Market-Oriented Product Innovation in Small Firms

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Abstract

This thesis deals with product-innovation in small firms. It aims at a better understanding of the determinants of product innovation in small firms, particularly those determinants that are related to the market orientation of small firms. The focus of the study is on small firms that supply more or less homogeneous products to the market. A general framework is developed to investigate the relationship between market orientation and product innovation in small firms. The main elements of this general framework are the following. Product innovation in small firms is modeled as an individual decision-making process and personal traits of the manager are supposed to be important influencers of decision making. It is hypothesized that innovativeness, as an important personal trait of the manager, influences market orientation and product innovation. It is argued that product innovation in small firms usually is not the development of a new product by the small firm itself but rather the adoption of a concept developed by customers or third parties. This puts forward the important role of marketing channel partners in product innovation by small firms. Small firms' market orientation is expected to rely heavily on its current customers. This general framework is elaborated in specific models for the adoption of product innovation and radical product innovation. In case of radical product innovation separate models for the adoption and the intention to adopt refine the analysis. Finally a model has been proposed to explain the formation of expectations of small firms about their future performance. The models have been tested using data from Dutch rose growers and poultry farms.

The empirical results show that elements of a small firm's market orientation drive product innovation and also radical product innovation. It appears that customer market intelligence stimulates product innovation. In the case of radical product innovation expressed needs of current customers but not those of potential customers stimulate the adoption of radical product innovation.
Innovativeness influences a small firm's market orientation and product innovation, also radical product innovation. It appears that market orientation may inhibit or stimulate product innovation, depending on whether the innovativeness of the firm in the respective product domain is high or low. The influence of the manager's attitude towards a radical product innovation on intention to adopt is larger, the higher the manager's innovativeness. Also, expressed needs by potential customers for radical product innovation only influence the decision to adopt the radical product innovation if the manager is highly innovative.
The expectations of small firms about future performance appear to be not a simple extrapolation of current success. Other factors which influence these expectations are amongst others: (a) whether or not the firms recently adopted a radical product innovation; (b) whether current customers expressed needs for that radical product innovation, and (c) whether the firm is dependent on current customers.

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Contents

Chapter 1

General Introduction

"... any business enterprise has two - and only these two - basic functions: marketing and innovation" (Drucker 1954)

1.1 Introduction

This thesis deals with product-innovation decision making in small firms (SFs). What to produce is a fundamental marketing decision for firms, particularly product innovation (PI) is at stake, because it determines a firm's competitive position (Baker and Hart 1999; Hunt and Morgan 1995), its performance (Capon et al. 1990), and even its survival (Wind and Mahajan 1997).

Recent developments in the business environment have increased the pace of product innovation in firms (Baker and Hart 1999; Kotler 2003; Wind and Mahajan 1997). Technological developments, particularly in information and communication technology (ICT), such as internet and mobile phones, have changed business practices. Markets have become more global and interconnected, which has increased competition. Changing Life styles have made consumers more interested in and sensitive to new products. To remain competitive, firms swiftly need to take advantage of new technological opportunities to serve their customers and to respond to changes in customer needs and tastes. Increased competition, shortened product life cycles, continually changing customer needs and tastes, and growing technological opportunities to serve customer needs explain the increasing importance of product innovation to firms (Cooper 1993). Governments and businesses explicitly acknowledge the importance of innovation, including product innovation. "Every sector and activity needs to be constantly initiating, refining and improving its products, services and processes" (European Commission 2002).

Although PI is increasingly important for firms, failure rates of new products launched on the market remain as high as 50% (Golder and Tellis 1993). This is particularly disturbing, because, on the basis of scientific research, the critical success factors for product innovation are well known (Cooper 1999; Henard and Szymanski 2001). Furthermore, new product development (NPD) processes that can improve success rates were being developed as early as the 1970s. These NPD processes have been shown to improve success rates of NPD but have not been implemented correctly in many firms (Cooper 1999; Cooper 1993; Griffin 1997).

Successful product innovation seems closely related to market orientation, defined as the organizationwide generation of market intelligence pertaining to current and future customer needs, dissemination of the intelligence across departments, and organizationwide responsiveness to it (Kohli and Jaworski 1990). The importance of market orientation for company performance is widely supported by empirical research (Cano et al. 2004; Deshpande and Farley 2004). Product innovation is instrumental for firms to respond to or even anticipate changes in the business environment in order to stay competitive and successful (Atuahene-Gima 1996; Han et al. 1998; Hurley and Hult 1998; Slater and Narver 1995). Furthermore, market orientation is considered a critical success factor by incorporating market research and market-related decision criteria throughout the NPD processes (Cooper 1993).

The merits of a market orientation for PI have also been questioned. First, market orientation may reduce the newness of PIs (Atuahene-Gima 1996), because customers are able to articulate needs for incrementally new PIs but rarely for radically new PIs (Wind and Mahajan 1997). Customers seem unable to articulate fundamentally new product benefits (Grunert et al. 1997b). This may reduce the long-term performance of market-oriented firms. Conflicting empirical support has been found about the influence of market orientation, specifically customer orientation, on the newness of PIs (Gatignon and Xuereb 1997; Lukas and Ferrell 2000). Second, market-oriented firms may ignore newly emerging market segments, because they focus exclusively on current customers (Christensen and Bower 1996). Most of the criticism on market orientation does not seem to result from flaws in the market orientation concept but from its poor implementation (Slater and Narver 1998; Slater and Narver 1999).

This research is concerned with small firms (SFs). SFs are often distinguished from medium-sized and large firms by the number of employees or sales volumes, but there is no widely accepted statistical demarcation. In Europe the demarcation between small and medium-sized firms differs across countries, ranging between five and fifty employees (Nooteboom 1994). We will refrain from a debate about the appropriate definition of a small firm and lay down a definition that fits the purpose of our study: a small firm is a firm run and controlled under the direct supervision of the owner.

The contributions of SFs to the economy are substantial, in terms of number of SFs, employment, and gross domestic product. For example, the United States of America has 23 million SFs, roughly 75% of which are without employees. In that country, SFs employ half of all private-sector employees and create more than 50% of non-farm, private gross domestic product (SBA 2004). In the European Union, about 34 percent of the workforce is working in firms with less than 10 employees (European Commission 2000). The contributions of SFs

also seem to vary per industry. In the United Kingdom, for example, the contribution of SFs (with less than 49 employees) to employment was high in agriculture (93.7%) and construction (74.4%), but low in financial intermediation (13.9%) and transport, storage, and communication (30.9%) (SBS 2004).

A substantial body of literature exists about the relationship between firm size and innovation. Rothwell and Dodgson (1994) summarize advantages and disadvantages generally ascribed to large firms and small firms. They conclude that small firms have behavioral advantages and large firms have material advantages. Furthermore, they argue that complementary roles exist for SFs and large firms and that the role of SFs varies per industry and depends on the industry life cycle. For example, Almeida and Kogut (1997) find that SFs tend to innovate in less crowded areas while large firms dominate patenting in well-established areas. Rothwell (1987) argues that SFs are disproportionately responsible for near-to-market developments and initial market diffusion. In other words, SFs modify a product innovation to make it suitable for market niches of initial users.

To our knowledge, specific research on market orientation of SFs in relation to product innovation does not exist, but other elements of market orientation have been analyzed with respect to SFs. For example, information generation in SFs has been researched, particularly the role of personal contacts with suppliers, customers, or bank employees (Smeltzer et al. 1988). Also, marketing planning in SFs has been analyzed (Carson 1990). The importance of the owner-manager's personal network for information, resources, and customers led to the development of a new approach to marketing for entrepreneurial small and medium-sized firms (Carson et al. 1995). Particularly, the role of social networks for innovation in SFs has received some attention in the literature (Barringer 1997; Bessant 1999; Donckels and Lambrecht 1997; Freel 2000; Miles et al. 1999).

Some research has confirmed the relationship between market orientation and performance for SFs and SMEs (Pelham 1999; Pelham 2000; Pelham and Wilson 1995). To the knowledge of this author, the relationship between market orientation and product innovation has not been researched for SFs.

The implementation of the market orientation concept and of new product development practices seems problematic in SFs because small sales volumes do not warrant the acquisition of specialists to correctly implement market orientation and NPD practices. Furthermore, strategic planning and implementation converge in SFs, which seems incongruent with models about market orientation and NPD practices in medium-sized and large firms.

Research on the relationship between market orientation and product innovation in SFs is called for because: (1) SFs have specific characteristics which might cause specific innovative behavior as compared to other firms, (2) the relationship between market orientation and product innovation in SFs is hardly investigated, and (3) market orientation in SFs is different from market orientation in large firms. A better understanding of the relationship between product innovation and market orientation of SFs can probably improve innovative policies and the competitiveness of SFs.

1.2   Objective
The objective of this research is to gain a deeper understanding of PI and market orientation in SFs, particularly the relationship between market orientation and PI. Insight is sought into the determinants of PI in SFs, particularly those determinants that are also related to the market orientation of SFs.

1.3   Problem statement and research questions
Models about product innovation in medium-sized and large firms offer little guidance to understand PI in SFs because the resources and capabilities of SFs are different from those of medium-sized and large firms. For the same reason, general market orientation models are not fully applicable to SFs. Consequently, the relationship between market orientation and PI in SFs is hardly investigated.

To understand the relationship between market orientation and PI in SFs the following key research questions will be addressed in this thesis.
1. What are the implications of SF characteristics for PI?
2. What are the implications of SF characteristics for market orientation?
3. What is the relationship between market orientation and PI in SFs?
4. How do market orientation and PI affect performance and performance expectations in SFs?

The role of SFs for innovation varies per industry and depends among others on the industry life cycle (Rothwell and Dodgson 1994). This research focuses on SFs that supply more or less homogeneous products to the market, and consequently operate in a market structure similar to perfect competition, where product innovation occurs less frequently, such as agriculture and transportation. Product innovation in these SFs is often an adoption process that requires coordination with marketing channel partners. For SFs in some industries, product innovation is the core of their business. For example, goldsmiths, film directors, and artists like painters and sculptors. These SFs operate in markets characterized by monopolistic competition. This study takes as the basic problem product-innovation decision making in SFs and the role of market orientation in it. Specific attention will be paid to some radical product

innovation (RPI). Certainly for SFs that sell a limited number of products, sometimes even just one product, RPI is a fundamental business decision.

The empirical setting of this thesis is the Dutch agriculture and horticulture, which is characterized by a large number of SFs. Dutch horticulture has always been subject to global competition and Dutch agriculture is increasingly experiencing international competition, due to changes within the European Common Agricultural Policy (CAP). Growing global competition has reduced prices for most agricultural commodities, which has increased the importance of PI and market orientation for firms in the Dutch agriculture as a means of remaining competitive.

1.4   Outline

This thesis consists of seven chapters. In chapter 2, a framework for product innovation in SFs is developed. The literature on market orientation, PI and the relationship between market orientation and PI is reviewed. SF characteristics are discussed and a general framework to investigate the relationship between market orientation and PI in SFs is proposed.

In chapter 3, a model is proposed to investigate the combined influence of the SF owner-manager's innovativeness and market orientation on PI and company performance. Hypotheses about the relationships in the model are developed and tested using data from Dutch rose growers.

In chapter 4, a model is proposed to analyze the SF owner-manager's intention to adopt RPI. Specific attention is paid to the role of the SF's current success. Furthermore, the SF owner-manager's attitude towards the RPI is analyzed. Hypotheses about the relationships in the model are developed and tested using data from Dutch poultry farmers.

In chapter 5, the adoption of radical product innovation (RPI) by SFs is analyzed with particular attention to the role of current and potential customers, the SF owner-manager's attitude toward the RPI and the SF owner-manager's innovativeness. Hypotheses about the relationships in the model are developed and tested using data from Dutch poultry farmers.

In chapter 6, the SF owner-manager's performance expectations are analyzed. RPI and current success are hypothesized as the key drivers of the SF owner-manager's performance expectations. The role of current and potential customers, and the SF owner-manager's innovativeness is further analyzed. Hypotheses about the relationships in the model are developed and tested using data from Dutch poultry farmers.

In chapter 7, conclusions will be drawn and discussed and implications will be given.

Chapter 2

Theoretical Framework

2.1   Introduction

Market orientation and product innovation (PI) have become crucial factors for the performance of firms. They are recognized as critical processes for the competitiveness of firms (Hunt and Morgan 1995). A specific aspect is that market orientation is related to PI. First, market orientation contributes to the success of PI projects (Cooper 1993). Second, market orientation stimulates the initiation and implementation of PI projects (Han et al. 1998; Hurley and Hult 1998). Third, market orientation seems to have a role in the selection of PI projects but the direction of this relationship, such as for product newness, is questioned (Atuahene-Gima 1996; Christensen 1997; Connor 1999; Gatignon and Xuereb 1997; Lukas and Ferrell 2000).

The relationship between market orientation and PI is extensively analyzed and discussed, because of their critical role for the success or failure of firms. Also, methodological issues stimulate the discussion. Both market orientation and PI are complex phenomena. For example, two perspectives on market orientation exist: a cultural perspective (Deshpande et al. 1993; Narver and Slater 1990) and a behavioral perspective (Jaworski and Kohli 1993; Kohli and Jaworski 1990). Furthermore, the term PI is used as an indication for a new product, but also for the new product development (NPD) process. Moreover, different categories exist for new products (Garcia and Calantone 2002) and NPD processes (Griffin 1997). In order to understand the scope of a theory, definitions of market orientation and PI need to be specified.

Another reason for the debate about the relationship between market orientation and PI is that the relationship may be contingent on the firm's internal and external environment. For example, a different relationship may exist between market orientation and PI for large and small firms (SFs), since both market orientation and PI are implemented differently in large and SFs. Likewise, a firm's market orientation and PI are affected by its external relationships.

The purpose of this chapter is to provide a conceptual framework about the relationship between market orientation and PI in SFs. Particular attention is paid to the role of marketing channel partners, because they seem to be important for an SF's market orientation and PI (Bessant 1999; Carson 1990). General hypotheses about the relationships in the framework are developed in this chapter, specified and empirically tested in subsequent chapters. Figure 2.1 shows the concepts that will be discussed in this chapter. Subsequently, PI, market

orientation, marketing channels, and SFs will be discussed. Based on this discussion, the conceptual framework will gradually be built.

Figure 2.1: The main relationships between market orientation, product innovation, firm size and marketing channels
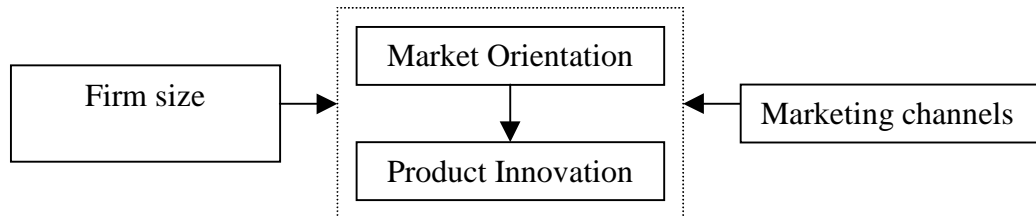
2.2 Product innovation

In this section, the mainstream of the PI literature will be reviewed to position the conceptual framework. Zaltman, Duncan and Holbeck's (1973) seminal work on innovation in organizations discusses innovation as the process of developing the new item, innovation as the new item itself, and innovation as the process of adopting the new item. The latter refers to the diffusion process of the new item. The main interest of this research is in PI as the new item itself, which is inseparable from the process of developing the new item (hereafter referred to as New Product Development or NPD). The new product diffusion process will not be discussed although the adoption processes will be discussed as an element of the NPD process. This section ends with a discussion of the concept 'innovativeness', both as a personal trait (Mudd 1990) and as an aspect of a firm's culture (Hurley and Hult 1998), because it is a concept that is closely related to product adoption and NPD. Moreover, innovativeness and market orientation are related (Homburg and Pflesser 2000).

2.2.1 Product innovation as the item itself (new products)
Zaltman, Duncan and Holbeck (1973) describe the new item itself as "the outcome of the development process, the new or improved product, service, process, management technique and so on". This description covers a wide range of innovations, even if we limit ourselves to products and services as the items. Hereafter, the new item will be specified by discussing product categories and degrees of newness.

Kotler (2003) defines a product as "anything that can be offered to a market to satisfy a want or need. Products that are marketed include *physical goods, services, experiences, events, persons, places, properties, organizations, information* and *ideas*." This definition shows the diversity in products and therefore in new products. Two categorizations are common in the marketing literature. First, a distinction between goods and services and second between products for industrial markets and products for consumer markets. Furthermore, Levitt (1969) introduced the idea that a product consists of three levels: the core product (i.e. the core benefit or service), the tangible product (including, for example, packaging, brand name,

and features), and the augmented product (including, for example, after-sales service, warranty, delivery, and credit). The fourth level, the potential product level, is everything that the product could be. Research on PI has addressed different aspects of the product (e.g. benefits, features, design, technology, services, quality, packaging, and/ or customer needs) and/ or the marketing of the product (e.g. new competition, customers, consumption patterns, marketing/ sales/ distribution skills, and/ or uses). However, research on PI is usually categorized based on product newness, and rarely on aspects of the product.

Whether a product is considered to be an innovation depends on whether it is perceived as new by an individual or other unit of adoption (Rogers 1995). However, it should be clear whose perspective on newness is considered (e.g., the customer, the firm, the market, the scientific community, the industry, or the world). Most studies take the firm's perspective (Garcia and Calantone 2002). Booz, Allen & Hamilton (1982) score new products on a 'new-to-the-company' dimension and on a 'new-to-the-market' dimension. Their framework introduces the problem of assessing the degree of product newness. One element of product newness is the width of its impact (ranging from worldwide, industry-wide, market-wide, and firm-wide to new to the customer). Another element is its impact on behaviors and required marketing and technological skills. PIs are considered newer if both new marketing and technological skills are required. Consequently, newness is contingent on the firm.

Classification of PIs is necessary to advance our knowledge of PI and to communicate this knowledge. However, many categorizations in the literature are based on continuous measures of newness with arbitrary cut-off values, which makes comparison across studies hard or even impossible. Garcia and Calantone (2002) propose a strict classification with the labels 'radical innovation', 'really new' and 'incremental', signifying diminishing degrees of product newness. However, they do not solve the problem of arbitrary cut-off values. Even if a common categorization is used in the literature, it remains to be seen whether empirical findings can be generalized across PI categories. Antecedents of firm innovativeness, product newness, and PI success may be contingent on many of the product categorizations discussed before or may even be unique per innovation. Most of the empirical management and marketing literature considers a product as an innovation if the producer of the product perceives it as new. One common procedure is to ask managers to select new product projects (Atuahene-Gima 1996; Ayers et al. 1997; Cooper 1979; Cooper 1975; Cooper and Kleinschmidt 1986; Gemunden et al. 1996; Moorman and Miner 1997).

2.2.2   *Product innovation as a process*
Zaltman, Duncan and Holbeck (1973) view innovation as "a process starting with the recognition of a potential demand for, and technical feasibility of, an item and ending with its widespread utilization...". Their model of the innovation process in organizations constitutes

two stages: an initiation stage (knowledge- awareness, attitude formation, and decision) and an implementation stage (initial implementation, continued implementation). An important element of their theory is that each (sub-) stage is affected differently by innovation characteristics and organization characteristics. For example, organizational characteristics such as formalization and centralization stimulate implementation stages of innovations but inhibit initiation stages. A central element of the knowledge-awareness sub-stage is a gap between a firm's "criteria for satisfactory performance" and a firm's "actual performance". Decreasing performance may increase the search for innovation opportunities. Alternatively, innovation opportunities may increase the criteria for satisfactory performance. A key concept during the attitude-formation sub-stage is "openness to the innovation". Central to the decision sub-stage is information, to evaluate the innovation. Zaltman, Duncan and Holbeck's (1973) work is still the conceptual basis in organization literature for modeling the relationship between market orientation and innovation (Han et al. 1998; Hurley and Hult 1998). However, 61.5% of firms in the U.S. use formal stage gate processes for PI (Griffin 1997).

Prescriptive models for NPD processes have been developed, based on studies identifying discriminating factors between successful new product development projects and failures (Cooper 1979; Montoyaweiss and Calantone 1994; Myers and Marquis 1969; Rothwell et al. 1974; Zirger and Maidique 1990). Most of the recommended models are stage gate models, where various activities (stages) are carried out, sequentially and each activity is followed by a decision (or gate) to continue or not. Well-known stage gate models are by Booz, Allen and Hamilton (1962; 1982), Cooper (1993) and Urban and Hauser (1993). Griffin (1997) found that the implementation of a formal NPD process still differentiates between successful and less successful innovating firms.

Many NPD processes have focused on the internal development of new products by a firm with important roles for R&D and marketing in the NPD process. However, important sources of PI may lie outside the company (Hippel 1988), and consequently customers and suppliers may perform important roles in the innovation process. Furthermore, if sources of PI lie outside the company, understanding adoption processes seems important to understand NPD processes.

Research into adoption processes has focused on the consumer's acceptance of innovations, but much of the theory, modeling, methodology, and findings also apply to management (Gatignon and Robertson 1985). The diffusion research paradigm includes two interrelated processes: the diffusion process and the adoption process, where diffusion is the process by which an innovation is adopted by the members of a social system. Our focus is on the adoption process, because we take a firm's perspective on PI. The adoption process is directly

influenced by perceived innovation characteristics, personal influence, and personal characteristics. Marketing strategies influence the former two.

Most models about the adoption process rely on a learning-oriented "hierarchy-of-effects" model. Rogers (1995), for example, identifies 5 stages in the innovation decision process: knowledge, persuasion, decision, implementation, and confirmation, which resemble the stages in Zaltman, Duncan, and Holbeck's (1973) model that has already been discussed. Gatignon and Robertson (1985) suggest exploring an information-processing perspective on the adoption process. They propose that information processing by innovators is different from information processing by non-innovators (Foxall and Haskins 1986; Kirton 1976). The information-processing literature elaborates on the role of expertise, information search and information processing, which provides a link with market orientation (See for a review Alba and Hutchinson 1987). The research on perceived innovation characteristics is dominated by Rogers' (1995) scheme to evaluate innovations (i.e., relative advantage, compatibility, feasibility, observability, and complexity). Rogers' (1995) theory is also very influential in identifying personal characteristics that discriminate between innovators and later adopters, for example, income, age, education, social mobility, risk attitude, and social participation. Moreover, Rogers (1995) describes 5 adopter categories, based on the time at which the individual adopts an innovation. However, these adopter categories are not entirely consistent across product categories. Gatignon and Robertson (1985) suggest that heavy product-category usage and experience are personal characteristics that are consistently related to early adoption across product categories. Likewise, involvement with the product category seems to be related to adoption (Foxall and Bhate 1993; Kleyngeld 1974). Research on personal influences is central to the innovation decision-process literature. It focuses on identifying opinion leaders, the flow of information in networks, amount and type of information exchanged, and its influence on the receiver. Gatignon and Robertson (1985) propose an exchange theory model to increase our understanding of personal influence on PI adoption. Marketing-mix variables clearly have an influence on an individual's decision to purchase an innovation and on the timing of that decision. However, the role of the marketing mix over the product life cycle (PLC) is not yet well understood (Gatignon and Robertson 1985).

2.2.3   Innovativeness

Innovativeness as a personal trait
To be a meaningful concept, innovativeness must be an enduring trait and consequently affect the adoption of several innovations. Moreover, one should distinguish between innovativeness as a personal trait and adoption.

Midgley and Dowling (1978) describe the nature of innovativeness as it relates to the adoption of new products by consumers: "it is a force that increases the probability of being

first to adopt an innovation". Innovators are those who "decide to adopt an innovation independently of the decision of others" (Midgley and Dowling 1978). They introduce innovativeness as a trait-like entity that can be measured by psychometric means and which is explicitly differentiated from adoption. Moreover, they argue that certain clusters of personality and sociological traits determine the degree of innovativeness in the individual. Hirschman (1980) equates 'inherent novelty seeking' with innovativeness, which is defined as "a willingness to adopt new products", though it is not related directly to new product adoption but to a motivation to seek information about new products. Moreover, she identifies three domains of 'actualized innovativeness': acquisition of information about a new product, actual adoption of a new product, and finding novel ways to use a new product. Foxall and Haskins (1986) argue that innovativeness is in fact a cognitive style tapped by Kirton's (1976) adaption-innovation inventory (KAI). Kirton (1976) shows that each individual has a preferred style of creativity and decision making, which can vary from adaptive to innovative. Adapters have a preference for doing things better within the generally accepted theories, policies and viewpoints. Innovators prefer to do things differently. Innovators turn a blind eye to accepted thoughts to reconstruct the problem and solve the new problem. Foxall and Haskin hypothesize that KAI predicts product adoption when the new product is discontinuous (i.e., the use of the product requires a basic change in life style or consumption behavior).

In spite of the conceptual differences of innovativeness in the previous discussion, Goldsmith (1983) has shown that the corresponding measures of innovativeness are strongly related. Moreover, Mudd (1990) argues that the views on innovativeness by the authors in the previous discussion seem to converge. First, innovativeness is a trait accessible to psychometric assessment, resulting in a continuous variable. Second, innovativeness has a role in the stages of the adoption process of new products and this role is particularly evident in the pre-adoption stages. Moreover, it better predicts adoption behavior for discontinuous PIs than for continuous PIs. Third, innovativeness is a higher-order construct determined by more fundamental personality variables, such as risk seeking.

Innovativeness as an aspect of a firm's culture
Sometimes innovativeness as a personal trait is directly applicable to firms. For example, Buttner and Gryskiewicz (1993) apply Kirton's (1976) distinction between adaptors and innovators to SFs. They find that founders of a company with an adaptive style of decision making are more likely to continue the business as time passes than founders with a more innovative style of decision making. However, usually innovativeness of a firm is conceptualized as an aspect of a firm's culture.

Deshpandé and Webster (1989) define organizational culture as "the patterns of shared values and beliefs that help individuals understand organizational functioning and thus provide them norms for behavior in the organization". It is widely acknowledged that innovativeness is a part of a firm's culture. Hurley and Hult (1998), for example, define innovativeness as "a receptivity to new ideas and innovation as part of an organization's culture". Homburg and Pflesser (2000) identify innovativeness as inherent components of a market-oriented culture. They identify values and norms related to innovativeness, which support market-oriented behavior.

However, innovativeness is only one aspect of a firm's culture and is used in many contexts, as an aspect of entrepreneurial orientation, for example. According to Lumpkin and Dess (1996) "innovativeness reflects a firm's tendency to engage in and support new ideas, novelty, experimentation, and creative processes that may result in new products, services, or technological processes". Other aspects of entrepreneurial orientation that are related to innovativeness but conceptually different are autonomy, risk taking, proactiveness, and competitive aggressiveness. "Autonomy refers to the independent actions of an individual or a team in bringing forth an idea or a vision and carrying it through to completion" (Lumpkin and Dess 1996). It is the possibility to act independently, the authority to make decisions and the drive to proceed. "Risk taking" depends on two concepts: risk attitude and risk perception. Risk attitude reflects the channel member's general or consistent predisposition toward risk (Pennings and Wansink 2004). Whereas risk attitude deals with the decision-maker's interpretation of the content of the risk, and how much (s)he dislikes risk, risk perception deals with the decision-maker's interpretation of the likelihood of being exposed to the content of a particular risk. Risk perception deviates from actual risk, for example, based on whether risk is framed as a potential loss or gain (Kahneman and Tversky 1979). Proactiveness is "acting in anticipation of future problems, needs or changes" (Lumpkin and Dess 1996). The opposite of proactiveness is passiveness. A proactive firm is a leader rather than a follower, though not necessarily the first to introduce a new product on the market. A proactive firm takes the initiative, acts opportunistically, tries to influence trends, and may even try to create demand. In the case of new product introductions, proactiveness is closely related to innovativeness. "Competitive agressiveness refers to a firm's propensity to directly and intensely challenge its competitors to achieve entry or improve its position, that is, to outperform industry rivals in the marketplace" (Lumpkin and Dess 1996). It includes responding to competitive actions, but also challenging industry leaders. It is not yet well understood how these aspects of entrepreneurial orientation are related to innovativeness.

