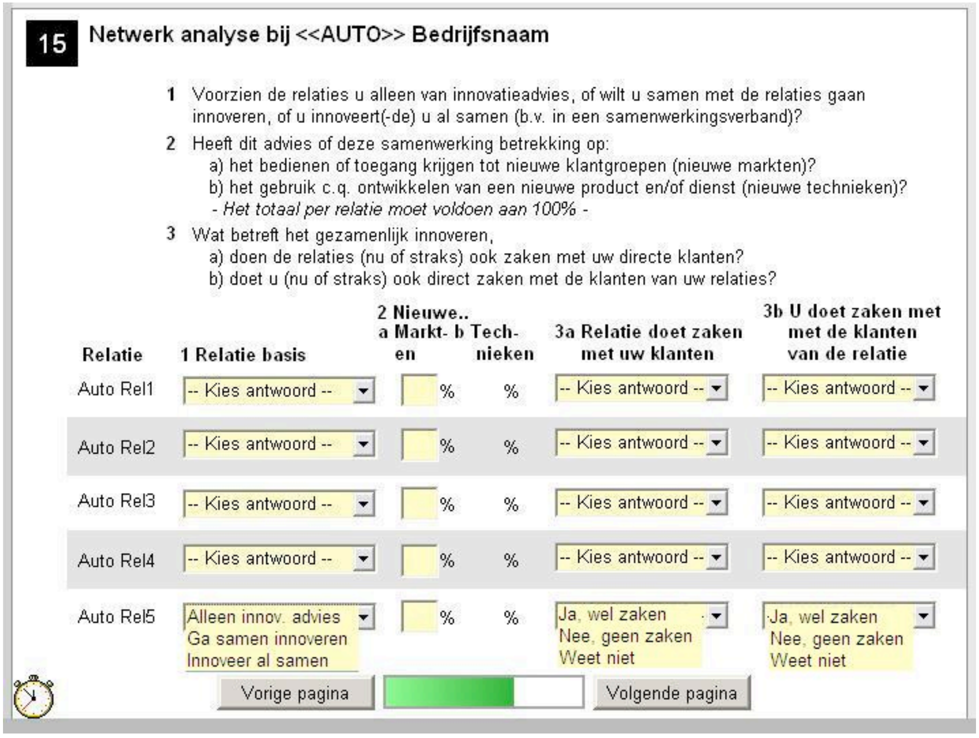
2 Kunt u tien (10) punten verdelen over uw contacten? Hoe meer punten u een contact geeft, des te waardevoller de relatie voor innovatie.

3 Welke van de 4 onderstaande rollen vervult de relatie?
- Een *klant* is iemand die uw producten of diensten afneemt.
- Een *toeleverancier* is iemand die aan u grondstoffen, half-fabrikaten of diensten levert die uw bedrijf nodig heeft om te kunnen functioneren.
- Een *concurrent* is iemand die normaliter uw producten of diensten minder waard maakt.
- *Anders,* kunt u invullen voor b.v. spin-offs, onderzoeks- en onderwijsinstellingen, consultancy- moeder- en zusterbedrijven.

Noot: Speelt de relatie een dubbelrol, kies dan de rol die voor u het belangrijkste is voor innovatie!

	1 Initialen	2 Tien p.	3 Type rol van relatie	
Relatie 1			-- Kies antwoord --	
Relatie 2			-- Kies antwoord --	
Relatie 3			-- Kies antwoord --	
Relatie 4			-- Kies antwoord --	
Relatie 5			Klant Toeleverancier Concurrent Anders, aub specificeren	

Vorige pagina ... ina



15 **Netwerk analyse bij <<AUTO>> Bedrijfsnaam**

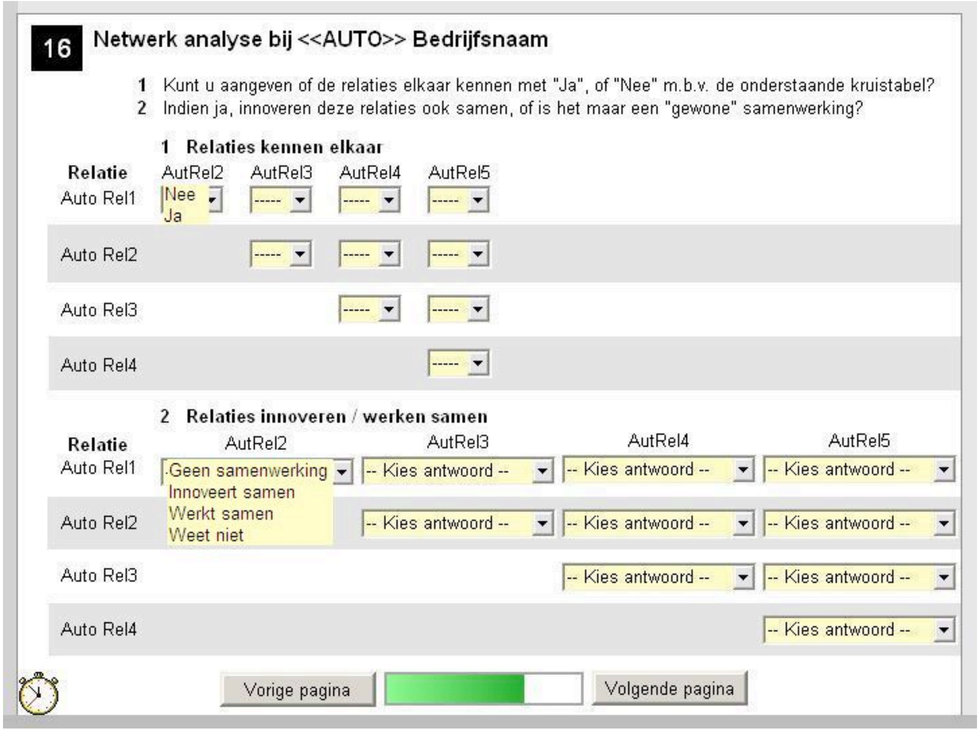
1 Voorzien de relaties u alleen van innovatieadvies, of wilt u samen met de relaties gaan innoveren, of u innoveert(-de) u al samen (b.v. in een samenwerkingsverband)?

2 Heeft dit advies of deze samenwerking betrekking op:
a) het bedienen of toegang krijgen tot nieuwe klantgroepen (nieuwe markten)?
b) het gebruik c.q. ontwikkelen van een nieuwe product en/of dienst (nieuwe technieken)?
- Het totaal per relatie moet voldoen aan 100% -

3 Wat betreft het gezamenlijk innoveren,
a) doen de relaties (nu of straks) ook zaken met uw directe klanten?
b) doet u (nu of straks) ook direct zaken met de klanten van uw relaties?