Homburg and Pflesser (2000) identify innovativeness as one aspect of a firm's market-oriented culture. Other cultural aspects are success, flexibility, openness of internal

communication, quality and competence, speed, interfunctional cooperation, responsibility of the employees, and appreciation of the employees.

Hurley and Hult (1998) consider innovativeness as a higher-order construct in a firm's culture. Cultural characteristics such as market focus, a learning orientation, communication, and tolerance for risk and conflict are precursors for innovativeness. This view of innovativeness as a higher-order construct is similar to the literature on innovativeness as a personal trait (Mudd 1990).

A firm's strategic orientation determines how a firm's innovativeness is manifested. Firms prefer to innovate by imitating competitor's products, by modifying competitive products, or by developing new products that are completely new to the industry. Miles and Snow (1978) distinguish between prospectors, analyzers, reactors and defenders. For prospectors, new product development and market development is a preferred strategy, while market penetration is a preferred strategy for analyzers. Reactors exploit applied research and are followers in the market. Defenders specialize on cost-efficient production and have a tendency for vertical integration. Gatignon and Xuereb (1997) define strategic orientations as "the strategic directions implemented by a firm to create the proper behavior for the continuous superior performance of the business". Based on a list of factors that determine the success or failure of new products, they identify three major strategic orientations: customer orientation, competitor orientation, and technological orientation.

For this research innovativeness is defined as 'the propensity to innovate' or 'the propensity to adopt innovations'. It is a personal trait, as well as an aspect of a firm's culture.

2.3   Market orientation

In spite of the basic and continuous marketing message of customer orientation, many firms seem not yet to have implemented this message adequately in their policies. As a result, the market orientation of firms has become a hot topic in marketing theory and practice since the 1990's. Amongst others, a lack of market orientation, deficient marketing activities, and, in particular, a lack of good market information are persistent themes in studies explaining new product success (Cooper 1993; Dougherty 1990; Henard and Szymanski 2001). However, before the 1990's, the market orientation concept was not well understood. In this section, the two dominant perspectives on market orientation as developed in the beginning of the 1990's, the cultural and the behavioral perspective, will be described. Furthermore, the influence of innovativeness on market orientation will be discussed.

2.3.1 *The cultural perspective on market orientation*

The work of Narver and Slater (1990) is representative of the cultural perspective on market orientation. Narver and Slater (1990) define market orientation as "the organizational culture and climate that most effectively encourages the behaviors that are necessary for the creation of superior value for buyers and, thus, continuous superior profit for business". Value for customers is created through increasing a buyer's benefits or decreasing a buyer's total acquisition and use costs. There are many potential sources of sustainable competitive advantage through the numerous means to create value for customers. Narver and Slater (1990) measure their cultural perspective on market orientation with behavioral measures. They identify three behavioral components: customer orientation, competitor orientation, and interfunctional coordination. A market-oriented culture is the common factor underlying these three behavioral components. They discuss each component. Customer orientation is the sufficient understanding of one's target buyers and, subsequently, the sufficient response to their needs, through which, other things being equal, one continuously creates superior value for the buyers. In a business-to-business context, this requires the understanding of a buyer's value chain (Day and Wensley 1988), today and in the future, but also the value chain of the buyer's buyer. Competitor orientation means that a seller must understand the short-term strengths and weaknesses, as well as the long-term capabilities and strategies of both the key current competitors and the key potential competitors.

Interfunctional coordination means that a seller must draw on all its resources, integrate them effectively, and adapt them when necessary, in its continuous effort to create superior value for buyers.

Homburg and Pflesser (2000) point out that Narver and Slater (1990) define market orientation as a culture, yet they focus on behavioral components in their measure of market orientation. Homburg and Pflesser's (2000) multiple-layer model of market-oriented organizational culture identifies shared values, norms for market orientation and artifacts indicating market orientation as drivers of market-oriented behavior. They acknowledge that the identified values are not unique for a market-oriented culture and their data does not support the idea of one underlying factor (i.e., market-oriented culture) as conceptualized by Narver and Slater (1990). Innovativeness is one of the values identified by Homburg and Pflesser (2000).

2.3.2 *The behavioral perspective on market orientation*

The work of Kohli and Jaworski (1990) is representative for the behavioral perspective on market orientation. Kohli and Jaworski (1990) define market orientation as the organization-wide generation of market intelligence pertaining to current and future customer needs, dissemination of the intelligence across departments, and organization-wide responsiveness to it. They explicate each of these three components. Intelligence generation also includes

monitoring factors that influence the needs and preferences of customers, such as conditions in customer's industries (government regulation and technology) and competitive actions. Customers include both end-users and distributors. Moreover, market-intelligence generation relies on a host of mechanisms: formal and informal; primary and secondary; internal and external. Little research is available about the quality of this process (Jaworski and Kohli 1996). Intelligence dissemination is important, because responding to a market need often requires the participation of virtually all departments in an organization. Moreover, intelligence flows from the marketing department to other departments and vice versa. Informal conversations are a powerful tool for this purpose. Responsiveness to market intelligence takes the form of selecting target markets, designing and offering products and services and producing, distributing, and promoting the products. Most research so far has focused on reactive responsiveness. Jaworski and Kohli (1996) argue that there is a need for research into proactive responsiveness or driving markets, where firms shape the evolution of markets. Jaworski, Kohli and Sahay (2000) argue that firms that drive markets can shape market structures and/ or shape the market behavior of market players.

Both the cultural perspective and the behavioral perspective have pros and cons. The cultural perspective is conceptually appealing and parsimonious, particularly when it is conceptualized as a one-dimensional construct. Firms simply score high or low on market orientation. However, the one-dimensional conceptualization cannot always be maintained in empirical research, where measures of the different behavioral components often show up as different dimensions in the analyses. The behavioral components are consequently included in models as separate variables, which is not in accordance with the cultural definition of market orientation and which makes the interpretation ambiguous. Furthermore, as noted by Homburg and Pflesser (2000), it seems odd that a culture should be measured with behavioral components only.

The advantage of the behavioral perspective is that both its measurement and its conceptual definition focus on behavior. Therefore, it is straightforward to derive managerial implications from empirical research. Its multidimensional conceptualization also makes it easier to fit into empirical research but harder to develop hypotheses about the influence of each individual dimension.

Both perspectives provide valuable insights. The cultural perspective is the driving force behind all market-oriented behavior and necessary for all firms to be successful in the long run. However, the manifestation of a market-oriented culture depends on the firm's environment. Furthermore, different environments require different market-oriënted behavior (Song and Parry, 1999). Therefore, the behavioral perspective is more suitable to provide managerial guidelines about how a firm should be market oriented.

2.3.3 Innovativeness and market orientation

In a reprint of their seminal 1990 article on market orientation, Narver and Slater (1999) have included a sentence that "continuous innovation is implicit in each of the behavioral components of market orientation". Since continuous innovation is not possible without innovativeness, this implies a close relationship between innovativeness and market orientation. Homburg and Pflesser (2000) find that organizational values and norms about "innovativeness and flexibility" support market orientation (i.e. market-oriented behaviors). Furthermore, Menon, et al. (1999) find that innovative culture (i.e. innovativeness) fully supports marketing-strategy making, defined as "a complex set of activities, processes and routines involved in the design and execution of marketing plans" (e.g. situation analysis and cross-functional integration). Recently, this view that innovativeness stimulates market orientation is supported by research investigating the combined effect of entrepreneurial orientation, which includes innovativeness, and market orientation on performance (Matsuno et al. 2002; Slater and Narver 2000). Both entrepreneurial orientation and market orientation are positively related to performance, but market orientation mediates the relationship between entrepreneurial orientation and performance.

Christensen (1997) points out that a focus on existing customers may constrain a firm's ability to innovate, because managers are not inclined to serve new customers. However, focusing on existing customers is not the same as being truly market oriented. Slater and Narver (1999) call this focus on existing customers and expressed desires customer led, but argue that being truly market oriented is more than being customer led. A market-oriented firm also focuses on potential customers and latent needs by evaluating market information in an anticipatory manner.

This thesis elaborates for SFs Narver and Slater's (1999) statement that "continuous innovation is implicit in each of the behavioral components of market orientation", along with their view that a customer-led firm is not yet fully market oriented (Slater and Narver 1999).

2.4 The relationship between market orientation and product innovation

Now that the positive relationship between market orientation and performance is well established, academics are trying to understand how market orientation leads to superior performance. PI seems to be an important mediator, but PI has many aspects, particularly new product success, the number of PIs introduced by a firm, the new product-development process, and new product characteristics.

In research about the relationship between market orientation and performance, new product success has often been included as an aspect of overall performance, because new product success is widely accepted as being important for performance (e.g. Baker and Sinkula 1999; Pelham 1999; Slater and Narver 1994b). New product success is also modeled more explicitly

as a mediator in the relationship between market orientation and overall performance (e.g. Li and Calantone 1998; Pelham and Wilson 1995; Slater and Narver 1994b). Another aspect of PI as a mediator for the relationship between market orientation and performance is the number of successful PIs introduced by a firm within a certain time period (Han et al. 1998; Hurley and Hult 1998). The number of PIs introduced over a certain time period, and the success of these PIs together, determine the role of PI in transferring a market orientation into superior performance. Furthermore, as discussed, PI as the item itself is the outcome of the NPD process. Therefore, the influence of market orientation on the NPD process should be understood to understand the relationship between market orientation and PI.

In this section, the literature about the influence of market orientation on PI will be reviewed. Successively, the influence of market orientation on the aspects of innovation being distinguished will be discussed: the NPD process, new product characteristics, new product success, and the number of PIs in a firm. It is assumed that these aspects of PI are related and that market orientation may have direct and indirect impacts on each aspect. Furthermore, new product success moderates the relationship between the number of PIs in a firm and performance. Figure 2.2 illustrates this perspective and demonstrates the complexity of the relationship between market orientation and PI. Finally, our framework of figure 2.1 will be elaborated.

Figure 2.2: The relationship between market orientation, product innovation, and performance
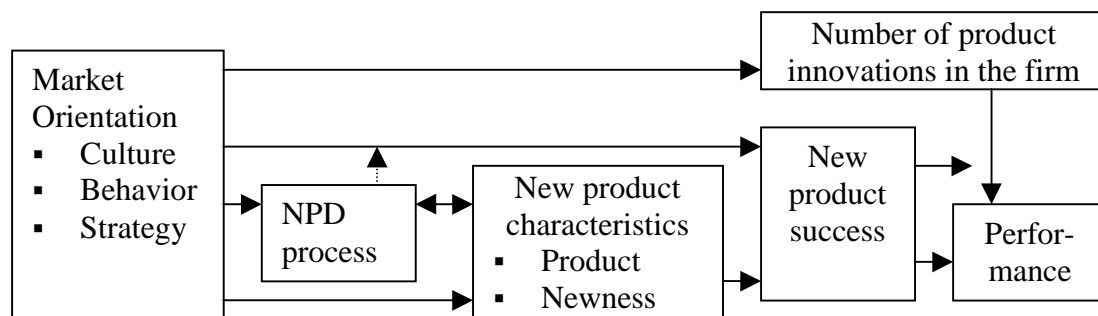
2.4.1 Market orientation and the new product-development process
Lawton and Parasuraman (1980) give a first indication about the influence of market orientation on the NPD process. They examine the impact of adopting the marketing concept on new product planning. Adoption of the marketing concept was measured by assessing the:
- importance attached to knowledge about customers,
- importance attached to coordinated efforts to satisfy customers,
- influence of marketing in the organization and
- marketing experience within the organization.

Lawton and Parasuraman (1980) test the influence of adopting the marketing concept on:
- the use of customer-oriented sources for new product ideas,
- the use of marketing research in the new product development stages and
- the innovativeness of new products.

They did not find any significant influence, but acknowledge that this may be due to poor measurement instruments.

Hurley and Hult (1998) suggest that the impact of market orientation on the new product development process is twofold. First, a market focus influences innovativeness, because an external focus stimulates new ideas and responsiveness to markets (Day 1994; Jaworski and Kohli 1993; Slater and Narver 1995; Slater and Narver 1994b). Second, market orientation influences a firm's capacities with respect to the implementation stage of the innovation process, because market orientation has a positive influence on gathering information before an innovation is implemented. Previously, it was discussed that innovation processes in organizations consist of two stages, an initiation stage and an implementation stage, and that many firm characteristics (i.e. complexity, formalization, and centralization) have a different impact on each stage (Zaltman et al. 1973). Market orientation is expected to make an organization sensitive to changes in its environment, which is expected to stimulate the initiation stage of the innovation process. Furthermore, a market orientation is expected to contribute to the successful implementation of PIs (e.g., fine-tuning marketing-mix policies and responding to competitive actions). This view is in line with Hurley and Hult (1998).

2.4.2   *Market orientation and new product characteristics*
Atuahene-Gima's (1996) results suggest that market-oriented firms favor certain PIs. He finds that market orientation is positively related to "product advantage" (superior for customers compared to competing alternatives), negatively related to "product newness to customers", and unrelated to "product newness to the firm". Furthermore, Atuahene-Gima (1996) shows that all relationships between market orientation and new product characteristics result in a positive relationship between market orientation and performance. The relationship between market orientation and product newness is supported by Grunert, Harmsen, Meulenberg and Traill (1997b), who quote companies saying that really new products cannot come from observing the market, which can only point to minor product adjustments.

Other researchers (e.g. Gatignon and Xuereb 1997; Lukas and Ferrell 2000) study the influence of individual behavioral components of market orientation (i.e., customer orientation, competitor orientation, and interfunctional coordination) on new product characteristics and performance. Lukas and Ferrell (2000) find that customer orientation increases the introduction of new-to-the-world products and reduces the launching of me-too

products. Competitor orientation increases the introduction of me-too products and reduces the launching of line extensions and new-to-the-world products. Interfunctional coordination increases the launching of line extensions and reduces the introduction of me-too products. Lukas and Ferrel (2000) do not report relationships with firm performance.

Gatignon and Xuereb (1997) include market characteristics as moderating variables on the relationship between the behavioral components of market orientation and product characteristics. Furthermore, in addition to the behavioral components of market orientation they include technological orientation as an explanatory variable. Contrary to the findings of Lukas and Ferrel (2000), Gatignon and Xuereb (1997) find that customer orientation leads to innovations that are less radical and more similar to competitive products, which reduces product advantage. They also find that a technological orientation leads to more radically new products and together with interfunctional coordination to higher product advantage. The difference between the results of Gatignon and Xuereb (1997) and Lukas and Ferrell (2000) may be caused by the fact that innovativeness is not considered as a separate explanatory factor in these studies.

Since Atuahene-Gima (1996) investigates the impact of the common factor underlying the three behavioral components of market orientation on new product characteristics, it is hard to compare his results with those of Gatignon and Xuereb (1997) and of Lukas and Ferrell (2000).

2.4.3 Market orientation and new product success
Slater and Narver (1994b) propose a conceptual model for the relationship between market orientation and business performance with innovation and new product success as two important mediating concepts. In an empirical study, Slater and Narver (1994a) find that the positive impact of market orientation on new product success is greater in an environment of low technological turbulence than in an environment of high technological turbulence. Gatignon and Xuereb (1997) also find that the relationship between market orientation and new product success depends on environmental factors. More specifically, customer orientation has a stronger impact on new product success when demand is highly uncertain (i.e. changing preferences of consumers). Competitor orientation has a positive influence on new product success when demand is not uncertain (i.e., consumer preferences hardly change), but competitor orientation has a negative influence when demand is highly uncertain. Interfunctional orientation has a positive impact on new product success under all environmental situations. Li and Calantone's (1998) concepts of customer-knowledge processes, competitor-knowledge processes, and an R&D-marketing interface closely resemble Narver and Slater's (1990) behavioral components of market orientation. Li and Calantone (1998) find that all three processes contribute to new product advantage, and

consequently to market performance. Overall, market orientation is a critical success factor for PI (Cooper 1993; Henard and Szymanski 2001). Pelham and Wilson (1995) also find a strong positive relationship between market orientation and new product success for SFs.

A moderating influence of new product characteristics (e.g. product types and degrees of newness) on the relationship between market orientation and new product success may be expected. NPD processes are different, depending on new product characteristics (Griffin 1997), while NPD processes prescribe at what stage and to what extent elements of market orientation (such as current customer needs) influence NPD.

2.4.4 *Market orientation and the degree of product innovation in the firm*
Slater and Narver (1994b) argue that high levels of market orientation and innovation (innovative new products as well as line extensions) coexist in America's fastest-growing companies. Hurley and Hult (1998) suggest that, in addition to an innovative culture, market intelligence contributes to innovative capacity. Han, Kim and Srivastava (1998) find that the total number of innovations implemented, both administrative and technological, mediates the relationship between market orientation and performance.

2.4.5 *A framework for the relationship between market orientation and product innovation*
Based on the previous discussion, the initial framework in figure 2.1 on the relationship between market orientation and PI in SFs is elaborated (See figure 2.3).

First, in line with Hurley and Hult (1998), and based on Zaltman, Duncan, and Holbek (1973), an initiation stage and an implementation stage for PI is being distinguished. The initiation stage of PI is a stage-gate process. The first "stage" is the idea-generation stage. Afterwards, a decision is made about which ideas are further evaluated in subsequent stages. This decision is the first "gate". In the next stages, these ideas are researched and evaluated technologically, commercially, and financially, and each stage ends with a go/no-go decision (gate). Common names for subsequent stage-gate combinations are: idea screening, concept testing, product development, and test marketing. The implementation (or commercialization) stage involves scaling up production and launching the new product. Launching the new product involves those decisions and activities necessary to present the new product to the market and to generate income from the sales. However, strategic launch decisions, such as the target market for the new product, are already determined during the initiation stage. Tactical launch decisions are taken after product development and involve adjustments of the marketing mix (i.e. product, pricing, distribution and promotion).

Second, innovativeness is included as an element of a firm's culture. It is expected that innovativeness influences all stages of the PI process, but particularly the initiation sub-

stages. Moreover, we incorporate the view of Homburg and Pflesser (2000) that innovativeness stimulates market-oriented behavior.

Third, a distinction is made between market orientation as a culture and market-oriented behavior. In line with Narver and Slater (1990), a market-oriented culture is considered as a single factor underlying the behavioral components of market orientation. This approach is incongruent with conceptualizing a market-oriented culture as a bundle of distinct values and norms (Homburg and Pflesser 2000) and with treating the behavioral components of Narver and Slater's (1990) scale of market orientation as separate strategic orientations. However, Homburg and Pflesser's (2000) view that a market-oriented culture stimulates market-oriented behaviors is incorporated. The influence of a market-oriented culture is expected to be different from the influence of market-intelligence generation, and therefore, both elements of market orientation are included in the framework.

Fourth, we incorporate one element of market-oriented responsiveness, PI, which is the focus of our model. Figure 2.3 shows the adapted framework.

Figure 2.3: The relationship between market orientation and product innovation
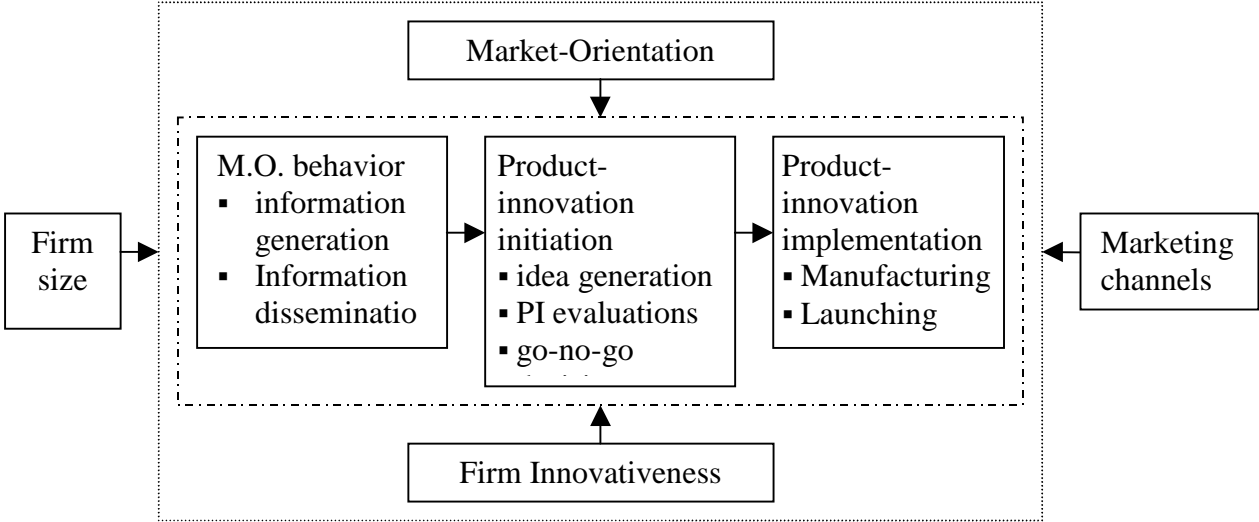
Next, marketing channels will be discussed and their influence on the relationship between market orientation and PI will be analyzed.

2.5 Marketing channels and their influence on market orientation and product innovation

In this section, we will discuss structures of marketing channels and their functions in relation to market orientation and PI, from a firm's perspective. First, we will describe types of marketing channels based on the relationship between buyers and sellers. Second, we will pay

attention to the influence of general aspects of marketing channels on PI and to the specific influence of customers and suppliers. Third, we will review the literature about how marketing channel relationships influence market orientation. So far, most of the literature has only considered the reversed relationship of how marketing – and consequently how market orientation – influences marketing channel relationships (e.g. Siguaw et al. 1998). The questions that remain are: how does a marketing channel influence market orientation (Frazier 1999) and how does market orientation influence the relationship between marketing channel partners and PI? This discussion results in an elaboration of the conceptual framework of figure 2.3.

2.5.1 *Marketing channels*

Marketing channels have been described based on the relationship between sellers and buyers by many authors. We follow Stern, El Ansary and Coughlan's (1996) characterization.

- In a conventional or free-flow marketing channel, no firm has any substantial control over another marketing-channel member. However, the marketing-channel partners may be committed to the relationship, which affects their marketing and purchasing behavior. In a transaction-based conventional marketing channel, each marketing channel member acts as an autonomous firm with its own aims and objectives. Each transaction is evaluated independently from previous or future transactions and only takes place if it is mutually beneficial. (e.g. auctions). Sometimes the partners in the marketing channel do not even know one another. The parties in the transaction require high-quality information about the values that are being exchanged (prices, products, services, guarantees etc.) to assure themselves that they have made a fair deal. Contracts may be specified for each transaction.

   When consecutive transactions remain beneficial and both parties are satisfied, the marketing channel relationship may move towards the alliance end of the continuum. This is manifested by increased levels of trust in the channel partner and commitment to the relationship. Trading practices are established with respect to the behavior of each channel member and the performance of the products. Parties no longer search for and evaluate alternative suppliers/ customers for each transaction. Consequently, a transaction requires less effort, which makes the relationship valuable for both parties. In such a relationship, additional information may be exchanged, such as information about future customer needs and technological opportunities. The relationship itself becomes an element in the evaluation of transactions, because its value diminishes if transactions are discontinued. Notice that it also takes time to create trust and commitment in a relationship. In an alliance two marketing channel partners "... function according to a perception of a single interest..." (Coughlan 2001). A strategic alliance is appropriate and therefore more likely to emerge when one side in the relationship has special needs, the other side has the capabilities to meet these needs, and each side faces barriers to exiting the relationship

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(mutual dependence). Notice that this means that alliances may or may not emerge when channel partners engage in satisfactory transactions for a long period.

- In an administered vertical marketing system, one channel member has power over another marketing channel member. The powerful marketing-channel member is so valuable for the other marketing-channel member that refusing transactions is not an option for the dependent channel member. For example, a manufacturer with strong consumer brands (Coca-Cola, Mercedes) versus a (small) retailer/ dealer or a small manufacturer versus a large retailer. The powerful marketing-channel member may even be able to influence other decisions than those related to the transactions. For example, a large retailer may force a small manufacturer to produce under the retailer's brand or to change his products.
- In a contractual vertical marketing system, a long-term contractual agreement is the basis for transactions, for example, a franchise. Contractual arrangements specify the degree of control one channel member has over another channel member (specificity of prescriptions, sanctions, etc.), in what fields (product specifications, production, services, prices, promotion campaigns, etc.), and for how long.
- In a corporate vertical marketing system, the activities of the business units in a marketing channel are coordinated by one owner. For example, a food retailer owning a meat processor, or a car manufacturer owning dealerships.

2.5.2   General aspects of marketing channel relationships and product innovation

PI requires external feedback mechanisms to ensure that complementary technical knowledge from suppliers and market knowledge of users and customers enters the PI process (Haakansson 1987; 1989; Niosi 1999). Therefore, marketing channels are important resources for innovation. For example, Oerlemans, Meeus and Boekema (1998) find that the marketing channel (e.g., important buyers and suppliers) is an important resource for innovation in most sectors (except for specialized suppliers) and for most types of innovations, except for RPIs. They also find that the purchasing and sales/ marketing function do not make a major contribution to innovation, except to RPI. This is in line with our previous assertion that customers are able to suggest minor product adjustments (Grunert et al. 1997b), but are unable to articulate radically new product benefits, which requires foresight from (marketing/ sales) managers.

Dependence on marketing-channel relationships for PI is complicated by the observation that 70% of new alliances fail and that prescriptions for successful alliance management conflict with prescriptions for successful PI (Sivadas and Dwyer 2000). Innovation requires flexibility, and a free flow of information and alliances require the specification of clear, detailed goals and responsibilities. Sivadas and Dwyer (2000) find that a firm's "cooperative competencies", composed of trust, communication, and coordination, are able to overcome this conflict and

improve the success of alliances for PI. Sivadas and Dwyer (2000) argue that the concept "cooperative competencies" is similar to the concept "absorptive capacity", which is the ability of firms to assimilate and make use of information obtained from partners (Cohen and Levinthal 1990). It is also similar to the concept "relational capability", which is the willingness and ability to engage in partnerships (Dyer and Singh 1998).