Relatie	1 Relatie basis	2 Nieuwe.. a Markt-en	b Tech-nieken	3a Relatie doet zaken met uw klanten	3b U doet zaken met met de klanten van de relatie
Auto Rel1	-- Kies antwoord --	%	%	-- Kies antwoord --	-- Kies antwoord --
Auto Rel2	-- Kies antwoord --	%	%	-- Kies antwoord --	-- Kies antwoord --
Auto Rel3	-- Kies antwoord --	%	%	-- Kies antwoord --	-- Kies antwoord --
Auto Rel4	-- Kies antwoord --	%	%	-- Kies antwoord --	-- Kies antwoord --
Auto Rel5	Alleen innov. advies Ga samen innoveren Innoveer al samen	%	%	Ja, wel zaken Nee, geen zaken Weet niet	Ja, wel zaken Nee, geen zaken Weet niet

Vorige pagina Volgende pagina



16 Netwerk analyse bij <<AUTO>> Bedrijfsnaam

1 Kunt u aangeven of de relaties elkaar kennen met "Ja", of "Nee" m.b.v. de onderstaande kruistabel?
2 Indien ja, innoveren deze relaties ook samen, of is het maar een "gewone" samenwerking?

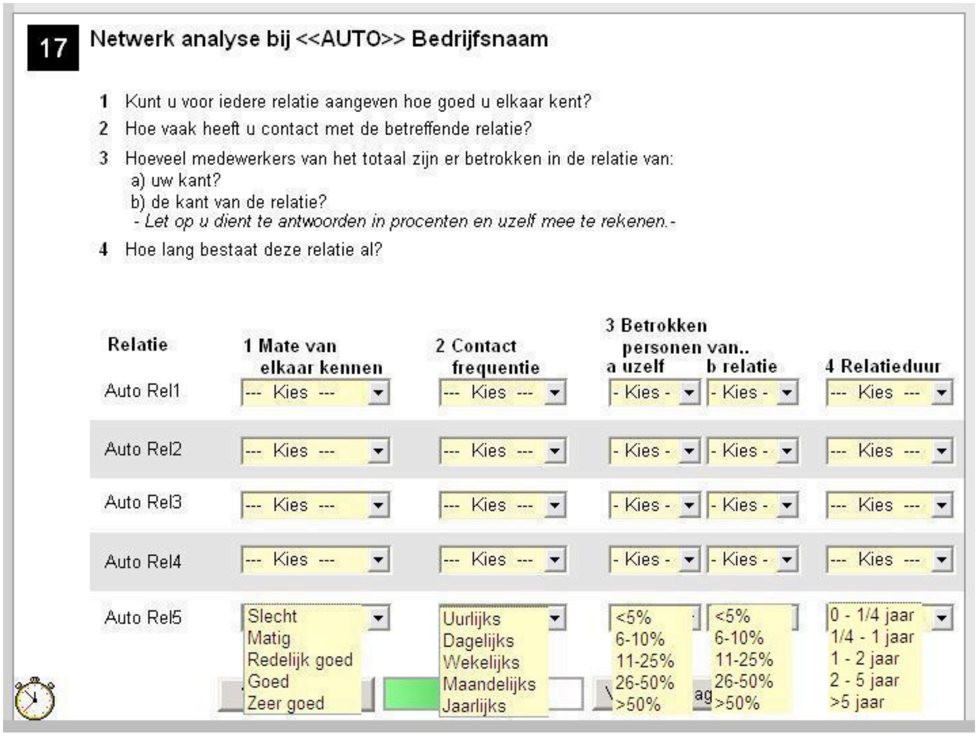
1 Relaties kennen elkaar

Relatie	AutRel2	AutRel3	AutRel4	AutRel5
Auto Rel1	Nee / Ja	-----	-----	-----
Auto Rel2		-----	-----	-----
Auto Rel3			-----	-----
Auto Rel4				-----

2 Relaties innoveren / werken samen

Relatie	AutRel2	AutRel3	AutRel4	AutRel5
Auto Rel1	Geen samenwerking / Innoveert samen / Werkt samen / Weet niet	-- Kies antwoord --	-- Kies antwoord --	-- Kies antwoord --
Auto Rel2		-- Kies antwoord --	-- Kies antwoord --	-- Kies antwoord --
Auto Rel3			-- Kies antwoord --	-- Kies antwoord --
Auto Rel4				-- Kies antwoord --

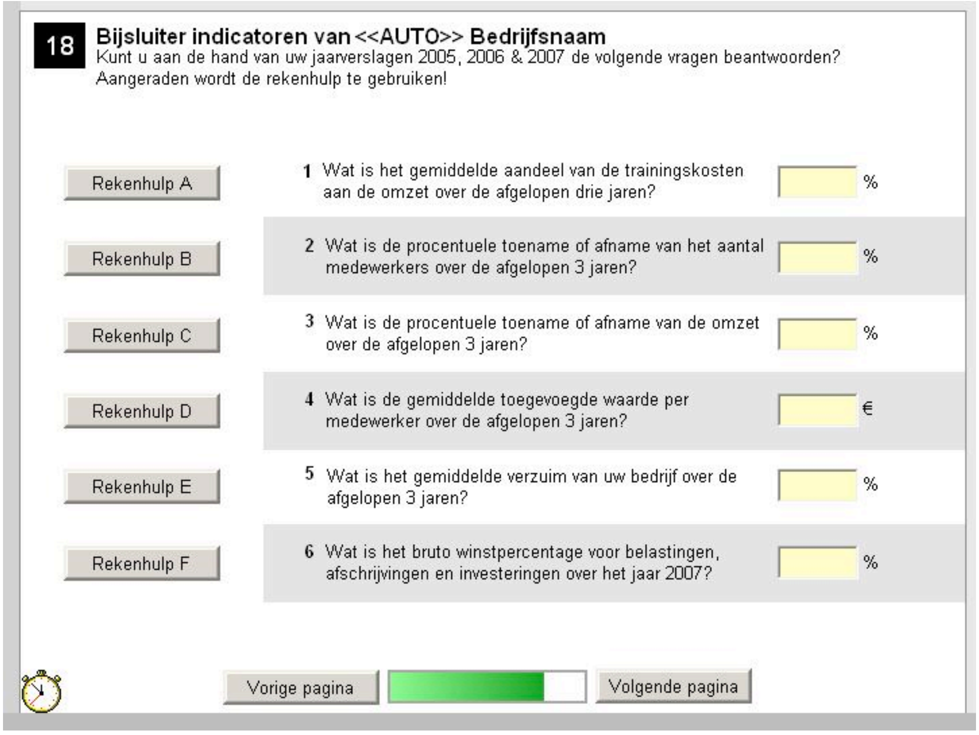
Vorige pagina | Volgende pagina

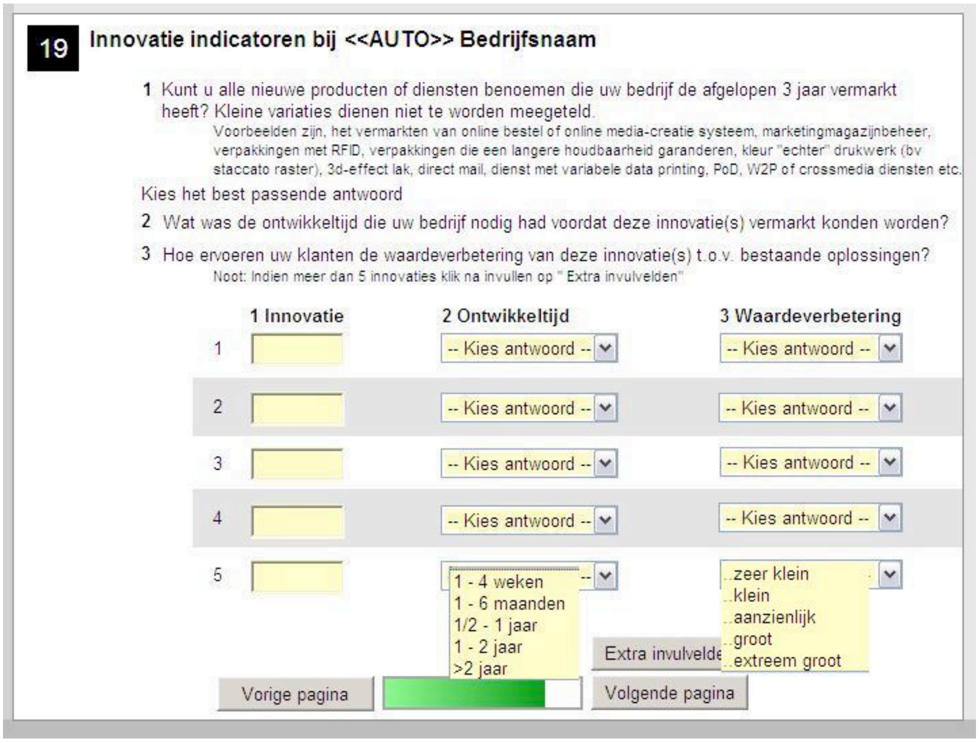


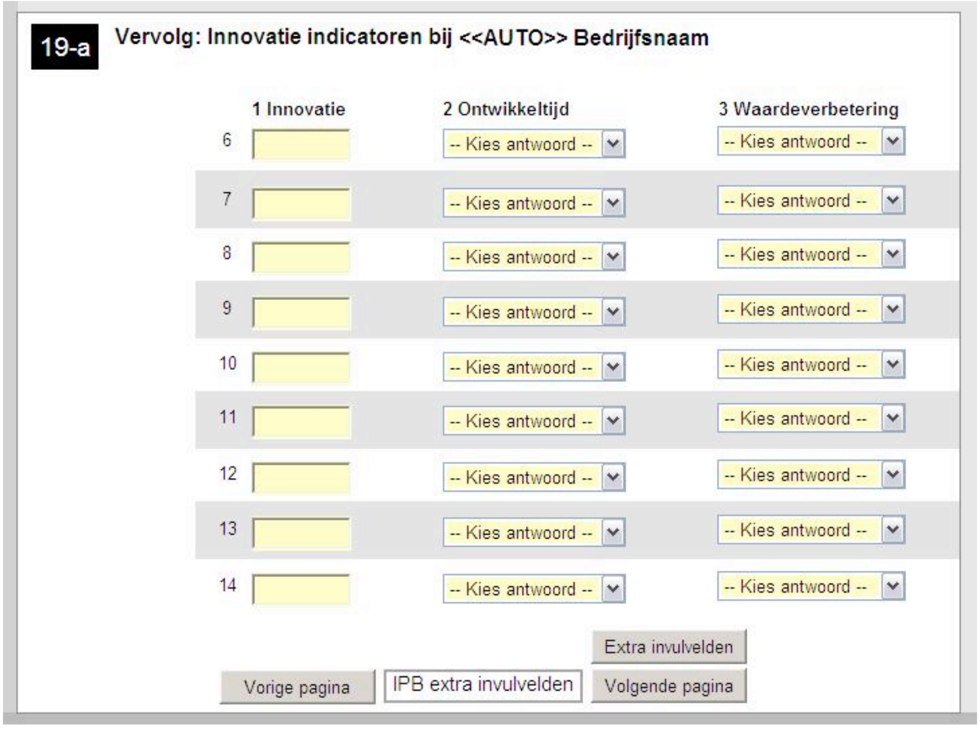
17 Netwerk analyse bij <<AUTO>> Bedrijfsnaam