One perspective on PI in marketing channels is to consider the whole marketing channel as one organization, as a vertical marketing system (VMS), and to look at PI by one channel member as an intra-organizational diffusion process in the VMS. Kim and Srivastava (1998) develop propositions about the intra-organizational diffusion rate of technological innovations. Following Zaltman, Duncan and Holbek (1973) they propose that centralization and formalization stimulate intra-organizational diffusion. In a channel context, centralization would mean that power and control is in the hands of one channel member, i.e., the channel leader in an administered VMS. Generalizing this to PIs and marketing channels, this suggests that administered VMS stimulate the implementation of PIs, compared to conventional marketing channels. Formalization in a channel context, is the degree to which channel members explicitly emphasize the following of rules, i.e. a contractual VMS. However, low levels of centralization and formalization stimulate the initiation of PI (i.e., an increased awareness level) by increasing the susceptibility to new information. Kim and Srivastava (1998) also argue that firms sensitive to new technologies are able to encourage their employees to get familiar with technologies and to use them. In the context of marketing channels, this would mean that innovative channel partners are able to encourage a firm to initiate PI by making them aware of the innovation and by stimulating them to implement the innovation. Kim and Srivastava (1998) propose that price sensitivity of firms as buyers stimulates the rate of interorganizational diffusion, because price-sensitive organizations want to get as much value as possible from an invested dollar. However, price sensitivity is expected to decrease PI initiation because often PIs initially increase costs (Rogers 1995). The application of this proposition to marketing channels means that suppliers and customers that focus on costs and efficiency may hinder the initiation of PIs, but speed up the implementation of PIs once the PI has been adopted. Kim and Srivastava (1998) expect that organizational resistance is negatively related to interorganizational diffusion, and that risk taking and openness to external information are positively related to interorganizational diffusion. Similarly, open communication between departments is expected to stimulate the initiation of innovations, as well as the diffusion of innovations. The generalization to marketing channels and PIs is straightforward: open communication with suppliers and customers stimulates the initiation and implementation of PIs. Task interdependence is expected to stimulate intraorganizational diffusion of innovations. Task interdependence is the extent to which two units depend on each other for assistance, information, compliance, or other cooperative acts in the performance of their respective tasks. In a marketing-channel

context this may vary widely, depending on the type of product that is exchanged, e.g. commodities versus special components. Also, Kim and Srivastava (1998) propose that a top-down approach is more appropriate than a bottom-up approach for implementing technological innovations. Generalizing Kim and Srivastava's (1998) proposition to marketing channels suggests that PI initiated by a channel leader in an administered or contractual VMS is more effective than PI initiated by a channel member without channel power in a conventional VMS. Finally, conflict between departments, and hence between marketing-channel partners, is expected to decrease the rate of intraorganizational diffusion, because it decreases information sharing.

2.5.3 Customers and product innovation

Customers play an important role throughout the PI process. First, they can initiate the PI or be an important source of new product ideas. Second, customers are the gates towards the consumer, and therefore customer acceptance is crucial to the success of the PI. Finally, customers hold important information about consumer needs and wants, which is crucial to developing successful new products. This view is supported by Gemunden, Ritter and Heydebreck (1996) when they argue that, besides defining new requirements, buyers solve problems of implementation and market acceptance, and they have a reference function.

The initiating role of customers is supported by Von Hippel (1988), who finds that particularly the group of customers that he describes as "lead users" are an important source of new product ideas for a firm. Morrison, Roberts and von Hippel (1998) find that "lead users" are often innovative themselves. However, Grunert, Harmsen, Meulenberg and Traill (1997b) quote companies saying that really new products cannot come from observing the market, which can only point to minor product adjustments.

Most research does not distinguish between the role of customers as a gate towards consumers and as a source of information about consumers. Shaw (1994) also concludes that an interface with users is essential for successful innovation.

Gemunden, Ritter and Heydebreck (1996) show that a customer relationship is important for all PIs. They conclude that particularly the synergy between supplier and customer interaction is important for successful product improvements, while customer interaction and contact with universities is particularly important for developing new products. Grunert, Harmsen, Meulenberg and Traill (1997b) suggest that links with retailers are particularly important for PI in the food sector.

2.5.4 Suppliers and product innovation

Suppliers are usually considered as important for PI as sources of new technology and new supplies (Gemunden et al. 1996). Grunert, Harmsen, Meulenberg and Traill (1997b) argue that links with suppliers are vital to successful process innovation in the food industry and Rama (1996) concludes for commodity-oriented industries that learning to use new equipment and input from suppliers is equally and probably even more fruitful than internal innovation.

2.5.5 Incorporating marketing-channel relationships in the relationship between market orientation and product innovation of firms

The previous sections show that marketing-channel relationships, particularly with customers, are a valuable element of market orientation. In this section, we will refine the conceptual framework of the relationship between market orientation and product innovation by incorporating marketing channel relationships.

First, it is hypothesized that the influence of market information from marketing-channel partners on PI is more specific than the influence of market orientation, because market orientation is not just about current customers, but also about potential customers.

Second, based on the literature review, we hypothesize that channel relationships directly influence both stages of PI, i.e., new product initiation and new product implementation. Innovative channel partners stimulate PI initiation and a lack of innovative channel partners may decrease PI initiation. Firms become customer led if relationships with current customers have a strong influence on the firm's PI. Truly market-oriented firms do not only depend on marketing channel relationships for their PI. True market orientation may substitute for a lack of innovative channel partners and thus avoid market myopia. Also, channel partners increase PI implementation, if the channel partners support the initiated innovation, because channel partners provide important capacities for PI implementation.

Third, the strength of the relationship between a firm and its marketing-channel partners moderates the influence of the channel partner on the firm's PI. For example, stronger relationships with market-channel partners might increase the influence of marketing-channel partners on PI, which makes the firm customer led, thus introducing the risk of market myopia. Based on these arguments, the framework in figure 2.4 is elaborated.

Figure 2.4: An elaboration of the influence of marketing channels on the relationship between market orientation and product innovation
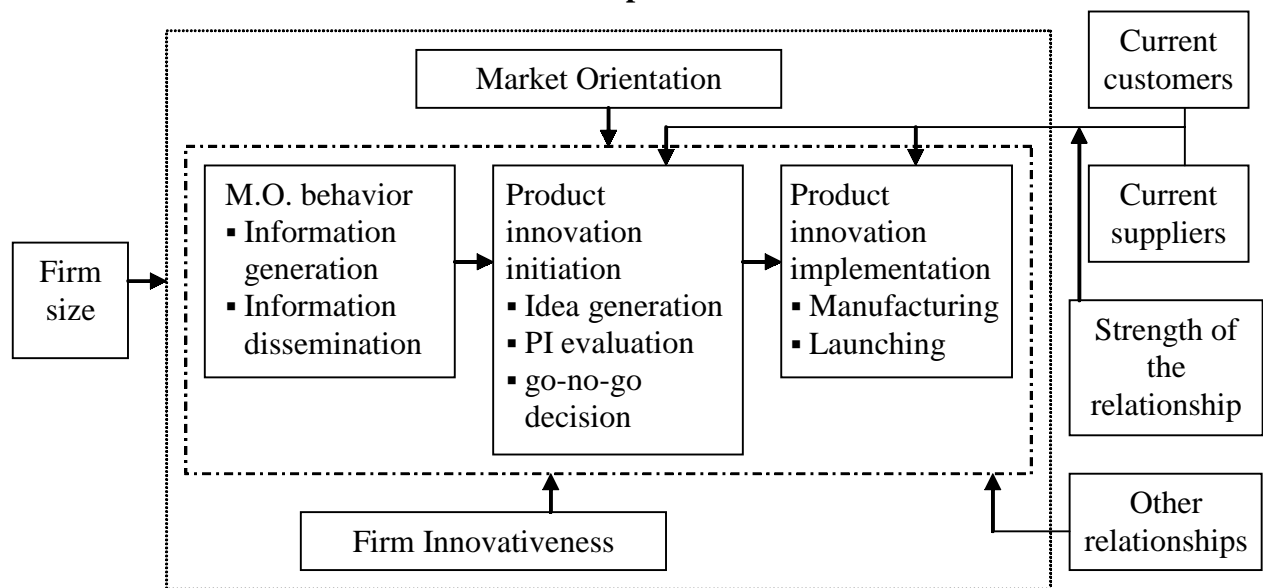
2.6 Market orientation and product innovation in small firms

In this section, our general framework is elaborated for SFs. First, we will review general characteristics of SFs. Second, we will discuss how these general characteristics influence innovation in SFs. Third, we will describe marketing practices in SFs. Fourth, we will discuss issues of marketing-channel relationships that are specific for SFs.

2.6.1 Characteristics of small firms

There is no widely-accepted statistical demarcation of an SF. The number of employees might define an SF. In Europe the demarcation between small and medium-sized firms varies across countries, ranging between five and fifty employees (Nooteboom 1994). The importance of SFs is illustrated by the fact that about 34 percent of the workforce in the European Union is working in firms with less than 10 employees (European Commission 2000). We will refrain from the debate about the appropriate definition of an SF and lay down a definition that fits the purpose of our study: an SF is a firm which is run and controlled under the direct supervision of the owner.

SFs have limited resources at their disposal and the owner's personal network is important to acquire the necessary resources. However, suppliers are often reluctant to supply small quantities and price discounts that are offered to large customers are often unavailable for SFs. Moreover, SFs are less attractive for suppliers than medium-sized and large firms, because the demand per firm is small and often highly flexible. SFs favor flexible relationships with suppliers in order to profit from attractive offers in the market. On the one

hand, SFs are at a disadvantage to acquire cheap financing on the capital markets. On the other hand, many SFs are willing to accept low returns on their equity capital. Furthermore, small volumes do not warrant specialization of tasks and the acquisition of specialists to perform these tasks. Therefore, SFs lack specialized management expertise, particularly financial management expertise.

SFs have little control over their environment (Carson et al. 1995). In general, their output does not affect the industry's prices and in the case of homogeneous products, they have to accept market prices. Moreover, they do not have the volume and economies of scale to compete on the basis of price.

In SFs, strategic planning and implementation converge. However, Stewart et al. (1999) find that entrepreneurs, focused on growth and change, tend to engage in more planning than SF owners, who focus more on stability. The manager-owner of an SF performs managerial tasks, but is often also involved in tasks normally performed by employees. In SFs, strategy is mainly a top-down process, and coordination is informal, but often under the direct supervision of the owner-manager. Therefore, there is a close relationship between the goals, respectively strategies of the firm and the personal values and goals of the owner-manager of an SF.

Opportunities for SFs compared to large firms are product and market niches, the development of new markets, and the fulfillment of customized orders, because SFs are less bureaucratic and therefore able to react swiftly to environmental changes.

2.6.2 Innovation in small firms
The contributions of SFs to innovation vary across industries, depending on entry costs and market niches. Moreover, their roles vary considerably over the industry cycle. Both large firms and SFs have comparative advantages and disadvantages with respect to innovation. Large-firm advantages are mainly material, while SF advantages are mainly behavioral (Rothwell and Dodgson 1994).

"Large firms are more than proportionally more innovative than SFs" (Galbraith 1952; Schumpeter 1939). Most arguments for this hypothesis are based on the "technology push hypothesis", meaning that innovation is initiated by new technology, based on R&D. R&D activities have economies of scale (Kamien and Schwartz 1982); researchers in a small R&D group have less contacts with other researchers of the same discipline (Damanpour 1987; Subramanian and Nilakanta 1996). Small R&D groups offer little opportunities for specialization and are unable to exploit efficiently special equipment. Furthermore, the necessarily increasing expenses for innovation in the present economy obviously put SFs in

an unfavorable position as compared to big firms (Kamien and Schwartz 1982). Finally, SFs cannot fully exploit the output of R&D efforts, because they have fewer opportunities to capitalize on the R&D results, respectively they have more difficulties protecting proprietary technology.

Most SFs are users of technology and not creators of new technology (Bessant 1999). The acquisition of external knowledge may be an important source for innovation for SFs. Also, SFs may have a bigger role in imitative innovation (Brouwer and Kleinknecht 1996; Eden et al. 1997). Rothwell (1987) argues that, although fundamental or radical invention ordinarily takes place within either large organizations or large public laboratories, SFs are disproportionately responsible for near-to-market developments and initial market diffusion. SFs may have better opportunities under the "market pull" hypothesis since they are closer to their customers. Rothwell and Dodgson's (1994) review of the literature confirms this view.

Bessant (1999) lists problems related to innovation, which might be bigger for SFs than for medium-sized enterprises. First, SFs do not have a strategic orientation, because they have weak management skills in areas like strategic planning, operations, strategy, marketing, and finance. They may operate in isolation or have a local focus and consequently may not see the need, direction, or scale of change required. SFs are unaware of external resources, or do not know how to access them, particularly with respect to technological infrastructure.

2.6.3   Market orientation in small firms
In SFs, resources for market-intelligence generation are scarce and there is no room for a marketing specialist. SF owner-managers often have a technical or production background and lack the broader perspective provided by marketing (Fuller 1994). In fact, market intelligence is mostly based on secondary data (from trade journals, sector research, conferences, and professional magazines) or personal contacts (with suppliers, customers, or bank employees) (Smeltzer et al. 1988). SFs cannot afford the luxury of specialized staff for scanning the environment (Smeltzer et al. 1988). Advances in IT will be helpful in this respect. Intelligence about suppliers and colleagues is very useful for SFs in order to innovate processes, products, and services. Sometimes SFs are organized in sector organizations that gather and distribute competitive information (such as production costs and produced quantities) for benchmarking purposes.

Market-information dissemination and interfunctional coordination are not relevant issues in SFs, where the owner makes the major decisions. However, the dissemination of market intelligence to other people in a firm might increase employee motivation. In fact, Ruekert (1992) showed that market orientation is positively related to job satisfaction.

SFs run by the owner can respond with alacrity and flexibly to market intelligence, because decision making is non-bureaucratic and the decision maker is able to oversee the whole production and marketing process (Carson et al. 1995; Nooteboom 1994). On the other hand, their responsiveness is constrained by limited marketing planning (Carson 1990). Marketing planning in SFs is constrained by limited time and money, limited expertise, and consequently, limited impact on the market and the wider environment (Carson 1990). Marketing principles, planning concepts, and marketing techniques are rarely adapted to the situation in which an SF is operating (Carson 1990), although this improves during an SF's evolution. Furthermore, marketing planning and implementation are inextricably linked (Carson 1990; Smeltzer et al. 1988)(Sashittal and Jassawalla 2001, Smeltzer Fann and Nikolaisen 1988, Carson 1990), which reduces the time horizon of marketing planning in SFs.

Market orientation seems to have similar benefits for SFs and for large firms, despite the implementation barriers. Lybaert (1998) found that SFs using more information achieved better results and were more optimistic about the future. Freel (2000) argues that new information often provides the stimulus for change in SFs and Hartman, Tower and Sebora (1994) find that customers and competitors are perceived as important sources for new product ideas by SFs.

2.6.4   *Relationships of small firms*
Carson et al. (1995) emphasize the importance of the owner-manager's personal network as a source of information, resources and customers. This approach is supported by Freel (2000), who argues that links with other organizations are an important medium for information, and by Donckels and Lambrecht (1997), who find that growth-oriented firms have positions in different kinds of networks. They too conclude that constructing networks is important for SFs. Bessant (1999) also argues in favor of developing networks for SFs to improve their innovation efforts. However, Barringer (1997) argues that while, on the whole, there are positive aspects of relational exchange, there are also disadvantages that threaten the traditional strengths of SFs. He offers a framework to assess the pros and cons of entering a relational exchange. A long-term orientation provides a reliable customer base, but might lead to a cultural clash and forecloses establishing ties with other firms. Mutual dependence results in cooperation and sharing burdens and benefits, but might reduce decision autonomy (Miles et al. 1999).

These results from the literature suggest that the influence of channel partners and the type of relationship between the SF and its channel partners on PI should be incorporated in our framework

2.6.5 A framework for the relationship between market orientation and product innovation in small firms

The discussion of SFs and marketing channels leads to a further refinement in the proposed general framework for the relationship between market orientation and PI in SFs.

First, an SF's culture closely resembles the owner-manager's values, because the owner manager is omnipresent. Therefore, market-oriented culture and firm innovativeness become personal traits of the owner-manager.

Second, dissemination of market information as part of market-oriented behavior is hardly an issue in SFs, because most decisions are made by one person, the owner-manager.

Third, the initiation stage in PI revolves around individual cognitive processes, rather than organizational group processes. Evaluation can be measured by the owner manager's outcome beliefs of the PI and his attitude towards the PI.

Finally, the SF's tactical launching activities (i.e., adjustments of the marketing mix after product development) are often limited.

Figure 2.5: The influence of marketing channels on the relationship between market orientation and product innovation, specified for SFs
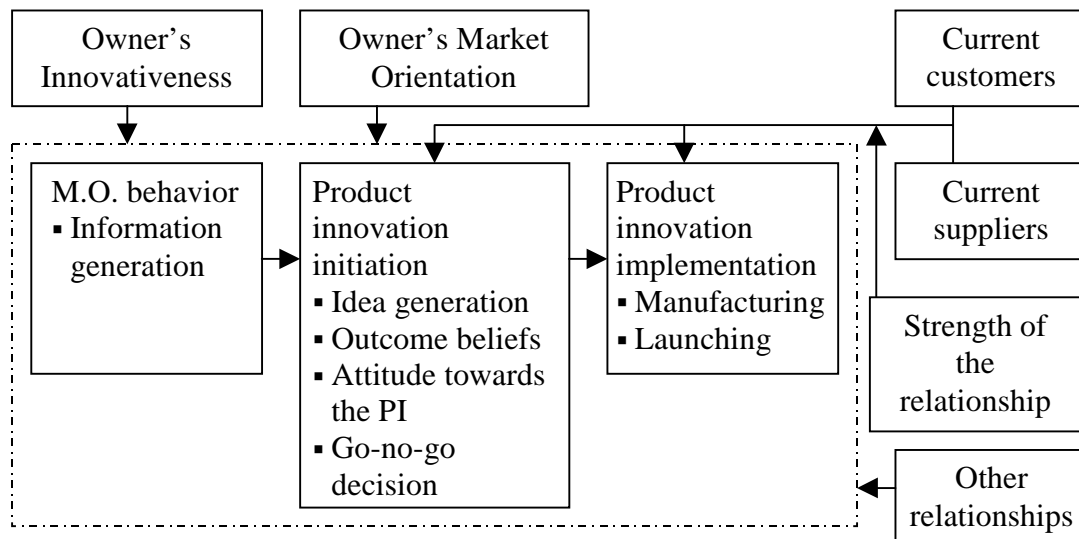
In subsequent empirical research, this framework will be used to analyze specific aspects of the relationship between market orientation and PI for SFs. In chapter three, we will explore this relationship in the Dutch horticultural sector, particularly for rose growers who do not have strong relationships with customers (i.e., a transaction-based conventional marketing

channel). In chapter four, we will explore the relationship between market orientation and RPI, particularly the intention to adopt an RPI in the Dutch poultry sector, more specifically the laying-hen sector, where long-term relationships exist between customers and suppliers (either a relationship-based conventional marketing channel or an administered vertical marketing system). In chapter five, we will explore the relationship between market orientation and RPI adoption. In chapter 6, the influence of RPI and market orientation on an SF's current success and its performance expectations are analyzed.

Chapter 3

Market Orientation, Innovativeness, Product Innovation and Performance in Small Firms[1][2]

3.1   Introduction

It is widely accepted that market orientation has a positive influence on the performance of firms (Jaworski and Kohli 1993; Narver and Slater 1990). This relationship has not only been firmly established for large companies, but has also been found in research on small and medium-sized enterprises (Pelham 2000). In analyzing the relationship between market orientation and performance, innovation has been identified as an instrumental variable. In this context, elaborate theories and frameworks about the relationship between market orientation and innovation have been proposed (Atuahene-Gima 1996; Connor 1999; Han et al. 1998; Hurley and Hult 1998; Jaworski et al. 2000; Slater and Narver 1998; Slater and Narver 1995; Slater and Narver 1999). They focus particularly on large firms and only to a lesser extent on SFs. However, it is doubtful whether the type of relationship between market orientation and innovation that has been established for large firms can be generalized to SFs, because innovation in SFs is different from innovation in large firms (Acs and Audretsch 1988; Audretsch 2002; Audretsch 2001; Cohen and Klepper 1992; Eden et al. 1997; Tether 1998; VanDijk et al. 1997). It is important to fill up that gap in our knowledge about SFs, because of the importance of innovation and small businesses for today's economy (Robbins et al. 2000). This chapter contributes to this matter by developing and testing a model of the relationship between market orientation, innovativeness, product innovation, and performance in SFs. In this context, we define the SF as a firm run and controlled under the direct supervision of the owner. This chapter is structured as follows. First, we review the concepts and notions on market orientation and innovation relevant to our research. Second, we specify market orientation and innovation for SFs and go on to propose a model that expresses the relationship between market orientation, innovation and performance in SFs. Hypotheses on these relationships are presented. We test our model on a specific type of SF: rose growers in the Netherlands. Finally, managerial implications of the results are discussed and suggestions for further research are made.

3.2   Conceptual Framework

3.2.1   Market Orientation

Two seminal articles, those of Narver and Slater (1990) and of Kohli and Jaworski (1990), coined the concept of market orientation in the early nineties. Narver and Slater (1990) represent the cultural perspective on market orientation. They define market orientation as "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 and Slater 1990). They state that market orientation consists of three behavioral components: customer orientation, competitor orientation, and interfunctional co-ordination. Continuous innovation is implicit in each of these components (Narver and Slater 1999), and the two decision criteria are long-term focus and profitability. Kohli and Jaworski (1990) represent the behavioral perspective on market orientation. They introduced market intelligence, rather than customer focus, as the central element of market orientation, because, in their view, market intelligence is a much wider concept than customer focus. "It includes consideration of exogenous market factors that affect customer needs and preferences and current as well as future needs of customers" (Kohli and Jaworski 1990). Although many other studies about market orientation have been reported, most authors either adopt the definitions of Kohli and Jaworski (1990) or Narver and Slater (1990) (Atuahene-Gima 1996; Pelham and Wilson 1995), or use them as a starting point (Deng and Dart 1994; Song and Parry 1999). In this study, we will use Kohli and Jaworski's (1990) definition of market orientation: "market orientation is the organization-wide generation of market intelligence, dissemination of the intelligence across departments and organization-wide responsiveness to it."

Responsiveness reflects the extent to which companies adjust their marketing policies to market intelligence. The narrow interpretation of responsiveness is the adaptation of offerings to expressed customer needs and market structures. This reactive response is labeled "market driven" by Jaworski, Kohli, and Sahay (2000) and "customer-led" by Slater and Narver (1998; 1999). However, being market-oriented means that companies also try to understand and respond to customers' latent and future needs (Slater and Narver 1998; 1999). Jaworski, Kohli, and Sahay (2000) elaborate on this by suggesting that market-oriented companies can "drive markets" by manipulating the structure of the market and the behavior of market players. Product innovation can be the most appropriate response to market intelligence. Therefore, focusing on the relationship between market orientation and product innovation, responsiveness is narrowed down to innovation as the component of responsiveness most relevant to this analysis.

3.2.2 Innovation

The term "innovation" has acquired various meanings over the years (Zaltman et al. 1973): the process of developing a new item, the new item itself, and the process of adopting the new item. Our research focuses on new products being "new to the company", because product innovations by SFs are often product modifications based on new types of inputs.

Innovation can be researched at various levels: the sectorial, regional, firm, and project level. During the past decades, research identifying how firms can successfully be innovative has flourished. At the firm level, research has focused on differences in firm structure, culture, and management to explain differences in innovative success (see, for example, Burns and Stalker 1961; Zaltman et al. 1973). Christensen (1997) distinguishes between sustaining and disruptive technological change. He explains why firms that are successful innovators based on sustaining technologies ignore crucial innovations based on disruptive technologies. Sustaining technologies improve the performance of established products, along the dimensions of performance that mainstream customers in major markets have historically valued. Disruptive technologies have a new value proposition that a few, usually new, customers value. Elaborating Christensen's argument, Meeus and Oerlemans (2000) conclude that in turbulent markets a focus on continuous innovation (adaptation) is a better innovation policy than inertia and gradual innovation (selection) and vice versa. We investigate innovation at the firm level, because we want to understand the impact of management characteristics on the level of innovation in the SF.

At the project level, where innovation projects are the objects of study, three studies have provided important insights: the SAPPHO studies (Rothwell 1972; 1974), the NewProd project (Cooper 1979), and the Stanford Innovation Project (Maidique and Zirger 1984). In each study, understanding customers consistently came up as an important factor for successful new product-development projects.

3.2.3 Small Firms

There is no widely accepted statistical demarcation of an SF. The number of employees might define an SF. In Europe the demarcation between small and medium-sized firms varies across countries, ranging between five and fifty employees (Nooteboom 1994). The importance of SFs is illustrated by the fact that about 34 percent of the workforce in the European Union is working in firms with less than 10 employees (European Commission 2000). We will refrain from the debate about the appropriate definition of an SF and lay down a definition that fits the purpose of our study: an SF is a firm run and controlled under the direct supervision of the owner. A farm is a case in point. Actually, SFs are a subset of small and medium-sized enterprises (SMEs). Rothwell and Dodgson (1994) listed advantages and disadvantages of SMEs and large firms as far as innovation is concerned. They concluded that SMEs'

advantages are mainly behavioral, such as entrepreneurial dynamism, internal flexibility, and responsiveness to changing circumstances, while those of large firms are primarily material, such as financial and technological resources. We will discuss those differences between SFs and medium-sized and large firms that seem particularly relevant to innovative behavior.

Compared to large firms, SFs are non-bureaucratic and more flexible; the owner is the decision maker (Carson et al. 1995; Nooteboom 1994). Private and business motives and goals of managers are more intertwined in SFs than in medium-sized or large firms (Carland et al. 1984). Information systems in SFs are relatively simple. Information is based on secondary data or on direct, formal and informal, external contacts of the owner (Smeltzer et al. 1988). The owner of an SF is often a craftsman with specific operational capabilities (Nooteboom 1994), but SFs perform various activities with less expertise than large firms (Freel 2000), because they have little room for functional specialists (Carson et al. 1995). For example, SFs rarely have the legal expertise to acquire patents nor can they build and defend trademarks (Eden et al. 1997). Small size limits the possibilities to fully capture the gains of innovation (Cohen and Klepper 1992). Also, SFs' limited access to finance for venture capital is a hotly-debated barrier to innovation (Carson et al. 1995; Freel 2000). Sometimes, SFs develop competencies in networks, which underlines the importance of networks for SFs (Carson et al. 1995). However, while large firms have the resources and strategic management capabilities to conceive and develop new future core competencies, (networks of) SFs are rarely equipped for such a fundamental long-term planning process (Shrader et al. 1989). Finally, it is important to notice that various SFs operate in niche markets, which are not served by large firms (Carson 1985; Christensen 1997; Eden et al. 1997).

3.2.4 Market Orientation in Small Firms

The specific resources and capabilities of SFs have consequences for market orientation as defined by Kohli and Jaworski (1990)[3]. In SFs, resources for market intelligence generation are scarce and there is no room for a marketing specialist. In fact, market intelligence is mostly based on secondary data (from trade journals, sector research, conferences, and professional magazines) or personal contacts (with suppliers, customers, or bank employees) (Smeltzer et al. 1988).

When SFs sell a differentiated product in a local or regional market, they can use market intelligence more effectively. Advances in IT will be helpful in this respect. Intelligence about suppliers and colleagues is very useful for SFs in order to innovate processes, products, and services.

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[3] Note that we do not propose that small firms are less market oriented than large firms. Research suggests that small firms can be just as market oriented as large firms. Moreover, Pelham and Wilson (1995) and Slater and Narver (1996) report about small firms that are highly market oriented.

The dissemination of market intelligence is not a relevant issue in SFs where the owner makes the major decisions. However, the dissemination of market intelligence to other people in the firm might increase employee motivation. In fact, Ruekert (1992) showed that market orientation is positively related to job satisfaction.

SFs run by the owner can respond with alacrity and flexibly to market intelligence, because decision making is non-bureaucratic and the decision maker is able to oversee the whole production and marketing process (Carson et al. 1995; Nooteboom 1994). On the other hand, their responsiveness is constrained by limited financial and technical resources.

3.2.5   Innovation in Small Firms

Innovation in SFs has been discussed extensively in the literature on entrepreneurship. The term "entrepreneur," has been applied amongst others to the "..person who creates new combinations ….who sees how to fulfill currently unsatisfied needs or perceives a more efficient means of doing what is already being done" (Schumpeter (1934), quoted by Kamien and Schwartz (1982)). No generally accepted definition of an entrepreneur exists. Cunningham and Lischeron's (1991) definition of an entrepreneur as one who creates, manages, and assumes the risk of a new venture, embraces the total innovative process. The term "entrepreneurship" has been applied amongst others to the identification and exploitation of an opportunity, and to the development of a niche in the market (Cunningham and Lischeron 1991). However, Lumpkin and Dess (1996) distinguish between entrepreneurship and entrepreneurial orientation. In their view, entrepreneurship refers to the content of entrepreneurial decisions, i.e., what is undertaken, while entrepreneurial orientation refers to key entrepreneurial processes, i.e., how new ventures are undertaken. Lumpkin and Dess (1996) identify five dimensions in entrepreneurial orientation: autonomy, risk taking, proactiveness, competitive aggressiveness, and innovativeness. This study focuses on innovativeness as the entrepreneurial dimension relevant to our research.

Innovativeness is defined as "…the notion of openness to new ideas as an aspect of a firm's culture" (Hurley and Hult 1998). In an SF, innovativeness implies a willingness of the owner to learn about and adopt innovations, both in the input and output markets. High innovativeness of an SF does not mean that the owner is innovative in all domains. Kirton (1976) shows that each individual has a preferred style of creativity and decision making, which can vary from adaptive to innovative. Adaptors have a preference for doing things better within the generally accepted theories, policies, and viewpoints. Innovators prefer to do things differently. Innovators turn a blind eye to accepted thoughts to reconstruct the problem and solve the new problem. Buttner and Gryskiewicz (1993) find that founders of a company

with an adaptive style of decision making are more likely to continue the business as time passes than founders with a more innovative style of decision making.

Domain-specific innovativeness of SFs captures the innovativeness of the owner for a particular domain of interest (Gatignon and Robertson 1985). Some domains can capture the attention of owners with an adaptive style of decision making and other domains can attract owners with an innovative style of decision making.

Limited resources and capabilities, as discussed, prevent SFs in many industries from conducting in-house research and development activities. Many innovations by SFs are based on off-the-shelf technologies, concepts, and/or resources offered by supplying industries. As a result, new inputs are a very important source of innovations for SFs. Networks of SFs can establish collective R&D programs as a basis for product innovation of network members. Co-operative competencies (Sivadas and Dwyer 2000) of participating firms seem important for the success of such programs. SFs that produce differentiated products can also innovate individually, by adapting products to the needs of the target group of customers.

3.3   The Model

The model aims at explaining innovation and its impact on market performance for SFs. It focuses on market orientation and innovativeness, a dimension of entrepreneurial orientation, as explanatory variables. They are core concepts in two streams of research that are relevant for innovation in SFs: marketing and entrepreneurship. Hypotheses are formulated on the basis of the model.

In our model, market orientation, as conceived by Kohli and Jaworski (1990), is adapted to the analysis of the relationships between market orientation, innovation, and performance in SFs as follows: (a) customer intelligence is used as a representation of market intelligence; (b) information dissemination is not included, since information collection, strategy planning, and decision making are integrated in one person, the owner; and (c) response is refined to innovation, because of the research objective. Since the available alternatives on the input side greatly influence the small enterprise's innovation responsiveness, *supplier intelligence* is included as a separate variable.

Owner *innovativeness* seems to be an essential element of entrepreneurial orientation for innovation in SFs. We expect the *innovativeness* of the owner to permeate all variables of the model. A distinction is made between *innovativeness* as a general characteristic, which reflects the values of the owner and *domain-specific innovativeness*, which also reflects the owner's interest in a specific domain. In SFs, we expect market orientation to moderate the relationship between *innovativeness* in the new product domain and *product innovation*.

Figure 3.1: Customer Market Intelligence and Innovation in Small Firms, the model
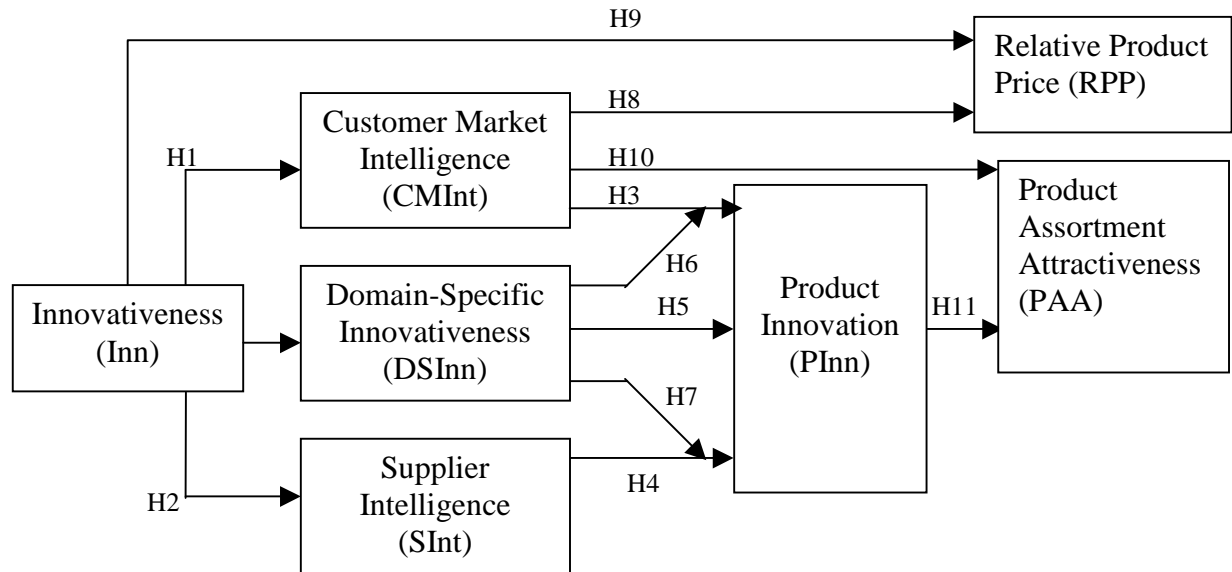
Our model as specified in figure 3.1 can be expressed in the following recursive model:

CMInt	=	f (Inn)	(1)
SInt	=	f (Inn)	(2)
DSInn	=	f (Inn)	(3)
PInn	=	f (CMInt, CMInt x DSInn, SInt, SInt x DSInn, DSInn)	(4)
RPP	=	f (Inn, CMInt)	(5)
PAA	=	f (CMInt, PInn)	(6)

Following Slater and Narver (1995), we assume that *product innovation* mediates the relation between *customer market intelligence* and company performance. We use two market-related performance criteria: (a) *product-assortment attractiveness*, a weighted average of firm assortment and market prices of the respective products in the assortment. This measure expresses the market attractiveness of the chosen assortment; and (b) *relative product price,* a price premium on the average market price, which a firm is able to realize. This is a measure of doing better or worse than other companies in product quality and service.

3.4 Hypotheses

The following hypotheses are proposed with respect to the relationships between the variables in our model. It should be stressed that the model and hypotheses are specified for SFs.

The first hypothesis addresses the relationship between innovativeness and customer market intelligence in SFs. Innovativeness being an element of entrepreneurial orientation is expected

to stimulate customer market intelligence, because customer information is a key resource for innovation (Hartman et al. 1994). Kohli and Jaworski (1990) argue that: "the more positive the senior manager's attitude towards change, the greater the market orientation of the organization" (Kohli and Jaworski 1990)[4]. This is supported by the strong correlation between entrepreneurial orientation and market orientation reported by Miles and Arnold (1991) and Slater and Narver (2000). Homburg and Pflesser (2000) identified innovativeness as a basic organizational value supporting market orientation. We expect this relationship to hold for SFs as well. Keeping in mind that customer market intelligence is the core element of market orientation of SFs, we hypothesize that:

H1:   Innovativeness is positively related to customer market intelligence.

In SFs, innovation rarely equates formal Research and Development: "Most are not creators but users of technology and so a prime concern is that of effective technology transfer" (Bessant 1999). "Disadvantages of scale dictate that small enterprises must have easy and affordable access to external sources of aid and information to surmount inevitable shortfalls in internal resources and skills" (Freel 2000). Owners of SFs with an entrepreneurial orientation will use their suppliers as a valuable source of technological and marketing information, because suppliers are often willing and able to help their customers. As a result, various suppliers have expert power vis-à-vis small enterprises. Therefore, we propose the following hypothesis:

H2:   Innovativeness is positively related to supplier intelligence.

In the marketing literature, market intelligence is expected to improve a firm's capacity to innovate (see, for example: Day 1994; Grunert et al. 1997a; Hurley and Hult 1998; Li and Calantone 1998; Slater and Narver 1995). Companies are able to detect the unfulfilled needs of customers through *customer market intelligence* and are expected to respond to that intelligence. Some evidence for a positive relationship between market orientation and innovation exists. Han, Kim, and Srivastava (1998) find that customer orientation (though not competitor orientation and interfunctional co-ordination) is positively related to the number of innovations implemented. We propose the following hypothesis:

H3:   Customer market intelligence is positively related to product innovation.

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[4] In their empirical work, Jaworski and Kohli (1993) do not test this proposition directly. They argue that new products, services, and programs often run a high risk of failure and hypothesize that top management's risk aversion is an antecedent to market intelligence generation. This hypothesis is not

Technological change initiated through R&D is considered to be the key technology-push source of innovation (see, for example, Kamien and Schwartz 1982). We have argued that R&D is often substituted by external contacts in small enterprises. Through *supplier intelligence*, companies are able to detect new technologies and other types of input necessary for innovation (Carson et al. 1995). For example, Rama (1996) shows that upstream industries are important sources for innovation, especially for commodity-type industries. Case studies for the food industry support the idea that a link to suppliers is important for process innovations and that a link with retailers is important for product innovation (Trail and Grunert 1997). However, if SFs are too small to initiate product innovations, the retailers may cooperate with the suppliers of the SFs to initiate product innovations. This is particularly the case when suppliers' inputs have a substantial influence on the product characteristics of the SF, for example, seeds as an input of farms.

In reality, SFs rarely scan for new technological opportunities or articulate their needs (Bessant 1999). Suppliers may take a more active role in stimulating innovation by trying to influence the SF's innovation decision. In Rogers' (1995) terminology such firms are called "change-agents." Change-agent contact stimulates the adoption of innovations, which offers support for the following hypothesis:

H4: Supplier intelligence is positively related to product innovation.

Domain-specific innovativeness, which is defined as a willingness of the owner to learn about and adopt innovations in a specific domain, is positively related to innovation in that domain. The question is how a market orientation and an entrepreneurial orientation together affect innovation in a specific domain. If market orientation is interpreted as the adaptation of product offerings to expressed customer needs (Christensen 1997) and if the value of traditional market research tools for really innovative products is limited, market-oriented firms are "notoriously lacking in foresight" (Hamel and Prahalad 1994). Consequently, the market orientation of these firms is not reinforcing the entrepreneurial orientation innovativeness, in its influence on innovation. For SFs, this type of market orientation may be the only option, because they do not have the resources to drive markets (Connor 1999). Consequently, a market orientation may slow down innovation in an SF whose manager is highly innovative in a specific domain, until the need for this new product shows up in the SF's customer market intelligence. Conversely, firms that lag behind in innovativeness in a specific domain are stimulated by customer market intelligence to adopt an innovation, because customers are able to express their needs for less innovative products, often modifications of existing products. This argument also holds for supplier intelligence, even though suppliers to SFs have an interest in promoting innovation by their client firm, because

many suppliers to SFs also lack detailed information about fundamentally new innovations. This leads to the following set of hypotheses:

H5: *Domain-specific innovativeness is positively related to product innovation.*

H6: *Customer market intelligence inhibits product innovation in small firms with highly innovative owners and stimulates product innovation in small firms with less innovative owners.*

H7: *Supplier intelligence inhibits product innovation in small firms with highly innovative owners and stimulates product innovation in small firms with less innovative owners.*

We expect *customer market intelligence* to be instrumental in achieving better service and product quality, which result in a higher price for the products. Pelham and Wilson (1995) find that market orientation is the only variable in their model that significantly influences the level of relative product quality. Our model only includes *relative product price* to capture the extent of service and quality differentiation. Narver and Slater's (1990) and Pelham and Wilson's (1995) findings that market orientation is significantly associated with a differentiation strategy offers support for a positive relationship between *customer market intelligence* and *relative product price*. We expect that this relationship also holds for SFs:

H8: *Customer market intelligence is positively related to relative product price.*

SFs cannot maintain a differentiated market position based on superior quality and service (and consequently a higher *relative product price*) in the long run without being innovative, because colleagues will copy a successful marketing policy and this will level out high relative prices. Therefore, in order to maintain high relative prices an SF needs to innovate continuously on all aspects of its marketing policy: new products, better quality and service, but also innovative distribution methods. Therefore, we expect general innovativeness of the owner to influence the relative price of the products:

H9: *Innovativeness is positively related to relative product price.*

While a positive relationship between market orientation and performance/marketing effectiveness has been widely reported (Jaworski and Kohli 1993; Narver and Slater 1990), Pelham (2000) established this relationship for SMEs as well. Atuahene-Gima (1996) found a positive relationship between market orientation and product advantage, which refers to the benefits that customers get from the new product. Foregoing findings suggest a positive relation between *customer market intelligence* and *product-assortment attractiveness,* in terms of average market price received:

H10: Customer market intelligence is positively related to product-assortment attractiveness.

Firms try to make new products that are more attractive than existing products, and thus to realize a price premium. Moreover, at the beginning of the product life cycle new products are not yet widely available and competition is low, which enhances the price level of new products (excluding the case of temporarily low penetration prices). However, high prices of new products attract competition, leading towards lower prices. Prices will decrease further, since the new product will become mature and eventually obsolete due to new products entering the market. Foregoing arguments lead to the following hypothesis:

H11: Product innovation is positively related to product-assortment attractiveness.

3.5 Research Design

Our hypotheses will be tested by data on rose growing firms in the Netherlands. The Dutch rose-growing industry consists of specialized family firms, realizing an average annual turnover of approximately 450.000 Euro. Average tillage areas are approximately 11500 m^2 of heated glasshouse per firm. Roses are sold through auctions. The Dutch flower industry is a dynamic industry with an international focus. Actually, it is a main player in the global flower trade (Porter 1990) and does not receive any support from the European Union's Common Agricultural Policy. Foregoing characteristics of the industry suggest that Dutch rose-growing firms are suited for testing our hypotheses.

3.6 Methodology

3.6.1 Measures

Archival data were used when available to overcome cognitive biases, but, like most studies in this field of research, this study relies heavily on perceptual measures. Multi-item scales were used, because they have a higher reliability than single-item scales (see for example Kerlinger 1985). The use of multi-item scales as a measurement methodology has a long history in psychology (see, for example, Cronbach and Meehl 1955; Thurstone 1934) and is widely accepted in the marketing literature (see, for example, Bearden et al. 1993; Bruner and Hensel 1992).

Most concepts in our model can be measured by existing measures, which consist of a large number of items to assure their reliability and face validity. The straightforward use of these existing measures would result in a lengthy questionnaire, which puts a heavy load on respondents and threatens to reduce the quality of the data. We made a trade-off between the length of the questionnaire and the number of items per measure by reducing the number of items per measure and testing the reliability and validity of the reduced measures. Construct

measures and Cronbach's alphas are shown in Appendix A. Summated scores are used for subsequent analyses.

The measure of *customer market intelligence* in SFs is a multi-item measure that includes customer market intelligence elements from general measures of market orientation. More specifically, items from Narver and Slater's (1990) customer-orientation element, Jaworski and Kohli's (1993) information-generation element, and Ruekert's (1992) "obtains-and-uses-information-from-customers" element were evaluated. Most items required adaptation to SFs, based on discussions with owners of SFs. Twenty-six items to measure *Customer Market Intelligence* were included in a pretest questionnaire, along with 18 items that measure other elements of market orientation. Principal component analysis with oblique rotation was used to select suitable items for our Customer Market-Intelligence measure. Only items that loaded higher than 0.6 on the hypothesized component and lower than 0.3 on other components were selected. Four items were selected for use in our model. To judge the validity of our four-item measure, we performed correlation analyses. Subsequently, our four-item measure of Customer Market Intelligence was highly correlated with the sum of the 40 remaining market-orientation items (0.67; $p < 0.01$) and with the sum of the 26 items that measure customer market intelligence (0.67; $p < 0.01$). Moreover, 38 of the 40 remaining market-orientation items were significantly ($p < 0.05$) correlated with our four-item measure of Customer Market Intelligence.

Our measure for the owner's *innovativeness* is based on Leavitt and Walton's (1975) scale for Innovativeness. Two dimensions have been identified in Leavitt and Walton's (1975) scale for Innovativeness (see Joseph and Vyas 1984), one with positively formulated items labeled as the openness dimension and one with negatively formulated items labeled as the cautiousness dimension. In the original scale, the sum of the items from the cautiousness dimension was subtracted from the sum of the items from the openness dimension. We only used items from the openness dimension in our model because summating items from two dimensions in one measure is questionable from a measurement perspective (see Steenkamp and Trijp 1991) and reduces its reliability. Additionally, many items from the openness dimension that were considered ambiguous by owners during face to face interviews—even after the wording had been adapted for use in SFs—were discarded. Eventually, four items for *Innovativeness* were included in the questionnaire. One item was discarded during a reliability assessment to ensure better measurement properties.

We apply Goldsmith and Hofacker's (1991) scale for *Domain-Specific Innovativeness*. The six original items were applied to the domain of rose varieties and included in the questionnaire. During the interviews, owners of SFs found no ambiguous items. Three negatively formulated items were discarded during a reliability assessment to ensure better

measurement properties. Further analyses showed that, as expected, these items were negatively correlated with the sum scores of the items that we eventually used. However, the correlation was weak (-0.32; *p<0.01*, -0.29; *p<0.01*; -0.39; *p<0.01*) compared to the correlation of the items that we eventually used (0.93; *p<0.01*, 0.89; *p<0.01*; 0.84; *p<0.01*).

The meaning of *supplier intelligence* was discussed with rose growers during interviews. Information from suppliers of rose plants was considered relevant for deciding which roses to grow. So supplier information in our research was focused on information from suppliers of rose plants. We asked the growers what information they would like to receive from their suppliers of roses and what information they had already received. We categorized the answers into information about the quality, (such as "shelf life"), growth characteristics (such as production, colors and susceptibility to diseases), and market potential of varieties. One item per category was generated and included in the questionnaire. One general item regarding the breadth of contact between the owner and the supplier was also included in the questionnaire but later discarded during reliability assessment to ensure better measurement properties.

Product innovation in the rose industry is, to a large extent, determined by new varieties grown. In contrast to many other studies on innovation, we use an objective measure of innovation, the weighted average age of the varieties of roses grown. Age was defined as the number of days between 1 January 1997 (the month of the survey) and a variety's date of registration in the Netherlands. A negative sign was included for an easier interpretation of the results.

$$\overline{A} = -\left(\sum_{i=1}^{n} A_i * M_i\right) \Big/ \sum_{i=1}^{n} M_i \qquad (7)$$

where

$\overline{A}$ = The average age of the rose varieties grown by a certain grower weighted by area

A_i = The number of days between 1 January 1997 and a varieties date of registration in the Netherlands (the survey was executed in January 1997)

M_i = The area in square meters of a certain variety "i" grown by a rose grower

n = The number of varieties that a grower grows

An owner's perception of firm performance was determined during face-to-face interviews and potential items for the measure were generated. Four elements were identified: Relative Product Price (RPP) (relative to the average price for a specific variety), Product-Assortment Attractiveness (PAA), job satisfaction, and overall performance and profitability. PAA and RPP were used as measures of performance in our model. RPP was measured using self-

reported information, which is common in this kind of research (see, for example, Narver and Slater 1990; Pelham 2000; Pelham and Wilson 1995). Two items for RPP were included in the questionnaire. PAA was calculated as a weighted (by area) average of Dutch annual average prices of different varieties of roses (Association of Dutch Flower Auctions), grown by the respective firm. This performance measure provides an objective measure for annual average market value of the roses in a grower's product portfolio.

3.6.2 Data

A written questionnaire mailed to 980 rose growers was used to estimate the parameters in our model. 491 rose growers returned the questionnaire. This high response rate was achieved because the questionnaire was attached to a poll of the Dutch Product Board for Horticulture that is considered mandatory by most Dutch rose growers. For our analyses we only used growers of large-headed roses, leaving 306 questionnaires. For 152 growers, information was available about all the variables in our model, including variables that require information about the area and kind of varieties grown. These 152 growers were used in our analyses. To test for non-response bias, we compared the respondents with missing values with those without missing values on company size (total area of roses) and the variables in our model. There were no significant differences between the two groups.

3.6.3 Estimation procedure

We first applied Ordinary Least Squares (OLS) regression to estimate the coefficients in our system of equations. OLS is an appropriate technique for our model, because it is a recursive model. However, if the error terms in the different equations of our model are correlated and the explanatory variables in each equation are not identical, Seemingly Unrelated Regression (SUR) may give more efficient estimates (Zellner 1962). As suggested by Breusch and Pagan (1980), we used the LaGrange multiplier statistic to test whether the error terms in our system of equations were correlated and consequently whether SUR might be a more appropriate technique than OLS.

3.7   Results

The LaGrange Multiplier statistic on the error terms in our system of equations after OLS regression analyses showed that the error terms were significantly correlated, and hence we used Seemingly Unrelated Regression (SUR) to obtain the final parameter estimates.

The beta coefficients for the parameters in our model are presented in Table 3.1. These results confirm Hypotheses 1 and 2, stating that *Innovativeness* positively affects *customer market intelligence* and *supplier intelligence*. Also, *domain-specific innovativeness* is positively affected by *Innovativeness*. *Domain-specific innovativeness*, *supplier intelligence* and

customer market intelligence are significant explanatory variables for innovation in our model, which supports Hypotheses 3, 4 and 5.

Table 3.1: **Regression Coefficients from the (Seemingly Unrelated) Regression Analyses for Testing the Relations in our Model**

Independent Variables	Dependent Variables					
	CMInt	SInt	DSInn	Pinn	RPP	PAA
I	0.40**	0.34**	0.48**		0.25**	
CMInt				0.57**	0.18*	0.17*
CMInt* DSInn				-1.10**		
Sint				0.48**		
Sint * DSInn				-0.73*		
DSInn				1.61**		
Pinn						0.23**
RPP						
PAA						
OPP						
N	152	152	152	152	152	152
R^2	0.16	0.12	0.23	0.26	0.13	0.07

* $p < 0.05$ two-tailed   ** $p < 0.01$ two-tailed

CMInt	=	customer market intelligence
DSInn	=	domain-specific (rose varieties) innovativeness
SInt	=	supplier intelligence
RPP	=	relative product price
PAA	=	product-assortment attractiveness
Inn	=	innovativeness
PInn	=	product innovation

Hypothesis 6 that *customer market intelligence* inhibits *product innovation* by owners of SFs that are highly innovative in the new product domain but stimulates *product innovation* by owners of SFs that are less innovative in the new product domain, is substantiated. To provide more insight into this non-linear relation, we divided the sample into three groups with low, medium, and high scores on *domain-specific innovativeness*.

Table 3.2:   Regression Coefficients from the Regression Analyses for Testing the Moderator Effects of DSInn in the Model

Independent Variables	Dependent Variable is Product Innovation		
Group	Low DSInn	Medium DSInn	High DSInn
CMInt	0.23*	-0.03	-0.24
Sint	0.31*	-0.23	-0.08
N	51	53	47
R^2	0.18	0.06	0.06

*   coefficient is significantly different $p < 0.10$ two-tailed from the coefficient in the high DSInn group

Beta coefficients for the relationship between *customer market intelligence* and *product innovation* in the low, medium, and high *domain-specific innovativeness* group show a smooth curvilinear relationship. The coefficient for *customer market intelligence* in the low *domain-specific innovativeness* group is significantly different from that in the high *domain-specific innovativeness* group ($p<0.05$).

The pattern in the beta coefficients for the relationship between *supplier intelligence* and *product innovation* is similar. The coefficient for *supplier intelligence* in the low *domain-specific innovativeness* group is significantly different from that in the high *domain-specific innovativeness* group ($p<0.10$). The coefficient for *supplier intelligence* in the medium *domain-specific innovativeness* group is not significantly different from either that in the high or in the low *domain-specific innovativeness* groups. These results offer support for Hypothesis 7.

Hypothesis 8, stating that *customer market intelligence* is positively related to *relative product price* is supported in addition to Hypothesis 9, stating that *innovativeness* is positively related to *relative product price*. Hypothesis 10, stating that *customer market intelligence* is positively related to *product-assortment attractiveness* is also supported, which suggests that *customer market intelligence* contributes to the selection of generic products. Hypothesis 11, stating that *product innovation* is positively related to *product-assortment attractiveness* is supported, which suggests that *product innovation* contributes to market success.

3.9   Discussion

In line with the growing amount of evidence about the positive impact of market orientation on company performance, these results confirm that *customer market intelligence* is positively related to the company performance of SFs. *Customer market intelligence* is probably helpful to perform better in terms of quality, service or timing, which results in better *relative product*

prices (RPP). Consequently, *customer market intelligence* about the augmented product, such as intelligence about quality and service requirements offers opportunities to become a preferred supplier. Future research should elaborate on how SFs differentiate their products based on *customer market intelligence*. Our results also show that a market orientation is helpful to SFs in markets with relatively homogeneous products in selecting an attractive product assortment. It confirms the value of market information about the generic product for SFs.

The observed role of *customer market intelligence* in the relationship between *domain-specific innovativeness* and *product innovation* offers an explanation for the debate about whether market orientation stimulates or inhibits innovation. Kohli and Jaworski (1990) cite several authors who found that the adoption of the marketing concept inhibits organizations from developing truly breakthrough innovations, and Atuahene-Gima (1996) even found that market orientation had a negative effect on product newness. Our results show that Market Orientation may do both, depending on the *innovativeness* of the company in the product domain. Owners of an SF with a highly innovative entrepreneurial orientation who are keen, perhaps too keen, on new products are mitigated by *customer market intelligence*. Owners who are less innovative in a specific domain are stimulated to innovate by *customer market intelligence*. Grunert, Harmsen, Meulenberg and Traill (1997b) suggest that product innovation is stimulated by a firm's enthusiasm for the product and a focus on the market. Our results elaborate on this view, by specifying the relationship between a firm's interest in the product, market orientation, and product innovation.