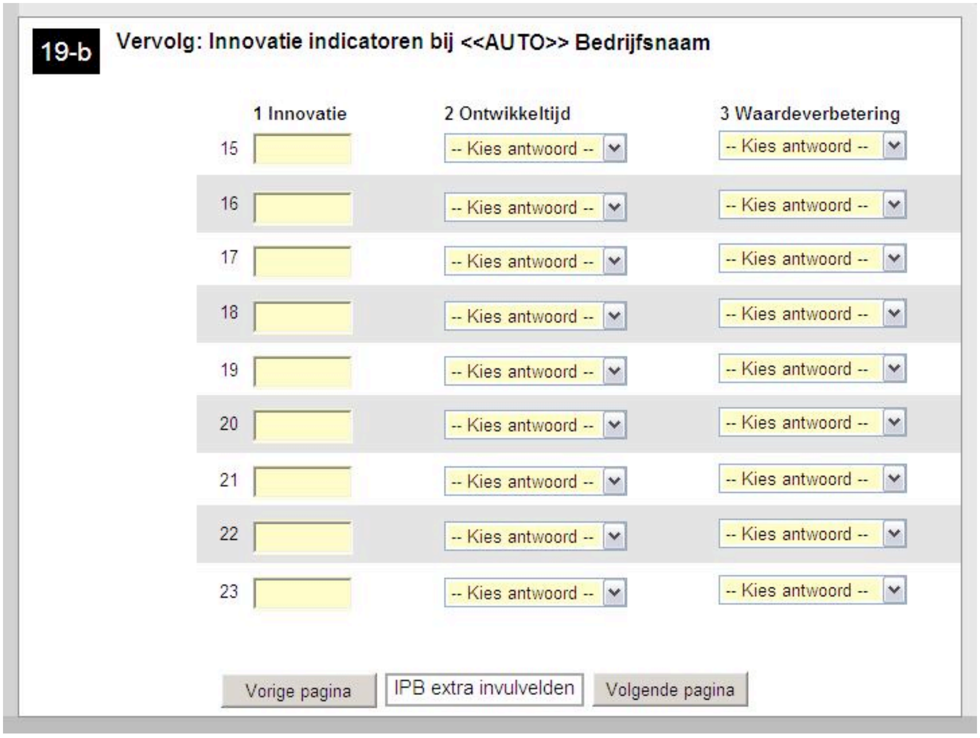
1 Kunt u voor iedere relatie aangeven hoe goed u elkaar kent?
2 Hoe vaak heeft u contact met de betreffende relatie?
3 Hoeveel medewerkers van het totaal zijn er betrokken in de relatie van:
a) uw kant?
b) de kant van de relatie?
- Let op u dient te antwoorden in procenten en uzelf mee te rekenen.-
4 Hoe lang bestaat deze relatie al?

Relatie	1 Mate van elkaar kennen	2 Contact frequentie	3 Betrokken personen van.. a uzelf	b relatie	4 Relatieduur
Auto Rel1	--- Kies ---	--- Kies ---	- Kies -	- Kies -	--- Kies ---
Auto Rel2	--- Kies ---	--- Kies ---	- Kies -	- Kies -	--- Kies ---
Auto Rel3	--- Kies ---	--- Kies ---	- Kies -	- Kies -	--- Kies ---
Auto Rel4	--- Kies ---	--- Kies ---	- Kies -	- Kies -	--- Kies ---
Auto Rel5	Slecht / Matig / Redelijk goed / Goed / Zeer goed	Uurlijks / Dagelijks / Wekelijks / Maandelijks / Jaarlijks	<5% / 6-10% / 11-25% / 26-50% / >50%	<5% / 6-10% / 11-25% / 26-50% / >50%	0 - 1/4 jaar / 1/4 - 1 jaar / 1 - 2 jaar / 2 - 5 jaar / >5 jaar


18
Bijsluiter indicatoren van <<AUTO>> Bedrijfsnaam
Kunt u aan de hand van uw jaarverslagen 2005, 2006 & 2007 de volgende vragen beantwoorden?
Aangeraden wordt de rekenhulp te gebruiken!
Rekenhulp A
1 Wat is het gemiddelde aandeel van de trainingskosten aan de omzet over de afgelopen drie jaren?
%
Rekenhulp B
2 Wat is de procentuele toename of afname van het aantal medewerkers over de afgelopen 3 jaren?
%
Rekenhulp C
3 Wat is de procentuele toename of afname van de omzet over de afgelopen 3 jaren?
%
Rekenhulp D
4 Wat is de gemiddelde toegevoegde waarde per medewerker over de afgelopen 3 jaren?
€
Rekenhulp E
5 Wat is het gemiddelde verzuim van uw bedrijf over de afgelopen 3 jaren?
%
Rekenhulp F
6 Wat is het bruto winstpercentage voor belastingen, afschrijvingen en investeringen over het jaar 2007?
%
Vorige pagina
Volgende pagina


19
Innovatie indicatoren bij <<AUTO>> Bedrijfsnaam
1 Kunt u alle nieuwe producten of diensten benoemen die uw bedrijf de afgelopen 3 jaar vermarkt heeft? Kleine variaties dienen niet te worden meegeteld.
Voorbeelden zijn, het vermarkten van online bestel of online media-creatie systeem, marketingmagazijnbeheer, verpakkingen met RFID, verpakkingen die een langere houdbaarheid garanderen, kleur "echter" drukwerk (bv staccato raster), 3d-effect lak, direct mail, dienst met variabele data printing, PoD, W2P of crossmedia diensten etc.
Kies het best passende antwoord
2 Wat was de ontwikkeltijd die uw bedrijf nodig had voordat deze innovatie(s) vermarkt konden worden?
3 Hoe ervoeren uw klanten de waardeverbetering van deze innovatie(s) t.o.v. bestaande oplossingen?
Noot: Indien meer dan 5 innovaties klik na invullen op " Extra invulvelden"
1 Innovatie
2 Ontwikkeltijd
3 Waardeverbetering
1
2
3
4
5
-- Kies antwoord --
1 - 4 weken
1 - 6 maanden
1/2 - 1 jaar
1 - 2 jaar
>2 jaar
zeer klein
klein
aanzienlijk
groot
extreem groot
Extra invulvelde
Vorige pagina
Volgende pagina


19-a
Vervolg: Innovatie indicatoren bij <<AUTO>> Bedrijfsnaam
1 Innovatie
2 Ontwikkeltijd
3 Waardeverbetering
6
7
8
9
10
11
12
13
14
-- Kies antwoord --
Extra invulvelden
Vorige pagina
IPB extra invulvelden
Volgende pagina


19-b
Vervolg: Innovatie indicatoren bij <<AUTO>> Bedrijfsnaam
1 Innovatie
2 Ontwikkeltijd
3 Waardeverbetering
15
16
17
18
19
20
21
22
23
-- Kies antwoord --
Vorige pagina
IPB extra invulvelden
Volgende pagina

20 **Innovatie indicatoren bij <<AUTO>> Bedrijfsnaam**
Kunt u aan de hand van uw jaarverslagen 2005, 2006 & 2007 de volgende vra(a)g(en) beantwoorden?
Aangeraden wordt de rekenhulp te gebruiken!

Rekenhulp G

1 Wat is het gemiddelde aandeel van R&D kosten aan de totale omzet over de afgelopen 3 jaar? %

Rekenhulp H

2 Wat is het gemiddelde aandeel van nieuw vermarkte producten en / of diensten aan de totale omzet over de afgelopen 3 jaar? %

Uw nieuwe producten en / of diensten zijn:

Vorige pagina | Volgende pagina

21 **Vermarkten van een innovatie bij<<AUTO>> Bedrijfsnaam**

1 Kunt u een product- of dienstinnovatie benoemen die u (wilt) vermarkt(en). Neem bij voorkeur een innovatie waar u relatief hoge verwachtingen van heeft.
- Bij geen innovatie, laat u de invulvelden leeg en klikt u direct op "Volgende pagina" -

...innovatie

2 Kunt u in de onderstaande tabel aangeven of de relaties directe bijdrage lever(d)en aan bovenstaande innovatie? De relatie kan een aanzet of een bijdrage leveren aan het innovatie idee (a), middelen (o.a. arbeid, machines, geld) leveren voor de ontwikkeling (b) en / of de vermarkting (c) ervan. Alle combinaties zijn mogelijk!

Bijdrage van relatie aan innovatie	a) ...idee	b) ...ontwikkeling	c) ...vermarkting
Auto Rel1	☐	☐	☐
Auto Rel2	☐	☐	☐
Auto Rel3	☐	☐	☐
Auto Rel4	☐	☐	☐
Auto Rel5	☐	☐	☐

Vorige pagina | Volgende pagina

22 **Vermarkten van een innovatie**
Kunt u bij de volgende stellingen de optie kiezen die het best past bij AUTO Bedrijfsnaam (1=Oneens, 7=Eens)

Wat betreft de A.INNO innovatie...	Oneens 1	2	3	4	5	6	Eens 7
1 ...is het grootste deel van de klanten totaal nieuw voor ons bedrijf.	○	○	○	○	○	○	○
2 ...is het grootste deel van de concurrentie totaal nieuw voor ons bedrijf.	○	○	○	○	○	○	○
3 ...houdt ons bedrijf zich meer bezig met het verder uitbouwen van afzet bij bestaande klanten dan introductie en vermarkting ervan bij nieuwe klanten.	○	○	○	○	○	○	○
4 ...is prijs het belangrijkste aspect voor het krijgen van opdrachten.	○	○	○	○	○	○	○
5 ...worden de klanten unieke mogelijkheden geboden.	○	○	○	○	○	○	○

Vorige pagina | Volgende pagina

23 **Vermarkten van een innovatie**
Kunt u bij de volgende stellingen de optie kiezen die het best past bij AUTO Bedrijfsnaam (1=Oneens, 7=Eens)

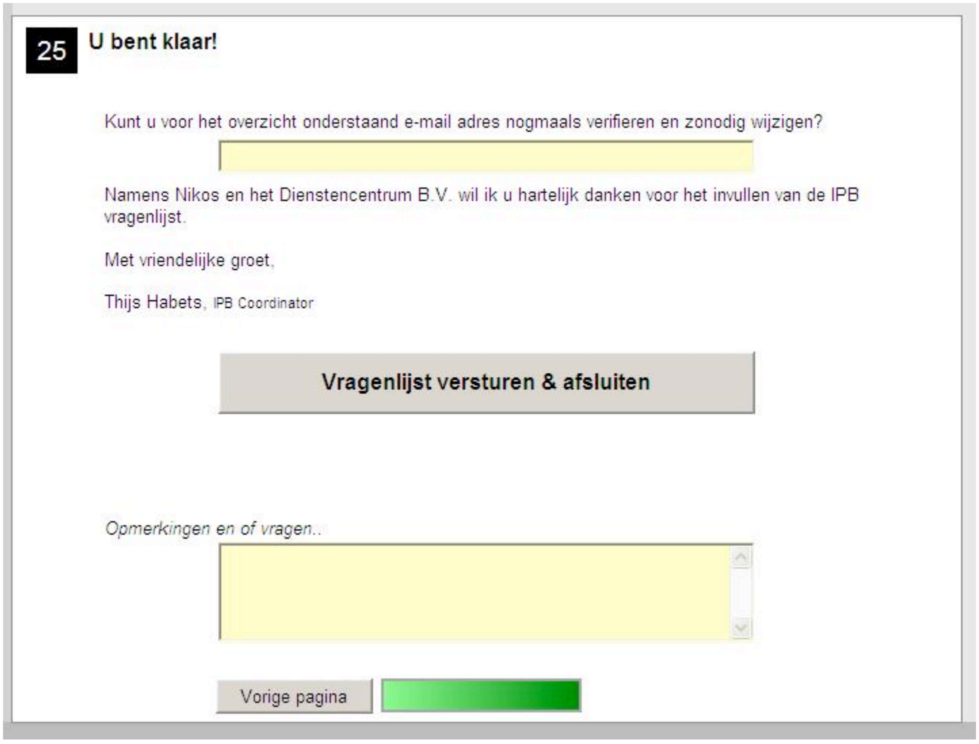
Wat betreft de A. INNOV innovatie...	Oneens 1	2	3	4	5	6	Eens 7
1 ... past perfect bij de laatste veranderingen in klantenwensen.	○	○	○	○	○	○	○
2 ...worden de klanten nauwelijks nog via traditionele methoden benaderd (dus hoofdzakelijk op andere manieren).	○	○	○	○	○	○	○
3 ... moet ons bedrijf veel bedrijfsprocessen veranderen als wij het willen verkopen / produceren.	○	○	○	○	○	○	○
4 ...heeft ons bedrijf voldoende kennis over procestechnieken die voor productie ervan gebruikt kunnen worden.	○	○	○	○	○	○	○
5 ...zijn er niet veel verschillen in technische specificaties met die van de concurrentie.	○	○	○	○	○	○	○

Vorige pagina | Volgende pagina

24 **Vermarkten van een innovatie**
Kunt u bij de volgende stellingen de optie kiezen die het best past bij AUTO Bedrijfsnaam (1=Oneens, 7=Eens)

Wat betreft de A. INNOV innovatie...	Oneens 1	2	3	4	5	6	Eens 7
1 ...is het productieproces of het proces voor het leveren van diensten relatief nieuw voor ons bedrijf.	○	○	○	○	○	○	○
2 ...levert betere prestaties dan vorige / bestaande oplossing(en).	○	○	○	○	○	○	○
3 ...is deze veel gemodificeerd de afgelopen tijd.	○	○	○	○	○	○	○
4 ...is het productieproces of het proces voor het leveren van diensten erg complex.	○	○	○	○	○	○	○

Vorige pagina Volgende pagina



25 **U bent klaar!**

Kunt u voor het overzicht onderstaand e-mail adres nogmaals verifieren en zonodig wijzigen?