The role of *supplier intelligence* is similar to *customer market intelligence* in the relationship between *domain-specific innovativeness* and *product innovation*. S*upplier intelligence* stimulates *product innovation* if a company is less inclined to innovate but inhibits *product innovation* if a company is very keen on new products. This offers some tentative support for our view that suppliers of SFs have a role in the (downstream) market orientation of SFs. *Innovativeness* of the owner, one dimension of an entrepreneurial orientation, appears to be an important characteristic of an SF, because it is highly correlated with performance, as measured in our analyses, and it permeates all variables in our model. This result is in accordance with research findings from the past, which stress the entrepreneurial skills of farmers as the decisive variable in the success or failure of a farm business (Zachariasse 1974). Moreover, the effect of *customer market intelligence* on innovation depends on the owner's innovativeness in a specific domain. Exploring other dimensions of entrepreneurial orientation seems worthwhile to further increase our understanding of the impact of *customer market intelligence* for owners of SFs with different entrepreneurial orientations. For example, the relationship between *customer market intelligence* and product innovation may also be moderated by risk taking. Also, Kirton's (1994) theory on adopters and innovators

suggests a different relationship between *customer market intelligence* and product innovation, depending on the mode of entrepreneurial decision-making. (See, for example, Foxall and Bhate 1993). There appears to be some overlap between Kirton's work on adaptors and innovators and the literature on market orientation and learning organizations as well. (See, for example, Slater and Narver 1995).

It will be necessary to test our model for other innovations and type of SFs in order to be able to generalize the established relationships. The interactive impact of entrepreneurial orientation and market orientation on the adoption of innovations based on disruptive technology seems particularly interesting in this respect.

3.9 Managerial Implications

Our results suggest that providing an SF owner with customer market intelligence stimulates a more considered decision-making process. This may slow down product innovation when the owner is highly innovative in the product domain. However, providing less innovative SF owners with customer market intelligence may speed up product innovation, since it brings the new product and its opportunities to the attention of the owner.

Irrespective of the newness of the assortment, customer market intelligence contributes to the selection of an assortment of higher valued products. Both the innovativeness of the owner and customer market intelligence are instrumental for above-average prices in SFs.

Our results show that *customer market intelligence* provides value to customers through product innovation by SFs. Keeping in mind that SFs largely depend on secondary data for customer market intelligence, an effective infrastructure for conducting collective market research is important for product innovation and the competitiveness of SFs. Customer market intelligence about the newest products that are accessible to SFs will stimulate the production of new products that offer value to customers. To stretch the value of collective customer market intelligence, entrepreneurs should be trained in making effective use of such data (Smallbone and North 1999).

Our results demonstrate the value of a mixed population of SF owners with respect to innovativeness and market orientation. SF owners, who are highly innovative in a specific domain, may adopt innovations without clear information about its market acceptance. Market-oriented SFs copy the successful innovations, once customer market intelligence becomes available. Moreover, customer market intelligence stimulates SFs that would otherwise lag behind in innovation. Consequently, the *innovativeness* of SF owners is a crucial asset, which stakeholders of an industry, such as governments and suppliers, should cherish. Restrictions on innovativeness, via legislation, or conservative financing may propel

entrepreneurial owners of SFs out of an industry, thereby deteriorating its competitive position.

Appendix A.

Customer Market Intelligence   **Reliability: 0.76**
1. Ik vraag mijn klanten met regelmaat of ze tevreden zijn
   I regularly ask my customers whether they are satisfied
2. Ik ga regelmatig na of mijn rozen nog aansluiten bij wat mijn klanten willen (dus aanvullend op de informatie die de prijs biedt)
   I regularly check whether my roses correspond with what my customers want (In addition to the information provided by the price)
3. Ik heb informatie over klanten, concurrenten, consumenten en belangrijke maatschappelijke ontwikkelingen
   I have information on customers, competitors, and important social developments
4. Ik weet waar en bij wie mijn klanten hun rozen afzetten
   I know where and to whom my customers sell their roses

Supplier Intelligence   **Reliability: 0.91**
1. Ik ontvang veel informatie van veredelaars of leveranciers van plantmateriaal over de kwaliteiten van variëteiten
   I receive a lot of information from breeders or suppliers of plant material on the qualities of varieties
2. Ik ontvang veel informatie van veredelaars of leveranciers van plantmateriaal over specifieke kenmerken van variëteiten
   I receive a lot of information from breeders and suppliers of plant material on specific characteristics of varieties
3. Ik ontvang veel informatie van veredelaars of leveranciers van plantmateriaal over de marktontwikkelingen van variëteiten
   I receive a lot of information from breeders and suppliers of plant material on market developments of varieties

Innovativeness   **Reliability: 0.84**
1. Ik experimenteer graag met nieuwe manieren van werken
   I like experimenting with new ways of doing things
2. Ik neem uitdagingen vaker aan dan andere rozentelers
   I accept a challenge more often than other rose growers
3. Over het algemeen probeer ik graag nieuwe dingen in mijn bedrijf
   I generally like trying new things in my company

Domain Specific Innovativeness   **Reliability: 0.86**

1. Over het algemeen ben ik een van de eersten in mijn omgeving die een nieuwe variëteit rozen probeert

   In general, I am among the first in my surroundings to try a new rose variety

2. Vergeleken met collegae teel ik de nieuwste variëteiten

   Compared to colleagues, I grow the latest varieties

3. Ik teel graag nieuwe variëteiten voordat collegae dat doen

   I like growing new varieties before colleagues do

Product price relative to colleagues   **Reliability: 0.71**

1. Ik heb gemiddeld een lagere prijs ontvangen voor mijn rozen dan de gemiddelde prijs voor een bepaalde variëteit op de veiling

   On average, I have received a lower price for my roses than the average price for a particular variety

2. Ik ontvang voor rozen van een bepaalde variëteit een hogere prijs dan collegae

   I receive a higher price for roses of a particular variety than my colleagues do

Chapter 4

The Influence of Market-related Beliefs, Production-related Beliefs and Current Success on Intention to Adopt a "Radical" Product Innovation by Small Firms

4.1   Introduction

Radical product innovation (RPI) in small firms may differ from RPI in medium-sized and large firms. In fact, RPI by a small firm (SF) is often an adoption process of a concept developed by customers or third parties. Adoption of RPIs is the outcome of problem-solving processes. In extended problem-solving models, the decision to adopt a new product is preceded by a positive intention. It is interesting to understand an owner-manager's intention to adopt an RPI for SFs, because intentions "capture the motivational factors that influence a behavior, they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior" (Ajzen 1991). In this chapter, a model explaining the intention of SFs to adopt an RPI will be developed and tested. As such, the model elaborates the general model of innovations by SFs in chapter 2 in two ways: it focuses on RPIs instead of product innovations (PIs) and elaborates on the understanding of the intention to adopt an innovation.

The proposed model addresses two issues. First, the influence of perceived market-related outcomes of RPI and a firm's perceived capabilities to produce the RPI on attitude towards RPI and subsequently on intention to adopt an RPI is investigated. This is an important issue, because a thorough assessment of a product innovation's impact on the market and a firm's capabilities to compete in the market is very important for new product success (e.g. Cooper 1999). Second, this chapter addresses the influence of current success on intention to adopt an RPI. A positive influence of current success on intention to adopt has been suggested (Day and Wensley 1988), while others argue for a negative influence (Zaltman et al. 1973). This chapter is structured as follows. First a theory that explains intention of SFs to adopt an RPI is presented. Second, on the basis of this theory, a conceptual model is specified and hypotheses about the relationships are presented. Third, the methodology to test the hypotheses is reported. Fourth, the estimation results are presented and conclusions are drawn and discussed.

4.2   Theory

An SF is a firm that is run and controlled under the direct supervision of the owner-manager (the manager). The manager's attitude towards the RPI is hypothesized to be an important

driver of his/her intention to adopt an RPI. Market-related beliefs and production-related beliefs about the RPI are drivers of a manager's attitude towards the RPI.

4.2.1 Intentions

It is interesting to study intentions, because they capture the motivational factors that influence a behavior. Furthermore, they explain behaviors of people directly in situations over which they have limited control (Ajzen and Fishbein 1980). The limited control of SFs refers to their limited control over elements of the marketing mix, such as product specifications and product positioning. They can choose to adopt or not to adopt the product concepts that are presented to them, but it is very difficult for SFs to make changes to these product concepts. Then, understanding intentions is a necessary step to predict behavior (Ajzen 1988; Ajzen and Fishbein 1980). Ajzen (1988) proposes a theory that can explain human behavior in specific contexts by first explaining intention. He suggests that intentions are driven by attitude towards the behavior, subjective norm about the behavior, and perceived behavioral control. Attitude towards the behavior is "the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question" (Ajzen 1991). Subjective norm is "the perceived social pressure to perform or not to perform the behavior" (Ajzen 1991). It is based on a person's perceived ideas of people that are important to him/ her and the person's motivation to comply with the ideas of those people. "Perceived behavioral control refers to people's perceptions of the ease or difficulty of performing the behavior of interest" (Ajzen 1991).

4.2.2 Intention to adopt a radical product innovation in small firms

RPI in SFs is supposed to be a situation over which the manager's control is limited. This is explicitly captured by perceived behavioral control in Ajzen's (1988) theory of planned behavior. Therefore, the three drivers of intention in Ajzen's (1988) theory of planned behavior seem to be a good starting point to build a theory that explains a manager's intention to adopt an RPI.

Characteristics of SFs have implications for the control that SFs have over RPI adoption and for the intention to adopt an RPI (Ajzen 1988). SFs, specifically SFs that operate in markets of pure competition, have limited control over the elements of the marketing mix and consequently over product innovation. Particularly in the case of RPI, they largely depend on product concepts developed by customers, suppliers, or third parties, because they lack economies of scale and scope to make efficiently use of an R&D staff. SFs' control over prices is often limited. Particularly SFs operating in markets that come close to pure competition are price takers. Promotions by individual SFs selling homogeneous products do not make economic sense, because returns from promotions accrue to all firms selling the generic product. SFs can influence to whom they sell their products but often its customers

are larger and more powerful than the SF itself. Consequently, current customers, specifically their expressed needs, seem to be important for radical product innovation in SFs. Expressed needs for RPI by current customers will increase the manager's perceived behavior control, because it makes RPI adoption by SFs easier. Furthermore, the influence of these expressed needs on the manager's intention to adopt the RPI is hypothesized to depend on the SF's dependence on its customers, since customers can force SFs to do what they want them to do, if SFs are dependent on their customers.

Despite the limited control over the elements of the marketing mix, SFs are autonomous, at least in the sense that they can decide to adopt or not. Therefore, the manager's attitude towards the RPI will influence his intention to adopt the RPI. Furthermore, situational factors influence the relationship between attitude towards the RPI and intention to adopt the RPI (Ajzen 1991). Current success is hypothesized to be a particularly influential situational factor for SFs, because the adoption of the RPI may harm existing products. Another situational factor that is hypothesized to influence the relationship between the manager's attitude towards the RPI and intention to adopt the RPI is the innovativeness of the manager.

4.2.3 Market-related beliefs and production-related beliefs about the RPI

The manager's attitude towards the RPI is hypothesized to be an important explanatory variable for a manager's intention to adopt the RPI (Ajzen 1988). The manager's attitude towards the RPI is based on his or her evaluation of the RPI. Specifically, the manager's attitude towards the RPI is based on his perception of the likelihood of specific outcomes when adopting the RPI (Ajzen and Fishbein 1980). These perceived outcomes of RPI adoption are categorized as market-related beliefs and production-related beliefs, because managers assess the RPI in terms of its market opportunity, which is externally oriented and in terms of the SF's ability to produce the RPI, which is internally oriented (Cooper 1999). Furthermore, each outcome is evaluated as good or bad and may vary in the extent to which it determines the manager's attitude. In line with common practice, beliefs about the outcome of behavior under consideration are restricted to those that come easily to mind and that occur frequently in the research population (East 1997).

Market-related beliefs about the RPI are beliefs about the impact of RPI adoption by the SF on the SF's market environment. Central elements in an SF's market environment are customers, competitors, and general trends (political/legal, economic, social/ cultural and technological) that affect a firm's possibilities to serve its customers (Jaworski and Kohli 1996). Therefore, market-related beliefs about RPI adoption are important drivers of a manager's attitude towards RPI.

Market information is an important, probably the most important determinant of market-related beliefs. Market-related beliefs about RPI adoption may have a short-term orientation or a long-term orientation. In the short-term orientation, market-related beliefs about RPI adoption are about expected prices for the RPI and expected sales volumes of the RPI. Higher prices and/or higher sales volumes *ceteris paribus* lead to more profit, which will result in a more positive attitude of managers towards the RPI. In some industries, such as agriculture, production, and therefore sales volumes are fixed in the short-term, e.g., annual harvest. Then, only beliefs about prices influence the manager's attitude towards the RPI. In the long-term orientation, market-related beliefs are about customer and consumer perceptions of the RPI, such as benefit perceptions, competitive market position of the RPI, and perceived anticipation on general trends in the market environment. The market-related beliefs with a long-term orientation will concern both prices and sales volumes now, but also in the future. Long-term market-related beliefs are considered important for a firm's long-term profit performance (Narver and Slater 1990) and for product innovation success (Cooper 1999). Therefore, they are hypothesized to influence a manager's attitude towards RPI.

Market-related beliefs are not the only factors that determine a manager's attitude towards RPI. The perceived SF capabilities to produce the RPI also are important determinants of the manager's attitude towards the RPI. In our theory, these determinants are referred to as production-related beliefs about the RPI. Perceived production costs are an important component of production-related beliefs, because *ceteris paribus* lower costs lead to more profit, which will result in a more positive attitude of the manager towards the RPI. Managers are often involved in the production process of the SF (Nooteboom 1994). Therefore, changes in production methods that affect production costs and working conditions may also have a direct influence on the manager's attitude towards RPI.

4.3   The Model

On the basis of the presented theory a model is proposed in Figure 4.1, explaining a manager's intention to adopt an RPI. The model is an elaboration of a part of the general model of product innovation by SFs in chapter 2; namely, it distinguishes between current customers and potential customers, and it specifies the role of the manager's innovativeness. Special features of the model are its focus on RPI and on the manager's intention to adopt an RPI. Three factors are hypothesized to drive the manager's intention to adopt an RPI.

First, the manager's attitude towards the RPI drives his/her intention to adopt the RPI. This relationship is moderated by two concepts: the manager's innovativeness and the SF's current success. More (less) innovative SFs might be less (more) cautious (Rogers 1995) and as a result might have a stronger (weaker) intention to adopt the RPI. Current success is also expected to have a moderating influence on the relationship between manager's attitude

towards RPI and the manager's intention to adopt the RPI. This influence could go both ways. On the one hand, Day and Wensley (1988) argue that firms should use their profits to sustain and improve a firm's skills and resources, which should lead to superior customer value or lower costs. It suggests that high (low) current success leads to a high (low) intention to adopt innovations, particularly RPIs. On the other hand, Zaltman, Duncan and Holbeck (1973) suggest that a gap between satisfactory performance and actual performance increases the search for innovation opportunities. This suggests that high (low) current success leads to low (high) intention to adopt RPI. The latter might be particularly prevalent for RPI in SFs, because SFs have limited time and resources for management tasks. Consequently, they can only manage RPI at the expense of their current products.

Second, "expressed needs for RPI by current customers" drive the "manager's intention to adopt the RPI". This reflects the current customer's control over RPI in the SF, its role as a plausible source of support for RPI in SFs, and the importance of innovative networks for RPI in SFs (Bessant 1999). Based on the resource dependency theory and the theory of planned behavior (Ajzen 1988), it is hypothesized that "expressed needs for the RPI by current customers" affect the SF's intention to adopt the RPI directly and not via the "manager's attitude towards RPI". Dependence on the current customer is included as a moderating variable on the relationship between "expressed needs for RPI by current customers" and the "manager's intention to adopt the RPI". The *resource dependence* view on innovative activity (Cooper and Schendel 1976; Foster 1986; Pfeffer and Salancik 1978) holds that firms allocate resources to innovative programs that are required by customers who provide the resources that the firm needs to survive. Furthermore, the resource dependence view holds that a manager's freedom to choose is limited. Therefore, the resource dependence view may be particularly relevant for RPI in SFs, because SFs have limited financial resources and therefore need the support of their current customers to reduce the financial risk. In Ajzen's *theory of planned behavior* (1988) it is argued that models, which predict behavior should account for situations where subjects perceive limited behavioral control. A direct influence of expressed customer needs on intention to adopt the RPI is in line with that theory.

Third, "expressed needs for the RPI by potential customers" drive the manager's intention to adopt RPI. Potential customers can play the same role for RPI as current customers, but often barriers exist when switching from current customers to potential customers. For example, some investments of SFs may have been made specifically for current customers. Furthermore, SFs have to invest in the new relationship with the potential customer.

Figure 4.1: Model explaining a manager's intention to adopt an RPI
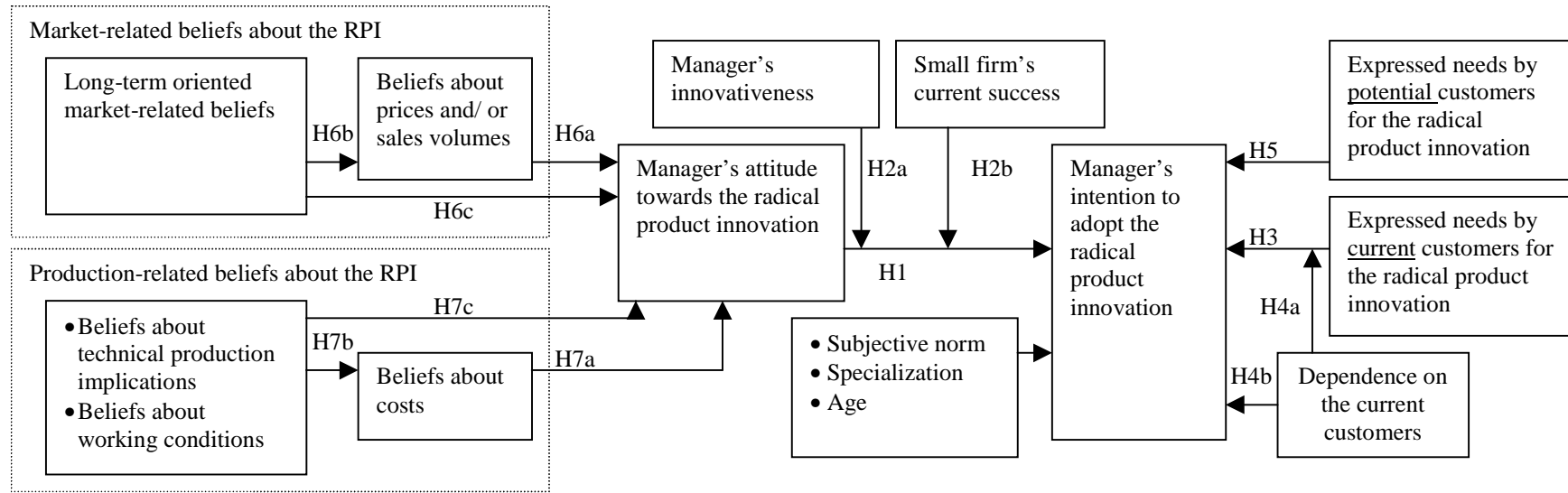
In addition, three background variables are supposed to influence intention to adopt RPI, i.e., age of the manager, the SF's specialization, and subjective norm towards RPI. A negative relationship between age of the manager and intention to adopt the RPI is hypothesized, because older managers have gained a lot of experience with the products that they currently sell, and this experience would be lost to some extent if they adopted the RPI. The impact of specialization on the intention to adopt an RPI depends on the type of firm and type of RPI. In our case, specialization is hypothesized to have a negative influence on intention to adopt the RPI, because adopting the specific RPI, namely animal-friendly produced eggs, is difficult for specialized SFs. First, the specific RPI considered in this study requires land that may not be available on specialized SFs. Second, for the same production volumes, the RPI requires more labor, which may not be available in specialized SFs. Finally, subjective norm is considered to influence intention to adopt RPI, which is in line with the theory of planned behavior (Ajzen 1988).

In the model, the "manager's attitude towards adopting the RPI" is based on the manager's beliefs about the RPI (Ajzen and Fishbein 1980). To determine the extent to which "market-related beliefs about the RPI" determine the "manager's attitude towards adopting the RPI", the manager's beliefs about the RPI are categorized into market-related and production-related beliefs. As depicted in figure 4.1, "beliefs about prices and/or sales" are expected to mediate to some extent the influence of "long-term oriented market-related beliefs about the RPI" on the "manager's attitude towards the RPI". "Long-term oriented market-related beliefs" refer to customer and consumer perceptions, competitive market positions, and perceived anticipation on general trends in the market environment. They are hypothesized to have a positive influence on prices and/ or sales volumes. The types of long-term oriented market-related beliefs to be included in the model vary per industry and are determined by elicitation with the group of SFs that is being examined (East 1997).
"Beliefs about costs", as depicted in Figure 4.1, are expected to mediate partially the influence of "beliefs about technical production implications of the RPI" and "beliefs about working conditions" on the "manager's attitude towards adopting the RPI". The specific "beliefs about technical production implications of the RPI" and "beliefs about working conditions" to be included in the model may vary per industry and are determined by elicitation with the group of SFs that is being researched (East 1997).

4.4 Hypotheses
Leading scholars have suggested a positive relationship between attitude towards a behavior and behavior itself (e.g. Ajzen 1991; Ajzen and Fishbein 1980). In the marketing literature, the causality of the relationship between attitude and behavior is still the subject of many debates for fast-moving consumer goods (fmcg) (East 1997). Beyond fmcg, most studies

support the view that attitude causes behavior, rather than the other way around (East 1997). Particularly for high-involvement problems, like decisions about radical product innovations, the primacy of attitude is most likely (Mowen 1990). The relationship between attitude towards a specific behavior and the actual behavior is mediated by intention to perform the behavior (Ajzen 1988). SFs have limited control over elements of the marketing mix, specifically RPI adoption, but they are free to take on the challenge. Therefore, a positive relationship between the manager's attitude towards the RPI and the manager's intention to adopt the RPI is hypothesized.

H1:   The manager's attitude towards the RPI positively influences the manager's intention to adopt the RPI

Midgley and Dowling (1978) describe the nature of innovativeness as related to the adoption of new products by consumers. Highly innovative decision makers are those who "decide to adopt an innovation independently of the decision of others" (Midgley and Dowling 1978). In other words, when decision makers are highly innovative, their attitude towards the product innovation probably has an important influence on the intention to adopt the RPI. This can be illustrated by comparing, in Rogers' (1995) terminology, the characteristics of the "early majority" to those of the "late majority", assuming that "manager's innovativeness" is distinctive between these two adopter categories. On the one hand, SFs in the "early majority", being more innovative, follow with deliberate willingness" (Rogers 1995), which suggests a strong influence of the "manager's attitude towards the RPI" on the "manager's intention to adopt the RPI". On the other hand, for the less innovative late majority, "the pressure of peers is necessary to motivate adoption" (Rogers 1995), which suggests a much weaker influence of the "manager's attitude towards the RPI" on the "manager's intention to adopt the RPI".

H2a: The higher the manager's innovativeness, the larger the influence of the manager's attitude towards the RPI on the manager's intention to adopt the RPI

Christensen and Bower (1996) show that firms ignore ideas for new technologies that emerge in the organization, as long as they successfully serve their current customers with existing technologies. In the context of this study, this argument suggests that managers discount their positive attitude towards RPI when they are successful with their current products. Zaltman, Duncan and Holbeck (1973) suggest that a gap between satisfactory performance and actual performance increases the search for innovation opportunities, which also suggests that current <u>poor</u> performance of an SF has a positive influence on the relationship between the "manager's attitude towards the RPI" and the "manager's intention to adopt the RPI". This is in line with Rogers' (1995) assertion, particularly for the "late majority", that innovation

might be an economic necessity. Therefore, it seems a plausible hypothesis that an SF's current success limits the manager's intention to adopt the RPI, even if (s)he acknowledges the benefits of the RPI. The following hypothesis is proposed.

H2b: The greater the SF's current success, the smaller the influence of the manager's attitude towards the RPI on intention to adopt the RPI

The resource dependence view on innovative activity (Cooper and Schendel 1976; Foster 1986; Pfeffer and Salancik 1978) holds that firms allocate resources to innovations that are required of the firm by current customers, who provide the resources that the firm needs to survive. It is easier for SFs to adopt RPIs, if current customers express a need for RPI, than if they do not express a need. In other words, the manager's perceived behavioral control to adopt an RPI increases when current customers express a need for RPI. In this situation, Ajzen (1988) suggests a direct influence of expressed needs by current customers for RPI on intention to adopt the RPI. The following hypothesis is proposed.

H3: Expressed needs by current customers for the RPI positively influence the manager's intention to adopt the RPI

Customer needs for an RPI are crucial to make an RPI viable. Dependence on the current customer reduces the SF's ability to adopt the RPI if current customers do not express a need for the RPI, because dependence on the current customer reduces the SF's ability to target potential customers that may express a need for the RPI. In other words, dependence on the current customer makes RPI adoption difficult when current customers do not express a need for the RPI. Also, if current customers do express a need for an RPI, the SF will not only be able to, but will even have to, adopt the RPI when the SF depends on the current customer. Therefore, it is hypothesized that dependence on current customers stimulates the intention to adopt the RPI in an SF if current customers have expressed a need for radical product innovation, and vice versa.

H4a: The higher the dependence on the current customers, the larger the influence of expressed needs for the RPI by current customers on the manager's intention to adopt the RPI

Dependence on current customers reduces the manager's perceived behavioral control over RPI adoption. This will reduce the motivation of managers to pursue the RPI. This is in line with Ajzen's (1988) theory of planned behavior, where a person's perceived behavioral control directly influences the person's intentions. Therefore, it is hypothesized that

"dependence on the current customers" also has a direct negative influence on the "manager's intention to adopt the RPI".

H4b: Dependence on the current customers has a direct negative influence on the manager's intention to adopt the RPI

SFs may respond to the expressed needs of potential customers as well as current customers. Therefore, expressed needs for RPI by potential customers may positively influence the manager's intention to adopt the RPI. More formally:

H5: Expressed needs for the RPI by potential customers positively influence the manager's intention to adopt the RPI

Throughout the NPD process, new product concepts are evaluated based on marketing assumptions (Cooper 1993). Marketing assumptions are a manager's beliefs about, for example, market size, market potential, and market acceptance of the product innovation. In our model, the manager's attitude towards the RPI is his overall evaluation of the RPI, and market-related beliefs about the RPI are his marketing assumptions. It is hypothesized that favorable market-related beliefs about the RPI positively influence the manager's attitude towards adopting the RPI. For firms, including SFs, the overriding objective is profitability (Narver and Slater 1990). Since market-related beliefs about prices and sales volumes are directly related to a firm's profitability, a direct relationship is hypothesized between beliefs about "prices and/ or sales volumes" and the "manager's attitude towards the RPI". This holds in particular for many SFs, like farms, where production and sales volumes are given in the short term, because production cannot be increased. More formally:

H6a: Market-related beliefs about prices and sales volumes for the RPI influence the manager's attitude towards the RPI

"Long-term oriented market-related beliefs about the RPI", such as consumer acceptance, perceived quality, and competitive position, are expected to influence profitability via "prices and/or sales volumes".