Namens Nikos en het Dienstencentrum B.V. wil ik u hartelijk danken voor het invullen van de IPB vragenlijst.

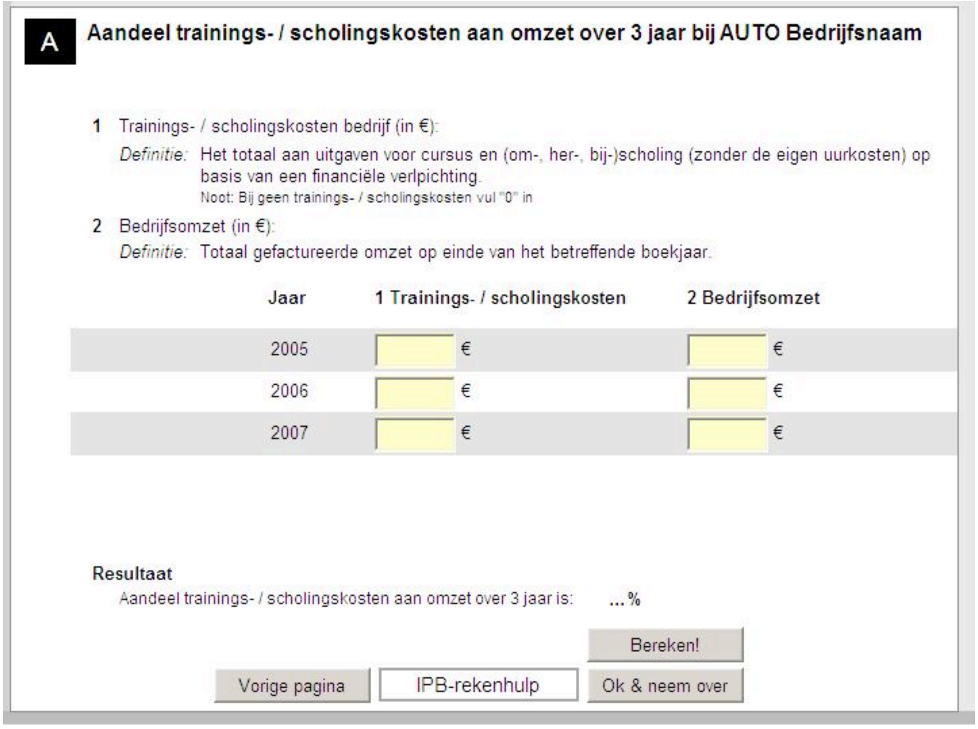
Met vriendelijke groet,

Thijs Habets, IPB Coordinator

Vragenlijst versturen & afsluiten

Opmerkingen en of vragen..

Vorige pagina



A **Aandeel trainings- / scholingskosten aan omzet over 3 jaar bij AUTO Bedrijfsnaam**

1 Trainings- / scholingskosten bedrijf (in €):

Definitie: Het totaal aan uitgaven voor cursus en (om-, her-, bij-)scholing (zonder de eigen uurkosten) op basis van een financiële verlpichting.

Noot: Bij geen trainings- / scholingskosten vul "0" in

2 Bedrijfsomzet (in €):

Definitie: Totaal gefactureerde omzet op einde van het betreffende boekjaar.

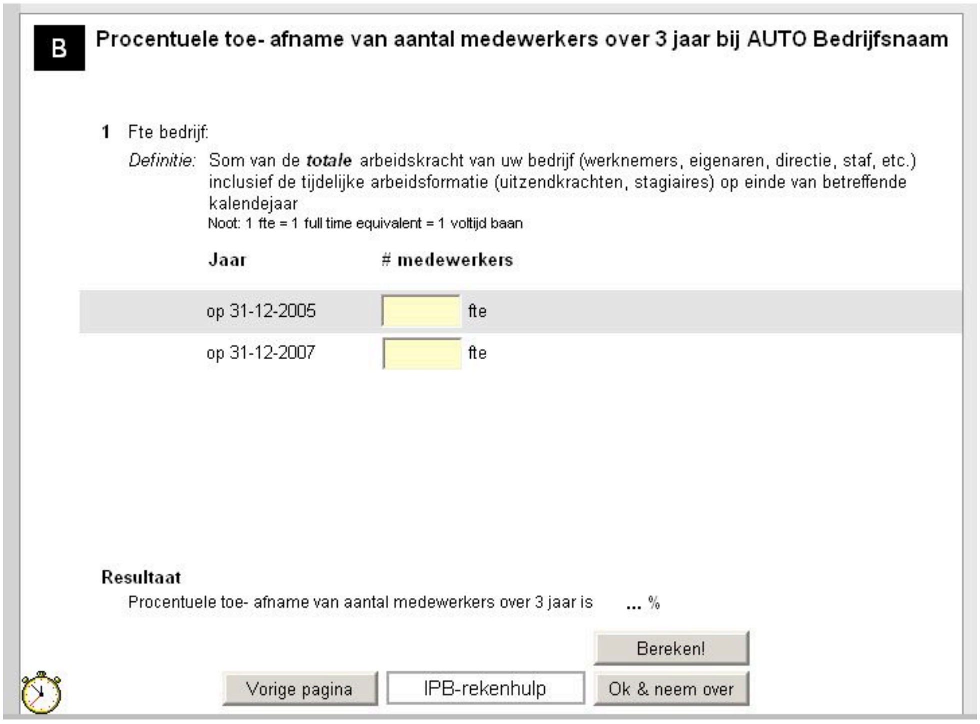
Jaar	1 Trainings- / scholingskosten	2 Bedrijfsomzet
2005	€	€
2006	€	€
2007	€	€

Resultaat

Aandeel trainings- / scholingskosten aan omzet over 3 jaar is: **... %**

Bereken!

Vorige pagina | IPB-rekenhulp | Ok & neem over



B **Procentuele toe- afname van aantal medewerkers over 3 jaar bij AUTO Bedrijfsnaam**

1 Fte bedrijf:

Definitie: Som van de ***totale*** arbeidskracht van uw bedrijf (werknemers, eigenaren, directie, staf, etc.) inclusief de tijdelijke arbeidsformatie (uitzendkrachten, stagiaires) op einde van betreffende kalendejaar

Noot: 1 fte = 1 full time equivalent = 1 voltijd baan

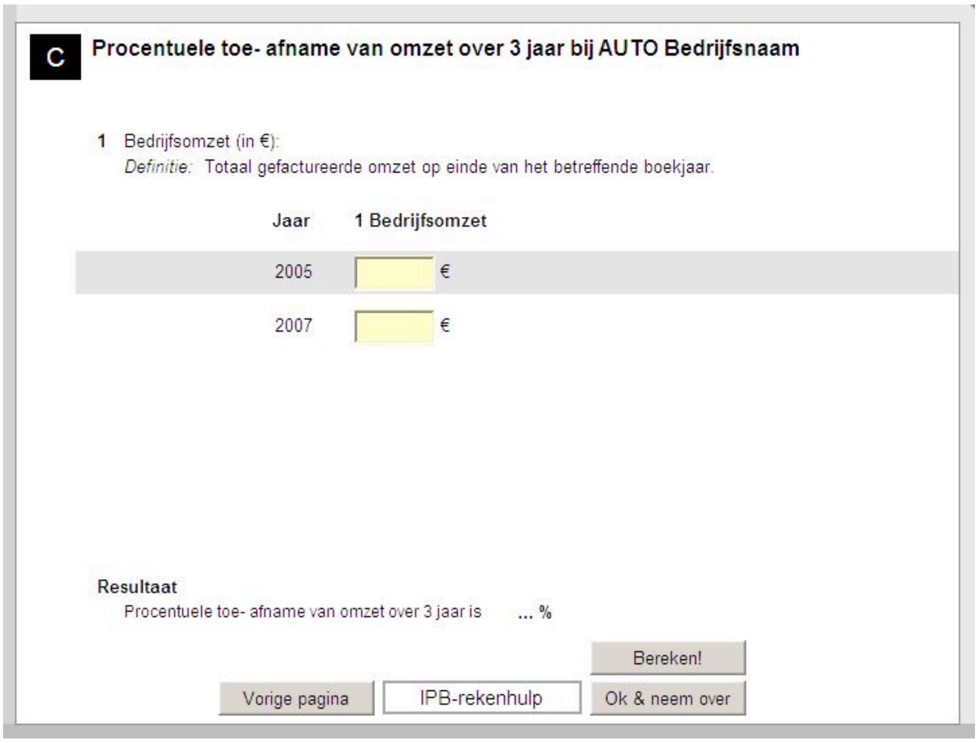
Jaar	# medewerkers
op 31-12-2005	fte
op 31-12-2007	fte

Resultaat

Procentuele toe- afname van aantal medewerkers over 3 jaar is **... %**

Bereken!

Vorige pagina | IPB-rekenhulp | Ok & neem over



C **Procentuele toe- afname van omzet over 3 jaar bij AUTO Bedrijfsnaam**

1 Bedrijfsomzet (in €):
Definitie: Totaal gefactureerde omzet op einde van het betreffende boekjaar.

Jaar	1 Bedrijfsomzet
2005	€
2007	€

Resultaat
Procentuele toe- afname van omzet over 3 jaar is **... %**

Bereken!
Vorige pagina | IPB-rekenhulp | Ok & neem over

D **Toegevoegde waarde per werknemer over 3 jaar bij AUTO Bedrijfsnaam**

1 Toegevoegde waarde (in €):
Definitie: De totale toegevoegde waarde is de gefactureerde verkoopwaarde minus de waarde van de daarvoor benodigde goederen & diensten (is inkoopwaarde).

2 Gemiddeld aantal fte eigen medewerkers:
Definitie: Som van de ***gemiddelde*** eigen arbeidskracht van uw bedrijf (werknemers, eigenaren, directie, staf, etc.), zonder de tijdelijke formatie (uitzendkrachten, stagiaires), maar inclusief de tijdelijke contracten over een kalender jaar gemeten.
Noot: 1 fte = 1 full time equivalent = 1 voltijd baan

Jaar	1 Toegevoegde waarde	2 Gemm. # eigen medewerkers
2005	€	fte
2006	€	fte
2007	€	fte

Resultaat
Toegevoegde waarde per werknemer over 3 jaar is **... € / fte / Jaar**

Bereken!
Vorige pagina | IPB-rekenhulp | Ok & neem over

E Gemiddelde verzuim personeel over 3 jaar bij AUTO Bedrijfsnaam

1 Afwezigheid werknemers (in dagen):

Definitie: Som van het ***totaal*** aantal ziekte dagen van al uw werknemers (werknemers, eigenaren, directie, staf, etc.) over de periode van een jaar. Deze dagen zijn zonder de tijdelijke formatie (uitzendkrachten, stagiaires).

2 Aantal werkdagen per werknemer per jaar

Definitie: Het gemiddelde aantal werkdagen ***per*** fte (werknemers, eigenaren, directie, staf, etc.), zonder de tijdelijke formatie (uitzendkrachten, stagiaires), maar inclusief de tijdelijke contracten over een kalender jaar gemeten.
Noot: 1 fte = 1 full time equivalent = 1 voltijd baan

3 Gemiddeld aantal fte eigen personeel:

Definitie: Som van de ***gemiddelde*** eigen arbeidskracht van uw bedrijf (werknemers, eigenaren, directie, staf, etc.), zonder de tijdelijke formatie (uitzendkrachten, stagiaires), maar inclusief de tijdelijke contracten over een kalender jaar gemeten.

Jaar	1 Afwezigheid werkn.	2 # werkdagen / werknemer	3 Gemm. # werknemers
2005	dagen	dagen	fte
2006	dagen	dagen	fte
2007	dagen	dagen	fte

Resultaat

Gemiddelde verzuim personeel over 3 jaar is **...%**

Bereken!

Vorige pagina | IPB-rekenhulp | Ok & neem over

F Winstmarge voor belasting, rente & afschrijvingen bij AUTO Bedrijfsnaam

1 Totale kosten bedrijf (in €):

Definitie: Totale gemaakte kosten van bedrijf (zoasl loon-, productie- en overhead kosten) maar zonder belasting, afschrijving en / of investeringen op einde van het betreffende boekjaar.

2 Bedrijfsomzet (in €):

Definitie: Totaal gefactureerde omzet op einde van het betreffende boekjaar.