H6b: Long-term oriented market-related beliefs about the RPI influence beliefs about prices and sales volumes of the RPI

Managers are supposed to evaluate RPIs based on a long-term orientation, because it will take several years to break even. Moreover, RPI adoption may be necessary to assure long term survival of the SF. Consequently, the manager may have a positive attitude towards the RPI

irrespective of prices and sales volumes. Therefore, a direct relationship is hypothesized between long-term oriented market-related beliefs about the RPI and the "manager's attitude towards the RPI". More formally:

H6c: *Long-term oriented market-related beliefs about the RPI influence the manager's attitude towards the RPI*

Managers will make marketing assumptions to evaluate RPIs, but also production-related assumptions. It is hypothesized that production-related beliefs about the RPI also influence the manager's attitude towards adopting the RPI. Since costs of the RPI are directly related to a firm's profitability, a direct relationship is hypothesized between "beliefs about costs of the RPI" and the "manager's attitude towards the RPI". More formally:

H7a: Beliefs about costs for the RPI influence the manager's attitude towards the RPI

Production costs emanate from technical production processes. Technical production implications affect costs. Similarly, working conditions affect costs, because working conditions influence productivity.

H7b: Beliefs about technical production implications of the RPI and working conditions influence beliefs about costs for the RPI

Particularly in SFs where the manager is personally involved in the production process, beliefs about technical production implications and working conditions directly influence the manager's attitude towards the RPI. The manager does not like running a firm with frequent production problems and poor working conditions.

H7c: Beliefs about technical production implications of the RPI and working conditions directly influence the manager's attitude towards the RPI

4.5   Methodology
4.5.1   Sample
The proposed model will be tested for firms in the Dutch laying hen industry. Thus, our testing refers to real decision makers in a real decision-making context, as opposed to testing respondents in an experimental laboratory setting, which seems important to understand the market behavior of SFs (e.g. Smith 1982). Firms in the Dutch laying hen industry suit the purpose, since they are SFs (with average sales amounts per farm from layers of 582.084 Euro in 2000 (Anonymous 2002, p.172)) and have to respond to customer needs, which require radical changes in production methods. These changes towards sustainable, particularly

animal-friendly, production methods are communicated in the market and are in fact perceived by the consumer as fundamental improvements in product quality (Bijleveld and Duindam 2003; Eelen 1989). Most SFs in this industry sell to only one customer/ wholesaler for a relatively long period of time, which makes it easy to isolate the influence of customers. Specifically, 90.5% of the respondents in the sample sell over 90% of their produce to their most important customer and only 4.5% switched to another main customer in the year prior to the year of the survey. Therefore, the influence of an occasional second customer is neglected.

At the time of the data collection (2000), the market for eggs was in a state of flux: customer needs and preferences with respect to eggs had been highly predictable for most of the 20th century, i.e., clean, undamaged, and fresh eggs. During the 1990's, more and more consumers, retailers, and wholesalers preferred eggs that were also produced in an animal-friendly manner. This trend has led to radical product innovations that require high investments in production methods, such as the birdcage stable with or without chicken run, the free-range stable, with or without chicken run, and the biological production of eggs[5]. In 1999, this radical product innovation had gained a market share of 45% in the Dutch market for fresh consumed eggs.

A random sample of 220 poultry farmers was drawn from a list including all firms with more than 1000 laying hens. The respondents were first contacted by phone to request their participation. Over 90% of the respondents agreed to participate. Face to face interviews were conducted, using a computer-guided questionnaire. Exactly 200 interviews were completed. In this chapter, only a specific part of the respondents was used, because the manager's *intention* to adopt the RPI is investigated. Those already having adopted such a production method had obviously passed the stage of intention. Consequently, only farmers, who had not yet adopted an animal-friendly RPI could be used for our analysis. Of our total sample of 200 poultry farmers, 125 respondents had not (yet) adopted the RPI, and they were used in our analyses. Consequently, the test of the model proposed in this chapter is biased toward less innovative producers. It might particularly affect our findings about the impact of the manager's innovativeness in our model, since the most innovative managers with respect to sustainability had already adopted the RPI.

4.5.2 *Measures*
All items of the measurement scales are shown in appendix A. The scores for the multiple-item variables in the model were computed by equally weighing and adding the corresponding item scores. All independent variables in the model were standardized to make the coefficients in the model comparable and to make the interpretation of the influence of individual components in the model easier (Irwin and McClelland 2001).

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[5] Free-range stable is referred to in the Netherlands as scharrelstal. Birdcage stable is referred to in the Netherlands as volière, which is in fact a French name

Manager's intention to adopt the RPI is assumed to capture the manager's motivational factors that influence the SF's adoption of the RPI. It is an indication of how hard the manager is willing to try, or how much of an effort (s)he is willing to exert, in order to adopt the RPI. (This is in line with Ajzen's (1991) definition of intentions). The manager's intention to adopt the RPI was measured using the Juster Scale, as suggested by Day et al. (1991). Respondents indicated the likelihood of their producing eggs in a free-range stable with a chicken-run within 10 years. The Juster Scale is an eleven-point scale with verbal descriptions and probabilities associated with each number. The verbal descriptions range from "no chance" to "certain". The complete scale is shown in appendix A.

Manager's attitude towards adopting the radical product innovation refers to the degree to which the manager has a favorable or unfavorable evaluation or appraisal of the radical product innovation (This is in line with Ajzen's (1991) definition of attitude). The manager's attitude towards adopting the radical product innovation was measured using three items. Respondents indicated their attitude towards "producing eggs in a free-range stable with a chicken-run" using a seven-point semantic differential scale. The three semantic differential scales were anchored by "a bad idea versus a good idea", "not wise versus wise" and "not attractive versus attractive". In a principal-component analysis, all items loaded higher than 0.8 on the first component, before rotation (*n=125*). The reliability of the measure (Cronbach's alpha) was 0.86 (*n=125*).

Manager's innovativeness was measured with five items taken from Pallister and Foxall (1998). With the items, the respondent indicates whether (s)he considers him/ herself as creative and inventive and whether (s)he is willing to try innovations before other people do. All items load higher than 0.59 on the first component, before rotation and were maintained in the final measure. The reliability of the measure (Cronbach's alpha) was 0.73 (*n=125*).

Small firm's current success was measured with five items. Success was discussed during three group interviews with members of the research population. Keywords that came-up during the discussions about firm success were profitability, income, and margin per egg, performance relative to competitors and financial results. The latter was used as a subjective evaluation of the former keywords. Five items were generated based on these keywords. All items load higher than 0.65 on the first component, before rotation and were maintained in the final measure. The reliability of the measure (Cronbach's alpha) was 0.80 (*n=125*).

Dependence on the current customer is defined as the firm's need to maintain a relationship with its current customers to achieve its goals (Kumar et al. 1995). Replaceability of the current customers is used to measure the SF's dependence on the current customers (Heide

and John 1988; Kumar et al. 1995). Three items were taken from Kumar, Scheer and Steenkamp (1995) and adapted for use in this study, based on discussions with members of the research population. All items loaded higher than 0.65 on the first component, before rotation ($n=125$). The reliability of the measure (Cronbach's alpha) was 0.66 ($n=125$).

Expressed needs of current customers
Our respondents provided the name and address of their main customer at the time of the survey, which allowed an assessment of the effect of specific customers on the SF's intention to adopt an RPI. A total of 54 different customers were identified. The customer's turnover in radically new products was used as an approximation for "expressed needs of current customers". The customer's turnover in radically new products was estimated based on the percentage of eggs that had the "animal friendly" product attribute in the customer's assortment. The total number of eggs sold to each customer by the respondents was calculated in the computer-guided interviews, as well as how many of these eggs had the product attribute "animal friendly". Then, the percentage of eggs with the product attribute "animal friendly" was used as a proxy for the expressed needs of current customers.

Expressed needs of potential customers
In the Netherlands, most SFs with laying hens sell their eggs to assembler packing plants, which are trading companies that assemble eggs from SFs with laying hens, pack for consumers, and distribute to retail outlets. All assembler packing plants, except the SF's current customers, were assumed to be potential customers for SFs with laying hens. To measure the "expressed needs of potential customers", respondents rated the following statement on a seven-point semantic differential scale anchored by very unlikely and very likely: "Assembler packing plants think I should produce free-range eggs". This measurement is suggested by East (1997) to measure referent beliefs in the theory of planned behavior.

Subjective norm and specialization
Subjective norm was operationalized with one single item, as suggested by East (1997). Respondents rated the following statement on a seven-point semantic differential scale anchored by very unlikely and very likely: "Most people who are important to me think I should produce Free-range eggs".
Specialization was operationalized with three items, where respondents indicated what percentage of their firm in terms of turnover, labor demand, and income is related to the production of eggs. All items loaded higher than 0.92 on the first component, before rotation. The reliability of the measure (Cronbach's alpha) was 0.93 ($n=125$).

Market-related beliefs about the radical product innovation

Three group discussions were conducted to elicit salient outcome beliefs about the RPI, i.e. free-range eggs, as suggested by East (1997). These group discussions resulted in a list of 24 outcome beliefs about the RPI. These outcome beliefs were included in the final questionnaire. Fourteen market-related beliefs were identified, including beliefs about higher prices for the RPI, though not including beliefs about higher sales volumes. The reason for this is that SFs in this particular industry are unable to increase their sales volumes in the short term. Therefore, good market performance of the RPI leads to higher profit via higher prices only and not via higher sales volumes. Subsequently the market-related beliefs were included in a principal-component analysis with a varimax rotation. Based on the Scree Test Criterion (Hair et al. 1992), four components were selected for the principal-component analysis. The components were labeled based on the beliefs that loaded highest on that particular component after rotation. These labels were:

- Beliefs about consumer's perception, acceptance and willingness to pay for the RPI (5 beliefs)
- Beliefs about traditional product quality dimensions (2 beliefs)
- Beliefs about competitive position and compliance with legislation (4 beliefs)
- Beliefs about higher prices (3 beliefs)

Outcome beliefs were considered only for the component on which they had the highest loading. Then the beliefs that were considered for each component were used as separate measures. Each measure, their label, and the beliefs included in the measure are reported in appendix A. "Beliefs about higher prices" are expected to mediate the relationship between "long-term oriented market-related beliefs about the RPI" and the "manager's attitude towards the RPI".

Production-related beliefs about the radical product innovation

Ten production-related beliefs were identified during the group interviews and included in the questionnaire. The production-related beliefs were included in a principal-component analysis with a varimax rotation. Based on the Scree Test Criterion (Hair et al. 1992), two components were selected. The two components were labeled based on the beliefs that loaded highest on that particular component after rotation. These labels were:

- Beliefs about technical production implications and working conditions (6 beliefs) and
- Beliefs about costs because of production inefficiency (4 beliefs)

Outcome beliefs were considered only for the component where they had the highest loading. Then, the beliefs considered for each component were used as separate measures. Each measure, their label, and the beliefs included in the measure are reported in appendix A. The latter component, i.e. "beliefs about costs because of production inefficiency", is expected to mediate the relationship between "beliefs about technical production implications and working conditions" and the "manager's attitude towards the RPI".

4.5.3   Estimation procedure

After obtaining scores for the variables in our model, ordinary least squares (OLS) regression is used to estimate the coefficients of the independent variables in our model (*n*= 125). This procedure is often used in this kind of research (e.g. Jaworski and Kohli 1993; Lukas and Ferrell 2000). Our procedure seems more appropriate than structural equation modeling (SEM), when sample sizes are small in relation to the number of parameters that need to be estimated with SEM[6]. Hair et al. (1992) recommend a minimum of five observations for each estimated parameter. This would require a minimum of 470 respondents. However, this introduces another problem, as maximum likelihood estimation in SEM becomes too sensitive when sample sizes exceed 400 respondents, making all goodness-of-fit measures indicate a poor fit (Hair et al. 1992). Furthermore, the investigation of interactions is tedious with SEM (Ping 1995), particularly when the interacting variables have multiple items (Jaccard and Wan 1995; Jöreskog and Yang 1996).

To further analyze the nature of the moderating variables in the model, i.e. "manager's innovativeness", "current success", and "dependence on current customers", the simple slopes of regression lines at specific values of the moderating variables were tested (Aiken and West 1991). Slopes were calculated for low, average, and high values of the moderating variable. Average values, minus and plus the standard deviation of the moderating variable are used as average, low and high values for the moderating variable. This analysis shows how the influence of the independent variable depends on the level of the moderating variable. A t-test for whether the slopes differ from zero is calculated (Aiken and West 1991).

In Ajzen and Fishbein's (1980) theory of reasoned action, attitude is a weighted average of outcome beliefs. Outcome beliefs and weights are obtained by direct questioning. Then attitudes are calculated. In our model, attitude towards RPI is also a weighted average of outcome beliefs, but outcome beliefs and attitude towards RPI are obtained by direct questioning. The weights of each outcome belief are estimated by regressing attitude towards RPI on outcome beliefs.

Mediation of variables in the model, i.e. "beliefs about prices" and "beliefs about costs through production efficiency", is investigated in three steps (Baron and Kenny 1986). First, the dependent variable is regressed on all the independent variables, including the mediating variable. The coefficient for the mediating variable should be significant, but the coefficient for the independent variable that is expected to be fully mediated should not be significant. Second, the dependent variable is regressed on all the independent variables, excluding the

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[6] Our model includes 45 items that load on 13 latent variables. The measurement model requires the estimation of 32 item loadings, and 45 error variances. Furthermore, the 13 coefficients in the structural model needs to be estimated and 4 error terms for the endogenous variables in the model. The total number of estimated parameters is 94.

mediating variable. The coefficient for the independent variable that is expected to be mediated should now be significant. Third, the mediating variable is regressed on the other independent variables. The coefficient for the independent variables that the mediating variable is expected to mediate should be significant.

4.6 Results

Table 4.1 shows the results of OLS regression of the "manager's intention to adopt the RPI" on the "manager's attitude towards the RPI", "expressed needs by current customers for the RPI", "dependence on the current customer", "expressed needs of potential customers for the RPI", the "manager's innovativeness", the "SF's current success", and the background variables.

Table 4.1: **OLS results in which the manager's intention to adopt the RPI is regressed on a number of explanatory variables**

	Manager's intention to adopt the RPI
Manager's attitude towards the RPI (H1)	0.76***
"Manager's innovativeness" x "manager's attitude towards the RPI" (H2a)	0.29*
"SF's current success" x "manager's attitude towards adopting the RPI" (H2b)	-0.47***
"Manager's innovativeness"	0.18
"SF's current success"	-0.13
"Expressed needs by <u>current</u> customers for the RPI" (H3)	0.70***
"Expressed needs by current customers for the RPI" x "dependence on the current customers" (H4a)	0.04
Dependence on the current customers (H4b)	-0.49***
"Expressed needs of <u>potential</u> customers for RPI" (H5)	0.46**
"Subjective norm"	-0.06
Age	0.00
Specialization	-0.66***
Constant	-3.331
N	125
F	7.4***
R^2 (adjusted R^2)	0.44 (0.38)

* $p<0.1$, ** $p< 0.05$, *** $p=<0.01$

The condition number is 5.77, which is far below 20 and indicates no problem with multicollinearity (Greene 2003). The variance inflation factor (VIF) of each coefficient is

smaller than 1.5. Since the R^2 is 0.44, the VIF of each coefficient in the model should be smaller than 1/(1-0.44)= 1.8 to provide some assurance that multicollinearity is not a serious problem for a specific coefficient (Klein 1962). The correlation matrix of all the variables in our model is provided in appendix B.

Hypothesis 1 is supported by the significant coefficient for "manager's attitude towards the RPI" (b=0.76, $p<0.01$) in table 4.1. This is the effect of "manager's attitude towards the RPI" on "manager's intention to adopt the RPI", for average values of the moderating variables, i.e., "manager's innovativeness", and "SF's current success" (Irwin and McClelland 2001), because both moderating variables are standardized.

Marginal support is found for Hypothesis 2a, because the coefficient for the interaction term between "manager's attitude towards the RPI" and "manager's innovativeness" (b=0.12, $p=0.10$) in table 4.1 is significant at the 10% level only, but has the hypothesized sign. Hypothesis 2b is confirmed by the significant negative coefficient for the interaction term between "SF's current success" and "manager's attitude towards the RPI" (b=-0.47, $p=0.01$) in table 4.1.

Hypothesis 3 that "expressed needs by current customers for RPI" positively influence "manager's intention to adopt the RPI" is supported by the significant coefficient for "expressed needs by current customers for the RPI" in table 4.1 (b=0.70, $p<0.01$).

Hypothesis 4a is not confirmed. The coefficient for the interaction term between "dependence on the current customers" and "expressed needs by current customers for the RPI" (b=0.04, $p=0.79$) in table 4.1 is not significant. Hypothesis 4b is confirmed. "Dependence on the current customers" has a negative influence on "manager's intention to adopt the RPI" (b=-0.49, $p<0.01$).

Hypothesis 5 is confirmed by the significant coefficient for "expressed needs by potential customers for the RPI" (b=0.46, $p=0.02$) in table 4.1.

Two additional explanatory variables that were included as background variables, "subjective norm" (b=-0.06, $p=0.87$) and age (b=0.02, $p=0.88$), did not have a significant influence on "manager's intention to adopt the RPI"[7]. Specialization, however, did have a significant negative influence on "manager's intention to adopt the RPI" (b=-0.26, p<0.01). The latter result may be explained by the fact that this specific RPI can be combined with other activities that are common to mixed farms in our research population (e.g. arable farming). Moreover, specialization makes it harder to adopt, because large-scale production of this specific RPI is hard to carry through by specialized farms.

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[7] Subjective norm correlates with manager's intention to adopt the RPI. Subjective norm also correlates with expressed needs for RPI by current customers and potential customers (see appendix A). This was expected, because, in SFs, current and potential customers also meet with the manager's family members who are an important component in subjective norm. Subjective norm probably correlates with manager's intention to adopt the RPI, because the subjective norm and the manager's intention to adopt the RPI have the same explanatory variables, i.e. expressed needs for RPI by current customers and potential customers.

Using the results of table 4.1, the nature of the moderating variables on the relationship between "attitude towards adopting the RPI" and "intention to adopt the RPI" can be further shown by using the average score minus (plus) the standard deviation as the influence of "manager's attitude towards adopting the RPI" on "intention to adopt the RPI", when the moderating variables are relatively low (high). This means subtracting (adding) the coefficient for the interaction term from (to) the coefficient for "attitude towards adopting the RPI", because the moderating variables are standardized. Table 4.2 shows the results of these calculations.

Table 4.2: **Influence of "manager's innovativeness" and "SFs current success" on the relationship between "manager's attitude towards the RPI" and "manager's intention to adopt the RPI"**

Dependent Variable:	Manager's intention to adopt the RPI			
	Manager's innovativeness		SF's current success	
	Low	high	low	High
Influence of "manager's attitude towards the RPI"	0.47	1.05	1.23	0.29
	(p=0.07)	(p<0.01)	(p<0.01)	(p=0.27)

The results in table 4.2 confirm Hypothesis 2a by showing that the influence of "manager's attitude towards the RPI" on the manager's intention to adopt the RPI is positive and highly significant (b=0.1.05, p<0.01) when "manager's innovativeness" is relatively high and positive, but only marginally significant (b=0.47, p=0.07) when "manager's innovativeness" is relatively low[8].

Also, Hypothesis 2b is confirmed by the results in table 4.2. The influence of "manager's attitude towards the RPI" on "manager's intention to adopt the RPI" is positive and highly significant (b=0.1.23, p<0.01) when "SF's current success" is relatively low and not significantly different from zero (b=0.29, p=0.27) when "SF's current success" is relatively high.

Hypotheses 6a, 6b, 6c, 7a, 7b and 7c are tested using the procedure suggested by Baron and Kenny (1986), as described before. Table 4.3 shows the first step in the test for mediating variables, the results of an OLS regression of "manager's attitude towards the RPI" on all "market-related beliefs about the RPI" and all "production-related beliefs about the RPI". The condition number is 4.97, which is far below 20 and hence indicates no problems with multicollinearity (Greene 2003).

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[8] p values are calculated using *Simple Slope Analysis by Computer* as described by Aiken and West (1991, p.18)

Both coefficients for the hypothesized mediating variables "beliefs about prices" (b=0.24, $p<0.01$) and "beliefs about costs because of production inefficiency" (b=-0.30, $p<0.01$) are significant, which confirms hypotheses 6a and 7a, respectively. The coefficient for "beliefs about competitive position and compliance with legislation" is also significant (b=0.22, $p<0.01$), which confirms hypothesis H6c for beliefs about competitive position and compliance with legislation.

Table 4.3: **Step one in the test for mediating variables: results of OLS regression of "manager's attitude towards adopting the RPI" on "market-related beliefs about the RPI" and "production-related beliefs about the RPI"**

	Manager's attitude towards the RPI
Market-related beliefs about the RPI	
• Beliefs about consumer's perception, acceptance, and willingness to pay for the RPI (H6c)	0.10
• Beliefs about traditional product quality dimensions (H6c)	0.06
• Beliefs about competitive position and compliance with legislation (H6c)	0.22***
• Beliefs about prices (H6a)	0.24***
Production-related beliefs about the RPI	
• Beliefs about technical production implications and working conditions (H7c)	-0.12
• Beliefs about costs because of production inefficiency (H7a)	-0.30***
N	125
F	12.9***
R^2 (adjusted R^2)	0.40 (0.37)

* $p<0.1$, ** $p<0.05$, *** $p<0.01$

The coefficients for the other market-related beliefs about the RPI, i.e. "beliefs about consumer's perception, acceptance and willingness to pay for the RPI" (b=0.10, $p=0.22$) and "beliefs about traditional product quality dimensions" (b=0.06, $p=0.52$), are not significant, which does not confirm hypothesis 6c for beliefs about consumer's perception, acceptance and willingness to pay for the RPI and beliefs about traditional product quality dimensions. The coefficient for "beliefs about technical production implications and working conditions" is not significant either, which does not confirm hypothesis 7c.

Table 4.4 shows the results of the second step in the test for mediating variables. "Manager's attitude towards adopting the RPI" is regressed on the "market-related beliefs about the RPI" and the "production-related beliefs about the RPI", without the hypothesized mediating

variables, respectively "beliefs about prices" and "beliefs about costs because of production inefficiency". Removing "beliefs about prices" as an independent variable results in a significant coefficient for "beliefs about consumer's perception, acceptance and willingness to pay for the RPI" (b=0.19, *p*=0.02). "Beliefs about traditional product quality dimensions" do not influence the "manager's attitude towards adopting the RPI", because the coefficient is not significant (b=0.09, *p*=0.33).

Removing "beliefs about costs because of production inefficiency" as an independent variable results in a significant coefficient for "beliefs about technical production implications and working conditions". This supports our hypothesis that the influence of "beliefs about technical production implications and working conditions" is mediated by "beliefs about costs because of production inefficiency".

Table 4.4: Step two in the test for mediating variables: OLS results excluding the hypothesized mediating variables as independent variables

	Manager's attitude towards the RPI	
Market-related beliefs about the RPI		
• Beliefs about consumer's perception, acceptance, and willingness to pay for the RPI (H6c)	0.18**	0.08
• Beliefs about traditional product quality dimensions (H6c)	0.09	0.09
• Beliefs about competitive position and compliance with legislation (H6c)	0.24***	0.30***
• Beliefs about prices (H6a)		0.29***
Production-related beliefs about the RPI		
• Beliefs about technical production implications and working conditions	-0.08	-0.20**
• Beliefs about costs because of production inefficiency	-0.34***	
N	125	125
F	12.90***	11.9***
R^2 (adjusted R^2)	0.35(0.32)	0.33(0.31)

* p<0.1, ** p< 0.05, *** p<0.01

The final step in the test for mediating variables is shown in table 4.5 where the hypothesized mediating variables "beliefs about prices" and "beliefs about costs because of production inefficiency" are regressed on all long-term oriented beliefs about the RPI.

The results in table 4.5 show that "beliefs about consumer's perception, acceptance and willingness to pay for the RPI" is significantly related to "beliefs about prices" (b=0.36, *p*<0.01). This confirms hypothesis 6b that long-term oriented market-related beliefs about the

RPI influence beliefs about prices and sales volumes for the RPI, for this particular long-term oriented market-related belief. Other market-related beliefs, i.e. "beliefs about traditional product quality dimensions" (b=0.13, $p<0.18$) and "beliefs about competitive position and compliance with legislation" (b=0.11, $p<0.24$) are not significantly related, which does not confirm hypothesis 6b for these long-term oriented market-related beliefs. Furthermore, it shows that "beliefs about technical production implications and working conditions" are significantly positively related to "beliefs about costs because of production inefficiency", which confirms hypothesis 7b that beliefs about technical production implications of the RPI and poor working conditions influence beliefs about costs for the RPI.

Table 4.5:   Step three in the test for mediating variables: OLS results with the hypothesized mediating variables as dependent variables

	"Beliefs about prices"	"Beliefs about costs…"
Market-related beliefs about the RPI		
• Beliefs about consumer's perception, acceptance, and willingness to pay for the RPI (H6b)	0.36***	0.06
• Beliefs about traditional product quality dimensions (H6b)	0.13	-0.11
• Beliefs about competitive position and compliance with legislation (H6b)	0.11	-0.29***
• Beliefs about prices		-0.18**
Production-related beliefs about the RPI		
• Beliefs about technical production implications and working conditions (H7b)	0.20*	0.27***
• Beliefs about costs because of production inefficiency	0.19**	
N	125	125
F	6.37	9.57
R^2 (adjusted R^2)	0.21(0.18)	0.29(0.26)

* p<0.1, ** p< 0.05, *** p<0.01

In summary, some long-term oriented market-related beliefs, specifically "beliefs about consumer's perception, acceptance, and willingness to pay for the RPI", influence "manager's attitude towards the RPI" via "beliefs about prices". Other long-term oriented market-related beliefs, specifically "beliefs about competitive position and compliance with legislation", directly influence "manager's attitude towards the RPI". Still other long-term oriented market-related beliefs, specifically "beliefs about traditional product quality dimensions", do not influence "manager's attitude towards the RPI".

"Beliefs about technical production implications and working conditions" influence "manager's attitude towards the RPI" via "beliefs about costs because of production inefficiency".

4.7   Conclusions and discussion

Figure 4.2 summarizes the results by showing the relationships that have been confirmed in the analyses of our model. Our results confirm that the manager's intention to adopt RPIs is driven by the manager's attitude towards RPI, the expressed needs of current customers, expressed needs of potential customers, and the SF's dependence on its current customers.

It appears that the attitude towards an RPI stimulates the manager's intention to adopt the RPI. The conclusion that the influence of a manager's attitude towards the RPI on the manager's intention to adopt the RPI increases when success with current products is smaller is in line with Zaltman, Duncan and Holbeck (1973). They suggest that the gap between satisfactory performance and actual performance stimulates the search for innovation opportunities. Only marginal support was found for a moderating influence of the manager's innovativeness on the relationship between attitude towards the RPI and the manager's intention to adopt the RPI. But attitude towards the RPI appears to stimulate the manager's intention to adopt the RPI, particularly when the manager is highly innovative.