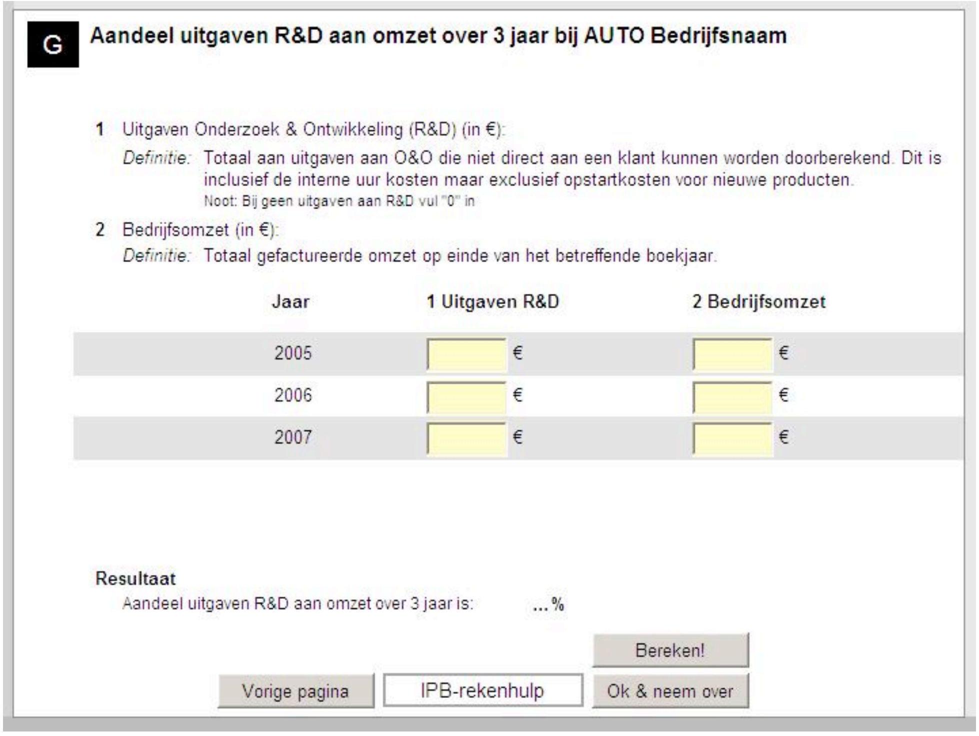
Jaar	1 Totale kosten bedrijf	2 Bedrijfsomzet
2007	€	€

Resultaat

Aandeel bruto bedrijfsresultaat aan de omzet (bruto winstpercentage) is: **...%**

Bereken!

Vorige pagina | IPB-rekenhulp | Ok & neem over



G **Aandeel uitgaven R&D aan omzet over 3 jaar bij AUTO Bedrijfsnaam**

1 Uitgaven Onderzoek & Ontwikkeling (R&D) (in €):

Definitie: Totaal aan uitgaven aan O&O die niet direct aan een klant kunnen worden doorberekend. Dit is inclusief de interne uur kosten maar exclusief opstartkosten voor nieuwe producten.

Noot: Bij geen uitgaven aan R&D vul "0" in

2 Bedrijfsomzet (in €):

Definitie: Totaal gefactureerde omzet op einde van het betreffende boekjaar.

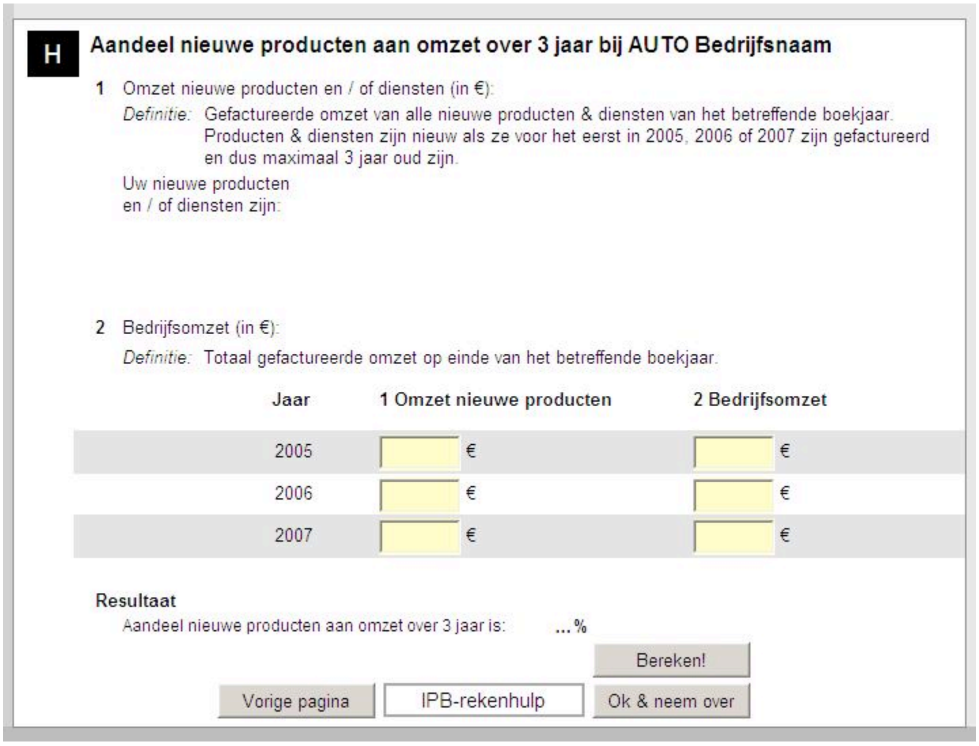
Jaar	1 Uitgaven R&D	2 Bedrijfsomzet
2005	€	€
2006	€	€
2007	€	€

Resultaat

Aandeel uitgaven R&D aan omzet over 3 jaar is: ...%

Bereken!

Vorige pagina | IPB-rekenhulp | Ok & neem over



H **Aandeel nieuwe producten aan omzet over 3 jaar bij AUTO Bedrijfsnaam**

1 Omzet nieuwe producten en / of diensten (in €):

Definitie: Gefactureerde omzet van alle nieuwe producten & diensten van het betreffende boekjaar. Producten & diensten zijn nieuw als ze voor het eerst in 2005, 2006 of 2007 zijn gefactureerd en dus maximaal 3 jaar oud zijn.

Uw nieuwe producten en / of diensten zijn:

2 Bedrijfsomzet (in €):

Definitie: Totaal gefactureerde omzet op einde van het betreffende boekjaar.

Jaar	1 Omzet nieuwe producten	2 Bedrijfsomzet
2005	€	€
2006	€	€
2007	€	€

Resultaat

Aandeel nieuwe producten aan omzet over 3 jaar is: ...%

Bereken!

Vorige pagina | IPB-rekenhulp | Ok & neem over