Current customers are very influential as to RPI in SFs. Expressed needs of current customers drive the manager's intention to adopt the RPI. Furthermore, dependence on current customers reduces the manager's intention to adopt an RPI.

Expressed needs by potential customers for the RPI also increase the manager's intention to adopt the RPI. Our results on the intention of adoption confirm that SFs are motivated to respond to potential customers, probably because the expected contribution to profits of potential customers is attractive for SFs. Chistensen and Bower (1996) suggest that managers in large firms are not motivated to respond to potential customers, because the expected contribution of potential customers to profits is initially often small for large firms. This differs from SFs, which tend to be sensitive to potential customer needs, at least at the intention stage. Therefore, SFs may be important to the early penetration of RPIs in an industry (Rothwell and Dodgson 1994).

Our findings elaborate on Cooper's (1999) suggestion that a thorough assessment of market characteristics and a firm's capabilities to compete in the market is often ignored in the evaluation of product innovations. It is shown that both market-related beliefs and production-related beliefs influence a manager's attitude towards the RPI.

The influence of beliefs about the consumer's perception, acceptance, and willingness to pay for the RPI is fully mediated by beliefs about higher prices. In other words, the expected consumer satisfaction from an RPI will only stimulate the adoption of RPIs by small firms if it is expected to result in higher prices. Thus, the possible influence of the consumer's perception, acceptance, and willingness to pay for the RPI on the long-term performance of the RPI does not motivate SFs to adopt it. The influences of other long-term oriented market-related beliefs on manager's attitude towards the RPI were not mediated by beliefs about prices. Competitive position and compliance with regulation had a direct influence on the manager's attitude towards the RPI. The influence of beliefs about traditional product quality dimensions on the manager's attitude towards the RPI was not confirmed.
The influence of beliefs about technical production implications and working conditions on the manager's attitude towards the RPI is fully mediated by expectations about costs.

Personal characteristics of the manager appear to be of marginal influence on the intention to adopt RPI in SFs. Age does not influence the intention to adopt the RPI. Market environment, particularly the SF's current customers, seems of much more influence on the intention to adopt RPI in SFs than the personal characteristics of the manager.

Figure 4.2: Confirmed relationships in our model explaining a manager's intention to adopt an RPI

Market-related beliefs about the RPI

Beliefs about competitive position and compliance with legislation

Beliefs about consumer's perception and willingness to pay for the RPI

Beliefs about prices

H6c +

H6b +

H6a +

Production-related beliefs about the RPI

+

Beliefs about technical production problems for the RPI and working conditions

Beliefs about costs

H7b +

H7a -

Manager's innovativeness

Small firm's current success

H2a +

H2b -

Manager's attitude towards the radical product innovation

H1 +

Manager's intention to adopt the radical product innovation

Specialization

-

Expressed needs by potential customers for the radical product innovation

H5 +

Expressed needs by current customers for the radical product innovation

H3 +

Dependence on the current customers

H4b -

Appendix A

Intention to adopt the RPI

How likely do you consider it to be that you will produce eggs in a free-range stable with a chicken run?

(Hoe aannemelijk acht U het dat U binnen 10 jaar eieren produceert met kippen in een scharrel systeem met vrije uitloop?)

10	Certain or practically certain	99 % chance
9	Almost sure	90 % chance
8	Very probable	80 % chance
7	Probable	70 % chance
6	Good possibility	60 % chance
5	Fairly good possibility	50 % chance
4	Fair possibility	40 % chance
3	Some possibility	30 % chance
2	Slight possibility	20 % chance
1	Very slight possibility	10 % chance
0	No chance, almost no chance	1 % chance

Attitude towards the RPI

I consider keeping hens in a free-range stable with a chicken-run to be

Ik vind het houden van kippen in een scharrelsysteem met vrije uitloop

	A bad idee-3	-2	-1	0	+1	+2	+3	A good idea
	Unwise -3	-2	-1	0	+1	+2	+3	Wise
	Unattractive -3	-2	-1	0	+1	+2	+3	Attractive

Dependence on current customers (Alpha = 0.86)

1. There are other customers than my major buyer to whom I could sell my eggs (R)

   (Er zijn andere klanten dan mijn belangrijkste afnemer aan wie ik mijn eieren kan leveren)

2. It is costly for me to switch to another buyer

   (Het is voor mij kostbaar om om te schakelen naar een andere afnemer)

3. It would be difficult for me to replace my most important buyer without losing some income

   (Het zou voor mij moeilijk zijn om mijn belangrijkste afnemer te vervangen zonder dat mijn inkomen daardoor onder druk komt te staan)

Current success (Alpha = 0.80)

1. Compared to colleagues, I achieve a good margin per egg
   (Vergeleken met collega's haal ik een goede marge per ei)
2. Compared to colleagues, I achieve good financial results with layers
   (Vergeleken met collega's haal ik goede financiële resultaten in de legpluimveehouderij)
3. Compared to colleagues, I have a profitable layer business
   (Vergeleken met collega's heb ik een rendabel legpluimveebedrijf)
4. I acquire a good income from my layer business
   (Ik haal een goed inkomen uit mijn legpluimveebedrijf)
5. I achieve excellent financial results with my layer business
   (Ik behaal met mijn legpluimveebedrijf uitstekende financiële resultaten)

Manager's Innovativeness (Alpha = 0.73)

1. I am reluctant to introduce new ways of doing things until I see them work well for other poultry firms
   (Ik ben terughoudend met het doorvoeren van nieuwe werkwijzen totdat ik zie dat het goed werkt op andere pluimveebedrijven)
2. I need to see other people use something new before I will consider it
   (Ik moet eerst zien dat andere mensen iets nieuws gebruiken voordat ik het zelf overweeg)
3. I often find myself skeptical of new ideas
   (Ik merk dat ik vaak sceptisch sta tegenover nieuwe ideeën)
4. I consider myself to be creative and original in my thinking and behavior
   (Ik zie mijzelf als creatief en origineel in denken en doen)
5. I am an inventive kind of person
   (Ik ben een inventief persoon)

Specialisation (Alpha = 0.93)

Which part of your firm consists of laying hens in terms of (in a normal year):

(Welk deel van Uw bedrijf bestaat uit legpluimveehouderij (in een normaal jaar))

1. Turnover   In omzet
2. Labor requirements   In arbeidsbehoefte
3. Income   In inkomen

Market-related beliefs about the RPI
Beliefs about consumer's perception, acceptance, and willingness to pay for the RPI
1. In the eyes of consumers free-range systems with chicken-run are animal friendly
   (In de ogen van consumenten zijn scharrelsystemen met vrije uitloop diervriendelijk)
2. The consumer will accept the production of eggs in free-range systems with chicken-run
   (De consument zal de productie van eieren in scharrelsystemen met vrije uitloop accepteren)
3. Social organizations will accept the production of eggs in free-range systems with chicken-run
   (Maatschappelijke organisaties zullen de productie van eieren in scharrelsystemen met vrije uitloop accepteren)
4. In the future, consumers will pay extra for eggs produced in free-range systems with chicken-run
   (Consumenten betalen in de toekomst extra voor eieren geproduceerd met kippen in scharrelsystemen met vrije uitloop)
5. The production of eggs in free-range systems with chicken-run adds emotional value to eggs
   (De productie van eieren in scharrelsystemen met vrije uitloop geeft gevoelswaarde aan het ei)

Beliefs about traditional product quality dimensions
1. Poultry farmers producing eggs in free-range systems with chicken-run have a high percentage of dirty eggs (R)
   (Pluimveehouders die eieren produceren in scharrelsystemen met vrije uitloop hebben een hoog percentage vuile eieren (R))
2. Eggs from free-range systems with chicken-run are often contaminated with salmonella (R)
   (Eieren uit scharrelsystemen met vrije uitloop zijn vaak besmet met salmonella (R))

Beliefs about competitive position and compliance with legislation
1. Eggs from free-range systems with chicken-run cannot compete with foreign eggs (R)
   (Eieren uit scharrelsystemen met vrije uitloop kunnen niet concurreren met buitenlandse eieren (R))
2. The specific knowledge required to produce eggs in free-range systems with chicken-run gives Dutch poultry farmers a competitive advantage
   (De specifieke kennis die nodig is voor scharrelsystemen met vrije uitloop geeft Nederlandse pluimveehouders een concurrentievoorsprong)
3. Keeping hens in free-range systems with chicken-run will fulfill all legal requirements in the future
   (Het houden van kippen in scharrelsystemen met vrije uitloop voldoet in de toekomst aan alle wettelijke eisen)
4. Keeping hens in free-range systems with chicken-run is possible within state and community legislation
   (Het houden van kippen in scharrelsystemen met vrije uitloop is mogelijk binnen de regels van gemeenten en provincies)

Beliefs about prices
1. Poultry farmers producing eggs in free-range systems with chicken-run receive an attractive bonus on their egg price
   (Pluimveehouders die eieren produceren in scharrelsystemen met vrije uitloop ontvangen een aantrekkelijke toeslag op de eierenprijs)
2. Poultry farmers producing eggs in free-range systems with chicken-run receive a high profit margin per hen
   (Pluimveehouders die eieren produceren in scharrelsystemen met vrije uitloop behalen een hoge marge per kip)
3. Poultry farmers producing eggs in free-range systems with chicken-run achieve good financial results
   (Pluimveehouders die eieren produceren in scharrelsystemen met vrije uitloop behalen goede financiële resultaten)

Production-related beliefs
Beliefs about technical production implications and working conditions
1. Hens in free-range systems with chicken-run suffer from diseases a lot
   (Kippen in scharrelsystemen met vrije uitloop hebben veel last van ziekten)
2. Free-range systems with chicken-run lead to problems with cannibalization
   (Scharrelsystemen met vrije uitloop leiden tot problemen met kannibalisme)
3. Free-range systems with chicken-run lead to high environmental pollution
   (Scharrelsystemen met vrije uitloop leiden tot een hoge milieubelasting)
4. Keeping hens free from diseases is very hard in free-range systems with chicken-run
   (Kippen vrij houden van ziekten is zeer moeilijk in scharrelsystemen met vrije uitloop)
5. A free-range system with chicken-run is unhealthy for the poultry farmer
   (Een scharrelsysteem met vrije uitloop is ongezond voor de pluimveehouder)
6. A free-range system with chicken-run requires a lot of work during evening hours
   (Een scharrelsysteem met vrije uitloop vereist veel werk in de avonduren

Beliefs about costs because of production inefficiency
1. A free-range system with chicken-run is labor intensive
   (Eierenproductie in scharrelsystemen met vrije uitloop is arbeidsintensief
2. Egg productivity is low in a free-range system with chicken-run
   (De eierenproductie per kip is laag in een scharrelsysteem met vrije uitloop
3. Producing eggs in a free-range system with chicken-run is expensive
   (Productie van eieren in scharrelsystemen met vrije uitloop is duur
4. A free-range system with chicken-run is not efficient
   (Een scharrelsysteem met vrije uitloop is niet efficiënt

Appendix B

Table 4.3: Correlation coefficients between the variables in our model (*p* values between brackets)

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. Manager's intention to adopt the RPI															
2. Manager's attitude towards the RPI	0.47 (0.00)														
3. Expressed needs by <u>current</u> customers for the RPI	0.32 (0.00)	0.25 (0.00)													
4. Expressed needs of <u>potential</u> customers for RPI	0.27 (0.00)	0.23 (0.01)	0.12 (0.20)												
5. Dependence on the current customers	-0.06 (0.50)	0.01 (0.93)	0.22 (0.01)	0.17 (0.07)											
6. Manager's innovativeness	-0.05 (0.60)	-0.16 (0.07)	-0.05 (0.54)	-0.21 (0.02)	-0.14 (0.12)										
7. SF's current success	-0.08 (0.35)	-0.12 (0.19)	0.15 (0.08)	-0.06 (0.54)	0.02 (0.79)	0.11 (0.23)									
8. Subjective norm	0.26 (0.00)	0.36 (0.00)	0.18 (0.04)	0.42 (0.00)	0.08 (0.37)	-0.09 (0.34)	-0.02 (0.79)								
9. Specialization	-0.28 (0.00)	-0.11 (0.22)	0.04 (0.65)	0.03 (0.72)	-0.12 (0.19)	0.13 (0.15)	0.13 (0.14)	-0.07 (0.42)							
10. Age	-0.07 (0.46)	-0.13 (0.16)	-0.03 (0.72)	-0.01 (0.87)	-0.06 (0.51)	-0.12 (0.17)	-0.01 (0.95)	-0.22 (0.01)	0.01 (0.88)						
11. Beliefs about consumer's perception, acceptance and willingness to pay for the RPI	0.10 (0.28)	0.20 (0.02)	-0.01 (0.88)	0.00 (0.96)	-0.36 (0.00)	0.18 (0.04)	0.22 (0.01)	0.09 (0.31)	0.06 (0.53)	-0.10 (0.27)					
12. Beliefs about traditional product quality dimensions	0.28 (0.00)	0.24 (0.01)	0.14 (0.12)	0.08 (0.36)	-0.04 (0.63)	0.08 (0.38)	-0.24 (0.01)	0.02 (0.85)	-0.06 (0.48)	-0.08 (0.38)	-0.05 (0.58)				
13. Beliefs about competitive position and compliance with legislation	0.25 (0.01)	0.42 (0.00)	0.14 (0.13)	0.19 (0.04)	0.03 (0.78)	-0.08 (0.37)	-0.02 (0.81)	0.14 (0.13)	-0.14 (0.13)	0.05 (0.56)	0.10 (0.25)	0.09 (0.31)			
14. Beliefs about prices	0.16 (0.08)	0.37 (0.00)	0.17 (0.07)	0.19 (0.03)	-0.10 (0.26)	0.03 (0.71)	0.07 (0.46)	0.34 (0.00)	0.01 (0.91)	-0.10 (0.26)	0.37 (0.00)	0.08 (0.40)	0.19 (0.04)		
15. Beliefs about technical production implications and working conditions	-0.28 (0.00)	-0.30 (0.00)	-0.09 (0.33)	-0.06 (0.52)	-0.03 (0.77)	0.08 (0.38)	0.06 (0.49)	-0.04 (0.67)	0.09 (0.31)	0.06 (0.51)	0.05 (0.61)	-0.53 (0.00)	-0.22 (0.01)	0.04 (0.63)	
16. Beliefs about costs because of production inefficiency	-0.10 (0.28)	-0.50 (0.00)	-0.11 (0.22)	-0.07 (0.42)	+0.03 (0.72)	0.06 (0.50)	0.07 (0.42)	-0.21 (0.02)	0.12 (0.19)	0.18 (0.05)	-0.02 (0.80)	-0.30 (0.00)	-0.39 (0.00)	-0.21 (0.02)	0.39 (0.00)

Chapter 5

The Role of Current Customers for Radical Product Innovation in Small Firms

5.1   Introduction

Market orientation is widely accepted as a leading business philosophy. It contributes to firm performance (Jaworski and Kohli 1993; Narver and Slater 1990) and product innovation success (Gatignon and Xuereb 1997; Li and Calantone 1998; Slater and Narver 1994b). Christensen and Bower (1996) point out that firms that focus exclusively on the expressed needs of current customers may ignore innovations that turn out to be crucial for a firm's future prosperity. Slater and Narver (1998) highlight that truly market-oriented firms listen to the expressed needs of current customers, but will also identify potential customers in emerging market segments and current customers' latent needs. They call the exclusive focus on expressed needs of current customers customer led.

It is not clear whether small firms (SFs) are either truly market oriented or customer led with respect to radical product innovation. On the one hand, Narver and Slater (1990) found no evidence that SFs are less market oriented than large firms. On the other hand, specific SF characteristics might influence product innovation, in particular radical product innovation, in a specific way, as compared to large firms. Among others, SFs lack the financial means for doing their own independent *market intelligence* and, consequently, rely on general information available from customers and media, such as papers, radio, and TV. Also an SF's *responsiveness* to market information is constrained by limited financial and technical resources, which in particular may be a constraint when market information calls for radical product innovation. As a result, even if SFs are market oriented, their innovative behavior may differ from big companies. In fact, innovation, also radical innovation, by an SF is often an adoption process of a concept developed by customers or third parties. Also, since SFs have limited financial means at their disposal, their response to market developments is limited in case of radical product innovation. Empirical research has shown that SFs can introduce radical product innovations, but that their innovative behaviour is different from large firms, because their resources are different (e.g. Galende and de la Fuente 2003). Also, it appears that SFs compensate for their limited resources by developing networks (Bessant 1999; Carson et al. 1995). Especially relationships with customers are important in this respect, because customers are a valuable source for new product ideas (Hippel 1988) and because customers provide the necessary resources (Cooper and Schendel 1976; Foster 1986; Pfeffer and Salancik 1978). However, in the case of radical innovation, SFs may collect more market information than from current customers only, e.g., also from potential customers. In

fact, it seems that the role of customers and potential customers in radical product innovation by SFs is not well understood yet. In this context, general characteristics of SF managers may play a role too. Therefore, a model will be proposed and tested, which hypothesizes that the expressed needs and latent needs of current customers, along with the expressed needs of potential customers, drive radical product innovation. Since customers by definition do not express latent needs, latent needs are pursued by SFs with foresight about customer needs.

This study is structured as follows. First, radical product innovation in general and radical product innovation in SFs are discussed. Second, the research model for this study and the hypotheses about the relationships in it are presented. Third, the methodology to test the hypotheses is explained. Fourth, the results are presented and, finally, the conclusions are drawn and discussed.

5.2   Theory

5.2.1   Radical product innovation

What is a radical product innovation? After a review of the literature, Chandy and Tellis (1998) conclude that two dimensions underlie most definitions: technology and markets. The technology dimension refers to the extent to which the technology involved in a new product is different from prior technologies. The market dimension refers to the extent to which a new product fulfils key customer needs better than existing products (on a per-dollar basis) or even creates new needs. The term radical in the phrase "radical product innovation" refers to a high degree of product newness, but the degree of newness that distinguishes radical product innovations from other innovations is not specified in most definitions. Furthermore, since newness is a relative concept, the basis for comparison needs to be specified. In order to classify the degree of product newness, and, for that matter, radically new, really new, and incrementally new, Garcia and Calantone (2002) have modeled product newness as a second-order factor model. Three elements or bases for comparison are specified, newness to the customer, newness to the industry and newness to the firm. They elaborate on the latter two:

❑   Newness to the industry refers to an evaluation of newness relative to factors outside the firm, and includes market newness and technology newness. Market newness means that the new product fulfils a demand previously unrecognized by the industry. This new demand requires new market know-how about new distribution channels, partners, and competitors in order to take advantage of the product innovation. Technology newness means that the product innovation is based on new technical know-how for an industry.

❑   Similarly, newness to the firm includes newness of market know-how and of technological know-how, but is evaluated relative to the situation of the firm. New market know-how refers to serving new customers, in ways unfamiliar to the firm and/ or with technologies unfamiliar to the firm's current customers. Technological know-how means that the product innovation is based on new technological know-how for the firm.

Green, Gavin and Aiman-Smith (1995) elaborate on newness to the firm by arguing that radical innovation incorporates four dimensions: technological uncertainty, technical inexperience, high technology costs and business inexperience, where the former three focus on technological know-how and the latter focuses on market know-how. However, while there is no full agreement about a formal definition of radical product innovation (McDermott and O'Connor 2002), most researchers agree that a radical product innovation "contains a high degree of new knowledge and represents a clear departure from existing practices" (Dewar and Dutton 1986).

In line with the studies reviewed, an operational definition of radical product innovation is suggested that includes two perspectives: the customer's and the firm's perspective. We propose that, from the customer's perspective, the extent to which a new product fulfils customer needs better than existing products on a per-dollar basis (i.e., the benefits) is the most important characteristic to determine the degree of newness. From the firm's perspective, two dimensions need to be evaluated, newness of market know-how and newness of technological know-how. We consider newness to the industry a matter of degree on market know-how and technological know-how, because it affects technological uncertainty and technology costs. Technological uncertainty, technical inexperience and high technology costs are considered to be drivers of technological newness. As an operational definition of radical product innovation, we suggest product innovation that has the following characteristics:

❑ Requires the acquisition of new technological know-how by the firm, which is surrounded by technological uncertainty (i.e. about the performance of the new technology), and involves large investments relative to the firm's resources.
❑ Serves new customers or new customer needs and therefore requires the acquisition of new market know-how by the firm.

5.2.2 *Small-firms and innovation*

Since my analysis of the relationship between current customers and radical product innovation focuses on SFs, a definition, at least an operational one, of SF's seems appropriate. There is no widely-accepted statistical demarcation of an SF. The number of employees might define an SF. In Europe, the demarcation between small and medium-sized firms ranges, across countries, between five and fifty employees (Nooteboom 1994). The importance of SFs is illustrated by the fact that about 34 percent of the workforce in the European Union is working in firms with less than 10 employees (European Commission). We will refrain from the debate about the appropriate definition of an SF and lay down a definition, which focuses on the decision-making process in a small firm: an SF is a firm which is run and controlled under the direct supervision of the owner-manager.

Differences exist in innovation behavior between large and SFs (Galende and de la Fuente 2003). In the context of industry-wide innovation, it has been suggested that Small and Medium Enterprises (SMEs) and large-firms are complementary with respect to innovation (Pavitt et al. 1987; Rothwell 1978; Rothwell and Dodgson 1994). One perspective on industry-wide innovation is that the initial invention and innovative activities take place in large firms, while SFs play an important role in the diffusion of innovations, because the disadvantages in product innovation for SFs outweigh the advantages (Cohen 1995; Kamien and Schwartz 1982; Scherer 1991). The initial invention and innovative activities often require large investments in technological know-how and SFs lack the economies of scale and scope to make efficient use of an R&D staff. Furthermore, the performance of new technology is uncertain. SFs cannot bear the financial burden of technological failures. Also, SFs have difficulties to appropriate the gains of new technologies (Rothwell and Dodgson 1994). Kamien and Schwartz (1982) conclude that, beyond some magnitude, size does not contribute to innovation anymore, and that this magnitude varies across industries.

Still, classical examples exist of radical product innovations that bring down dominating large firms and catapult SFs into leadership (Chandy and Tellis 2000). Whether these cases are the exception rather than the rule (Sorescu et al. 2003), or whether the rule cannot be generalized to all classes of goods (for example to services) is unknown. In spite of this, large firms should be willing to cannibalize their existing products to avoid loosing their leading positions (Chandy and Tellis 1998; Christensen and Bower 1996).

To overcome their disadvantages in radical product innovation, SFs mainly apply technology that is developed outside the SF. Therefore, a model about radical product innovation in SFs should incorporate, explicitly or implicitly, the adoption of new technologies that are required for radical product innovation.

The personality of a person is the unique psychological make-up, which consistently influences how (s)he responds to his/her environment. Personality can be quantitatively measured with personal traits. SF-owner-managers have more room for expressing their personal traits in the firm's decision-making process than managers of large firms (Nooteboom 1994), which justifies the inclusion of personal traits in models about SF behavior. Particularly innovativeness should be included, because it is a personality trait that influences a person's adoption behavior.

SFs have weak management skills in areas like strategic planning, marketing, and finance, (Bessant 1999) because their size is too small to develop special skills in those fields. In SFs, strategic planning and implementation converge. This results in greater flexibility and

informal controls, which are considered to be advantages of SFs with respect to innovation. Consequently, a model about radical product innovation in SFs should not focus on planning and procedures but on the mental processing of the owner-manager.

The correct understanding of consumer needs is important for successful product innovation by both large and SFs (Cooper 1979; Montoyaweiss and Calantone 1994; Myers and Marquis 1969). However, SFs lack the expertise to do market research. Furthermore, marketing efforts to convince potential customers seems crucial for successful radical product innovation (Di Benedetto 1999), but SFs have little control over the elements of the marketing mix. Consequently, good relationships with customers are hypothesized to be important for successful radical product innovation in SFs.

5.3   The Model

Based on the arguments in the previous section, radical product innovation behavior of SFs is specified as an adoption process. Three forces drive radical product innovation adoption in SFs:

- Current customers' expressed needs for radical product innovation, which reflects the limited autonomy of SFs to respond to the market with radical product innovation.
- Potential customers' expressed needs for radical product innovation, which indicates that SFs may be able to respond to emerging market segments.
- The SF owner-manager's attitude towards radical product innovation, which indicates that SF owner-managers may autonomously respond to market developments with radical product innovation.

It is assumed that expressed customer needs for radical product innovations affect radical product innovation adoption in SFs directly and not via the SF owner-manager's "attitude towards the behavior". The *resource dependence* view on innovative activity (Cooper and Schendel 1976; Foster 1986; Pfeffer and Salancik 1978) holds that firms allocate resources to innovative programs that are required of the firm by customers who provide the resources that the firm needs to survive. The resource dependence view holds that a manager's freedom to choose is limited. The resource dependence view may be particularly relevant for radical product innovation in SFs, because SFs have limited financial resources and therefore cannot adopt radical product innovations without the support of their current customers. Ajzen's (1988) theory of planned behavior argues that models, which predict behavior, should account for situations where subjects have limited freedom to choose. A direct influence of expressed customer needs on radical product innovation adoption is in line with that theory.

According to Slater and Narver (1998), market orientation is distinctive from customer led by also taking into account latent, unexpressed needs. Therefore, latent customer needs preferably should be introduced in the model as an explanatory variable of radical product

innovation adoption by SFs. However, SFs will not have the financial means to execute the market research to probe such latent needs systematically. The owner-manager's industry foresight (Hamel and Prahalad 1994), industry insight, and customer insight (Slater and Narver 1999) form an important subset of the variables relevant for being market oriented. They might play a role with respect to SF owner-manager's knowledge of, and his response to, latent customer needs. Measurement of this subset of variables is difficult, but it is assumed that the manager's attitude, as a proxy, is representing the impact of these variables on radical product innovation. Consequently, the owner-manager's attitude towards a radical product innovation is included in the model as a predictor of radical product innovation adoption by SFs, which is in line with the theory that attitude predicts behavior (Ajzen and Fishbein 1980).

The model also includes "dependence on current customers" as a moderator of the influence of current customers on radical product innovation adoption. This reflects the limitation of an SF to serve the market with radical product innovations, if its current customers do not express a need for radical product innovation.

As discussed in the previous section, an important element in the model is that the SF owner's personal traits influence the adoption of radical product innovation (RPI adoption) in the firm. Innovativeness is considered a higher-order construct, determined by more fundamental personality variables, which influences all stages in the adoption process of new products (Mudd 1990). Therefore, the innovativeness of the owner of an SF is an element in the model. We hypothesize that innovativeness strengthens the influence of the SF owner-manager's attitude towards radical product innovation on the adoption of a radical product innovation. Figure 5.1 shows the model.

In addition to the variables in figure 5.1, three background variables were included, i.e. age of the owner-manager, the SF's specialization, and social norm towards radical product innovation.

Figure 5.1: **Adoption of Radical product innovation in small firms**
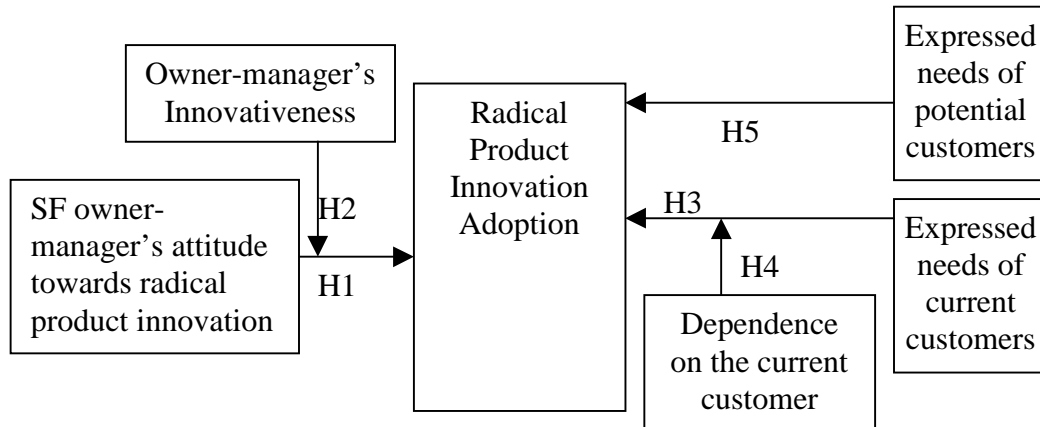
5.4   Hypotheses

A positive relationship between behavior and attitude towards that behavior is well established (e.g. Ajzen 1991; Ajzen and Fishbein 1980). Moreover, most studies support the view that attitude causes behavior, rather than the other way around (East 1997). Particularly for high-involvement problems like decisions about radical product innovations, a causal relation from attitude to behavior is most likely (Mowen 1990). An SF owner-manager first has to acquire information about the characteristics of a radical product innovation. Based upon this information, the radical product innovation is evaluated and an attitude is formed. If this attitude is positive, it will stimulate the adoption of the radical product innovation. Since the owner-manager is the key decision-maker in SFs, the following hypothesis is proposed.

H1:   The SF owner-manager's attitude towards radical product innovation positively influences the adoption of radical product innovation

Innovativeness is expected to influence all stages in the adoption process of new products (Mudd 1990). Moreover, it better predicts adoption behavior for radical product innovations than for incremental product innovations (Mudd 1990). However, how innovativeness affects each stage in the adoption process is unclear. Midgley and Dowling (1978) describe the nature of innovativeness as it relates to the adoption of new products by consumers. Innovators are those who "decide to adopt an innovation independently of the decision of others" (Midgley and Dowling 1978). In other words, the decision-maker's attitude towards the product innovation is decisive. In an SF context, these arguments support the following hypothesis.

H2:   The higher the owner-manager's innovativeness, the greater the influence of his attitude towards radical product innovation on radical product innovation adoption

It is widely accepted that new products that do not meet market needs lead to failure (Cooper 1993). Therefore, firms allocate resources to product innovations for which they can identify a need. The *resource dependence* view on innovative activity (Cooper and Schendel 1976; Foster 1986; Pfeffer and Salancik 1978) holds that firms allocate resources to innovative programs that are required of the firm by current customers who provide the resources that the firm needs to survive. This seems particularly relevant for SFs.

The resources to generate market information, and hence to identify market needs, are limited in SFs (Carson et al. 1995; Smeltzer et al. 1988), which makes it even harder for SFs than for large firms to identify market needs, other than expressed needs of current customers. In SFs, personal contacts with customers are recognized as an important source of market information (Carson et al. 1995; Hartman et al. 1994; Smeltzer et al. 1988). Furthermore, SFs usually cannot completely finance radical product innovations themselves. The required consent of financial institutions to adoption of radical product innovation by an SF amplifies the importance of risk reduction that expressed needs of current customers can offer. Consequently, product innovations that match current customers' expressed needs are adopted at the expense of new product ideas that match other needs (e.g. emerging markets and latent needs). Furthermore, because SFs have limited power vis a vis customers, we hypothesize that expressed needs of current customers explains the adoption of radical product innovation, rather than the other way around. These arguments lead to the following hypothesis.

H3:   *Expressed needs of current customers for radical product innovation positively influence the adoption of radical product innovation by small firms*

Small firms depend on their customers to acquire the resources for radical product innovation. However, this dependence may vary across firms. This suggests that dependence on customers would stimulate radical product innovation in an SF, if customers have a need for radical product innovation but would decrease radical product innovation, if customers do not have a need for radical product innovation. The following hypothesis is proposed

H4:   *The greater the dependence on current customers, the greater the influence of expressed needs of current customers for radical product innovation on the adoption of radical product innovation*

Slater and Narver (1998; 1999) argue that market-oriented firms also respond to the needs of potential customers. Furthermore, Slater and Narver (1999) argue that SFs are also market oriented and therefore respond to the needs of potential customers. It is hypothesized that this response also includes the potential customer's need for radical product innovation. More formally:

H5: Expressed needs of potential customers for radical product innovation positively influence the adoption of radical product innovation by small-firms

5.5 Methodology

5.5.1 Sample

The proposed model will be tested for firms in the Dutch laying-hen industry. Thus, our testing refers to real decision-makers in a real decision-making context, as opposed to testing respondents in an experimental laboratory setting, which seems important to understand the market behavior of SFs (e.g. Smith 1982). Firms in the Dutch laying hen industry suit the purpose, since they are SFs and have to respond currently to customer needs, which require radical changes in production methods. These changes towards sustainable, in particular animal-friendly, production methods are communicated in the market and in fact perceived by the consumer as a fundamental improvement in product quality (Bijleveld and Duindam 2003; Eelen 1989). Most SFs in this industry sell to only one customer/ wholesaler for a relatively long period of time, which makes it easier to isolate the influence of customers. Specifically, 90.5% of the respondents in the sample sell over 90% of their produce to their most important customer and only 4.5% switched to another main customer in the year prior to the computer-guided interviews. Therefore, the influence of an occasional second customer is neglected.

The market for eggs was in a state of flux at the time of the data collection (2000). Customer needs and preferences with respect to eggs had been highly predictable for most of the 20th century, i.e. clean, undamaged, and fresh eggs. During the 1990's, more and more consumers, retailers, and wholesalers preferred eggs that were also produced in a more animal-friendly manner. This trend has led to radical product innovations, such as the birdcage stable with or without chicken run, the free range stable, with or without chicken run, and the biological production of eggs, which require high investments in production methods[9]. In 1999, this radical product innovation had gained a market share of 45% in the Dutch market for fresh consumer eggs.

A random sample of 220 poultry farmers was drawn from a list including all firms with more than 1000 laying hens. The respondents were first contacted by phone to ask for their participation. Over 90% of the respondents agreed to participate. Face to face interviews were conducted, using a computer-guided questionnaire. Exactly 200 interviews were completed.

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[9] Free-range stable is referred to in the Netherlands as scharrelstal. Birdcage stable is referred to in the Netherlands as volière, which is in fact a French name

5.5.2 Scale development

All items of the measurement scales are shown in appendix A. All scores on the multi-item scales were divided by the number of items used to make the estimated coefficients more comparable.

Three group discussions were conducted to obtain a list of all innovations that were under consideration by owners of SFs in this industry or had been under consideration in the past 5 years. Five innovations from this list were considered to be radical product innovations in line with our conceptual definition of radical product innovation. The participants in the group discussions formulated these radical product innovations as production technologies, i.e., the birdcage stable (In Dutch: volière), with or without chicken run, the free range stable (In Dutch: scharrelstal), with or without chicken run, and the biological production of eggs. These production technologies require the acquisition of new technological know-how by the SF. Furthermore it is not clear how these production technologies will perform and the investments involved are very large for SFs. Furthermore, these production technologies all add "animal friendly" as a radically new product attribute for eggs, a product attribute for which some consumers are willing to pay. Therefore, the adoption of these production technologies is used as an indicator for radical product innovation.

"Radical product innovation adoption" was measured by asking respondents whether they had already adopted one of the radical product innovations. Note that this is a dichotomous variable, with 0 if the answer is no, i.e., the SF only produces eggs in a traditional system and 1 if the answer is yes, i.e., the SF has adopted one of the animal-friendly production systems.

The "SF owner-manager's attitude towards adopting radical product innovation" refers to the degree to which the owner-manager has a favorable or unfavorable evaluation or appraisal of the radical product innovation (This is in line with Ajzen's (1991) definition of attitude). The SF owner-manager's attitude towards adopting the radical product innovation was measured using three items. Respondents indicated their attitude towards "producing free-range eggs" using a seven-point semantic differential scale. The three semantic differential scales were anchored by "a bad idea versus a good idea", "not wise versus wise" and "not attractive versus attractive". In a principal-component analysis all items loaded higher than 0.8 on the first component, before rotation. The reliability of the measure, using alpha scores, was 0.89 (*n*=200). The average score of the items was used as measure for the "SF owner-manager's attitude towards adopting radical product innovation".

This attitude measure mentions one specific production technology, which is typical for adding the product attribute "animal friendly" (In Dutch: scharrelsysteem met vrije uitloop), but it is slightly different from my adoption measure, which includes all production technologies that add the product attribute "animal friendly". This specific production

technology was selected to measure an owner-manager's attitude towards radical product innovation, because it is well known by all owner-managers and most owner-managers have evaluated its merits at some point in time. The other production systems basically build on this system, but the specifics may not be known to all of the respondents.

"Owner-manager's innovativeness" was measured with five items taken from Pallister and Foxall (1998). With the items, the respondent indicates whether (s)he considers himself creative and inventive and whether (s)he is willing to try innovations before other people do. All items load higher than 0.59 on the first component, before rotation and were maintained in the final measure. The reliability of the measure, using alpha scores, was 0.71 (n=200).

"Dependence on the current customers" is defined as the firm's need to maintain a relationship with its current customers to achieve its goals (Kumar et al. 1995). Replaceability of the current customers is used to measure the SF's dependence on the current customers (Heide and John 1988; Kumar et al. 1995). Three items were taken from Kumar, Scheer, and Steenkamp (1995) and adapted for use in this study, based on discussions with potential respondents. All items loaded higher than 0.68 on the first component, before rotation. The reliability of the measure, using alpha scores, was 0.64 (n=200).

"Expressed needs of current customers." Our respondents provided the name and address of their main customer at the time of the survey, which allowed an assessment of the effect of specific customers on radical product innovation in the SF. A total of 54 different customers were identified. The customer's turnover in radically new products was used as an approximation for "expressed needs of current customers". The customer's turnover in radically new products was estimated based on the percentage of eggs in the customer's assortment that had the product attribute "animal friendly". For each customer We calculated the number of eggs sold to this customer by the respondents in the computer-guided interviews and how many of them had the product attribute "animal friendly". The percentage of eggs with the product attribute "animal friendly" was then used as a proxy for the expressed needs of current customers.

"Expressed needs of potential customers." In the Netherlands, most SFs with laying hens sell their eggs to assembler packing plants, trading companies that assemble eggs from SFs with laying hens, pack for consumers, and distribute to retail outlets. All assembler packing plants, except the SF's current customers, were assumed to be potential customers for SFs with laying hens. To measure the "expressed needs of potential customers", respondents rated the following statement on a seven-point semantic differential scale anchored by very unlikely and very likely: "Assembler packing plants think I should produce free-range eggs". This

measurement is suggested by East (1997) to measure referent beliefs in the theory of planned behavior.

Social norm was operationalized with one single item, as suggested by East (1997). Respondents rated the following statement on a seven-point semantic differential scale anchored by very unlikely and very likely: "Most people who are important to me think I should produce Free-range eggs". As previously discussed under an "SF owner-manager's attitude towards adopting radical product innovation", my measure for social norm also mentions one specific system, typical for adding the product attribute "animal friendly".

Age was measured by subtracting the respondent's year of birth from the year 2000 (year of the computer-guided interviews).

Specialization was operationalized with three items, where respondents indicated what part of their firm constituted the production of eggs in terms of turnover, labor demand, and income. All items loaded higher than 0.95 on the first component, before rotation. The reliability of the measure, using alpha scores, was 0.95 (n=200).

5.5.3 *Testing the Hypotheses*

Binary logistic regression with adoption of radical product innovation as the dependent variable was used to test the hypotheses. The logistic regression model takes the following functional form:

$$(1) \qquad \ln\left[\frac{p}{1-p}\right] = \beta_0 + \beta_1 X_1 + \ldots + \beta_k X_k$$

where p corresponds with the probability of adoption of radical product innovation and X's are the independent variables.

5.6 Results

Table 5.1 shows the results of the binary logistic regression, where the "SF owner-manager's attitude towards adopting radical product innovation", the "Owner-manager's innovativeness", "Expressed needs of potential customers", "Expressed needs of current customers" and "Dependence on the current customers" explain "Radical Product Innovation Adoption".

Table 5.1: Results of Binary Logistic Regression of "Radical Product Innovation Adoption" on a Number of Explanatory Variables

	Radical Product Innovation Adoption
"SF owner-manager's attitude towards adopting radical product innovation" (H1)	-0.45
"Owner-manager's innovativeness" x "SF owner-manager's attitude towards adopting radical product innovation" (H2)	0.13*
"Owner-manager's innovativeness"	-0.50
"Expressed needs of current customers" (H3)	7.3***
"Expressed needs of current customers" x "Dependence on the current customers" (H4)	-0.83*
"Dependence on the current customers"	0.01
"Expressed needs of potential customers"	0.11
"Social Norm"	0.13
Age	-0.01
Specialization	-0.01
N	200
Correctly predicted	156 (78%)
Nagelkerke R^2	0.42

* $p<0.1$, ** $p< 0.05$, *** $p<0.01$

The predictive validity of the model is good (see table 5.2). Out of 200 respondents, 156 (78%) are correctly classified by the model, 113 are classified as non-adopters and 43 as adopters, where the observed classification is 125 and 75 respectively. The proportion of correctly classified respondents significantly exceeds the proportion of choices correctly classified by chance (The test statistic for Huberty's test = 7.0 ($p<0.001$)) (Sharma 1996). The proportion of correctly classified respondents also significantly exceeds the proportion of choices correctly classified by a naïve model where all respondents are classified as non-adopters (The test statistic for Huberty's test = 4.5 ($p<0.001$)).

Table 5.2: Classification Table for the Logistic Regression in Table 5.1

		Predicted radical product innovation	
		No	Yes
Observed radical product innovation	No	113	12
	Yes	32	43

Hypothesis 3 is supported by the findings in table 5.1, because "Expressed needs of current customers for radical product innovations" has a positive influence on "radical product

innovation adoption" (b=7.3, $p<0.001$). This finding acknowledges the relevance of the research dependence view for radical product innovation in SFs (Cooper and Schendel 1976; Foster 1986; Pfeffer and Salancik 1978).

Some marginal support is found for Hypothesis 2, with the significant coefficient for the interaction term between "Owner-manager's innovativeness" and "SF owner-manager's attitude towards adopting radical product innovation" (b=0.13, $p=0.097$) in row three of table 5.1.

To analyze the nature of this interaction, the sample is split in three groups of equal size with low, medium and high scores on "Owner-manager's innovativeness", and the binary logistic regression is repeated per group, excluding the interaction term between innovativeness and attitude. The results of these analyses are shown in table 5.3. "SF owner-manager's attitude towards adopting radical product innovation" is –0.21($p=0.29$) when "Owner-manager's innovativeness" is low; 0.05 ($p=0.88$) when "Owner-manager's innovativeness" is medium; and 0.38 ($p=0.081$) when "Owner-manager's innovativeness" is high.

Table 5.3: **Results of 3 Binary Logistic Regressions of "Radical Product Innovation Adoption" on a Number of Explanatory Variables. The Sample is Split Into Respondents that Score Low, Medium and High on "Owner-Manager's Innovativeness"**

Dependent variable:	Radical Product Innovation Adoption		
	"Owner-manager's innovativeness":		
	Low	Medium	High
"SF owner-manager's attitude towards adopting radical product innovation"	**-0.21**	**0.05**	**0.38***
"Owner-manager's innovativeness"	0.44	3.3**	0.37
"Expressed needs of current customers"	6.73*	24.65**	3.38
"Expressed needs of current customers" x "Dependence on the current customers"	-0.45	5.69**	1.21
"Dependence on the current customers"	-0.25	1.37*	-0.12
"Expressed needs of potential customers"	-0.02	-0.07	0.39*
"Social Norm"	0.29	0.48	-0.23
Age	-0.03	0.04	-0.01
Specialization	-0.18	0.18	-0.01
N	67	62	71
Correctly predicted	49(73.1%)	48(77.4%)	60(84.5%)
Nagelkerke R^2	0.39	0.61	0.57

* $p<0.1$, ** $p<0.05$, *** $p<0.01$

Some partial support is found for Hypothesis 1, with the findings in table 5.3, because "SF owner-manager's attitude towards adopting radical product innovation" has a positive influence on "radical product innovation adoption" if "Owner-manager's innovativeness" is high (b=0.38, p=0.081). This support is surprisingly weak, which underlines that attitude predicts human behavior only in specific contexts (Ajzen and Fishbein 1980). Apparently, attitude is a poor predictor of behavior in the context of radical product innovation in SFs.

Hypothesis 4 is not confirmed. The coefficient for the interaction term between "Dependence on current customers" and "Expressed needs of current customers for radical product innovations" (b=-0.83, p=0.08) in row six of table 5.1 is significant but negative. Further analyses of the nature of this interaction presented in table 5.4 shows that this is opposite to hypothesis 4.

Table 5.4: **Results of 3 binary logistic regressions of "Radical Product Innovation Adoption" on a number of explanatory variables. The sample is split into respondents that score low, medium, and high on "dependence on the current customers"**

Dependent variable:	Radical Product Innovation Adoption		
	Dependence on the current customer:		
	Low	Medium	High
"SF owner-manager's attitude towards adopting radical product innovation"	-0.92	1.09	-0.14
"Owner-manager's innovativeness" x "SF owner-manager's attitude towards adopting radical product innovation"	0.22	-0.06	0.03
"Owner-manager's innovativeness"	-1.08*	0.77	0.01
"Expressed needs of current customers"	**9.04*****	**6.17****	**2.89*****
"Dependence on the current customers"	1.00	0.63	-0.16
"Expressed needs of potential customers"	0.07	0.24	0.18
"Social Norm"	0.27	-0.22	0.16
Age	-0.03	-0.08	0.00
Specialization	-0.11	0.21	0.03
N	81	52	67
Correctly predicted	65(80.2%)	45(86.5%)	49(73.1%)
Nagelkerke R^2	0.57	0.57	0.32

* $p<0.1$, ** $p< 0.05$, *** $p<0.01$

The sample is split in three groups with low, medium and high scores for " Dependence on the current customers" and the binary logistic regression is repeated per group, this time

excluding the interaction term between dependence and current customers' needs. These analyses showed that the coefficient for "Expressed needs of current customers for radical product innovations" is 9.04 ($p=0.001$) when "Dependence on current customers" is low; 6.17 ($p=0.04$) when "Dependence on current customers" is medium; and 2.9 ($p=0.009$) when "Dependence on current customers" is high.

Dependence on current customers limits the positive influence of expressed needs of current customers for radical product innovations on radical product innovation adoption by SFs. This is opposite to hypothesis 4. SFs that are highly dependent on their current customers are less likely to serve them with radical product innovations. Our explanation is that dependence on the customer increases the risk of asset specificity of investments in case of radical new production systems. As a result, farmers are less inclined to respond positively to the customer's needs for radical product innovation if dependence on that customer is high.

Hypothesis 5 is not confirmed, because the coefficient for "Expressed needs of potential customers" (b=0.11, $p=0.32$) in table 5.1 is not significant. In Slater and Narver's (1998) terminology, this suggests that overall SFs in this sample are not truly market oriented with respect to radical product innovation. Surprisingly, the analyses in table 5.3 show that "Expressed needs of potential customers" has a positive influence when "Owner-manager's innovativeness" is high (b=0.39, $p=0.08$).

The three additional explanatory variables that were included, "Social Norm" (b=0.13, $p=0.11$), Age (b=-0.01, $p=0.78$), and Specialization (b=-0.01, $p=0.88$) did not have a significant influence on "radical product innovation adoption".

5.7   Conclusions and discussion

This study proposes a model to test whether radical product innovation in SFs is driven by the SF owner-managers attitude towards adopting radical product innovation, which serves as a proxy for latent needs, expressed needs of current customers, or expressed needs of potential customers. In Slater and Narver's (1998) terminology, the model tests whether radical product innovation in SFs is driven by a true market orientation or customer led only.

The results show that radical product innovation in most SFs in the sample is customer led, because radical product innovation is driven by the expressed needs of current customers and not by expressed needs of potential customers or the SF owner-manager's attitude towards adopting radical product innovation. However, following Slater and Narver (1999), this does not mean that a true market orientation is only feasible for large firms. The results also indicate that radical product innovation in SFs with highly innovative owner-managers is predicted by expressed needs of potential customers and the owner-manager's attitude

towards radical product innovation. Consequently, radical product innovation in SFs with highly innovative owner-managers may be driven by a true market orientation. The latter elaborates on Verhees and Meulenberg (2004), who find that the SF owner-manager's innovativeness is related positively to customer market intelligence.

It has been argued that customer-led firms may ignore decisive innovations (Christensen and Bower 1996; Slater and Narver 1998; 1999). On the one hand, our results indicate that SFs with less innovative owner-managers may ignore radical product innovations, because they are customer led only with respect to radical product innovation. On the other hand, our results indicate that highly innovative owner-managers of SFs may be fully market oriented with respect to radical product innovation and acknowledge the need for radical product innovations that may be decisive. There is no indication that the situation in SF is different in this respect from the situation in large and medium-sized firms.

Furthermore, our results show that the influence of a customer's expressed needs on the adoption of radical product innovation in SFs is reduced by the SF's dependence on that customer. Further research should explore whether asset specificity plays a role.

Further research should explore whether these findings can be generalized to other, less radical product innovations and to other industries.

Appendix A

SF owner-manager's attitude towards radical product innovation
Keeping chickens in a free-range stable with a chicken run is:
(Ik vind het houden van kippen in scharrelsystemen met vrije uitloop)

1. A bad idea   -   A good idea   (Een slecht idee - Een goed idee)
2. Unwise   -   Wise   (Onverstandig   - Verstandig)
3. Not attractive - Attractive   (Onaantrekkelijk - Aantrekkelijk)

Owner's Innovativeness
1. I am reluctant to introduce new ways of doing things until I see that they work for other poultry firms
   (Ik ben terughoudend met het doorvoeren van nieuwe werkwijzen totdat ik zie dat het goed werkt op andere pluimveebedrijven)
2. I have to see other people use something new before I will consider it
   (Ik moet eerst zien dat andere mensen iets nieuws gebruiken voordat ik het zelf overweeg)
3. I often find myself skeptical of new ideas
   (Ik merk dat ik vaak sceptisch sta tegenover nieuwe ideeën)
4. I consider myself to be creative and original in my thinking and behavior
   (Ik zie mijzelf als creatief en origineel in denken en doen)
5. I am an inventive kind of person
   (Ik ben een inventief persoon)

Dependence on the current customer
1. There are other customers than my major buyer to whom I could sell my eggs
   (Er zijn andere klanten dan mijn belangrijkste afnemer aan wie ik mijn eieren kan leveren)
2. It is costly for me to switch to another buyer
   (Het is voor mij kostbaar om om te schakelen naar een andere afnemer)
3. It would be difficult for me to replace my most important buyer without losing some income
   (Het zou voor mij moeilijk zijn om mijn belangrijkste afnemer te vervangen zonder dat mijn inkomen daardoor onder druk komt te staan)

Expressed needs of potential customers
1. Wholesalers think I should switch to a free-range stable with chicken run
   (De eierhandel denkt dat ik over zou moeten schakelen op een scharrelsysteem met vrije uitloop)

Social Norm towards radical product innovation

1. Most people who are important to me think I should produce free-range eggs
   (De meeste mensen die belangrijk voor mij zijn denken dat ik kippen moet houden in scharrelsystemen met vrije uitloop)

Specialization

Which part of your firm consists of laying hens in terms of (in a normal year):

Welk deel van Uw bedrijf bestaat uit legpluimveehouderij (in een normaal jaar)

1. Turnover   In omzet
2. Labor requirements   In arbeidsbehoefte
3. Income   In inkomen

Chapter 6

The Influence of Current Success, Radical Product Innovation, Market Orientation and Innovativeness on a Small Firm's Performance Expectations

6.1   Introduction

Performance expectations, defined as the manager's expectations about whether his/her firm will thrive or deteriorate in the future, have a big impact on decision making in firms, particularly in relation to investment decisions and therefore buying behavior. Amongst others, performance expectations play an important role in the Dutch entrepreneurial trust index. In many countries, similar indices are used as economic indicators, such as the Geschäftsklima-index or Ifo-index in Germany and the Tankan-index in Japan. Furthermore, firms that operate in business-to-business markets may make investment decisions based on the performance expectations of their customers.

Performance expectations of firms seem to be partly determined by expected market demand. Performance expectations may also be influenced by specific actions of the firm, particularly radical product innovation (RPI). As such, increasing performance expectations of the firm may indicate its demand for new supplies. A firm's performance expectations may also be based on its capabilities, irrespective of market demand or RPI. It seems important to understand the determinants of performance expectations in order to understand better their impact on firm behavior, particularly purchase behavior.

Despite the widespread use of performance expectations, surprisingly little research exists about how performance expectations of firms are formed (Glazer et al. 1989). This chapter contributes to reduce this knowledge gap. It should be noted that, according to our definition of performance expectations, this research focuses on performance expectations of firms and not on performance expectations of strategic alternatives that firms may have. Furthermore, this research focuses only on small firms (SFs), defined as firms run and controlled under the direct supervision of the manager. Finally, only differences between SFs are considered as possible determinants of differences in performance expectations. This chapter focuses particularly on differences between SFs in the context of RPI. For example, differences in RPI adoption, in expressed needs for RPI by customers, and in the managers innovativeness. Dynamic environmental determinants of performance expectation, such as its relationship to business cycles, are not included in this study.

In this chapter, a model is proposed to explore the determinants of performance expectations. The model is applied here to address three questions. First, are performance expectations a naïve extrapolation of the SF's current success? This seems particularly relevant for SFs, because strategic marketing management in SFs is limited. Second, what is the influence of RPI adoption on performance expectations? The adoption of an RPI may increase long-term performance expectations. Also, the SF's planning increases when RPIs are considered, which may have a long-term effect on performance expectations. Third, are performance expectations based on capabilities of SFs, particularly capabilities that make SFs responsive to changes in the market environment?

This chapter is structured as follows. Performance expectations in SFs are discussed and a theory on the formation of performance expectations of managers is presented. Particularly, current success, RPI, the manager's innovativeness, and market orientation are discussed as antecedents of performance expectations of SFs. A model is specified that explains the formation of performance expectations in SFs and hypotheses are derived. The model is empirically tested for poultry farmers and the methodology to test the hypotheses is given. Finally, the results are presented and discussed.

6.2   Theory

Firms acquire market information about customers, competitors, and the market environment. Furthermore, firms assess their capabilities and their access to resources. Based on this information, firms evaluate the possibilities for product innovation, for market development, and for serving their current customers better. In this strategic marketing-management process, firms form performance expectations. In this section, elements in the formation of performance expectations are elaborated on with specific reference to SFs. Some peculiarities of strategic marketing management in SFs and the consequences of manager's cognitive limitations for performance expectations in SFs are presented. Based on the market orientation concept, the acquisition of market information is discussed. Capabilities of SFs and their access to resources are discussed. In the remainder of this chapter we will refer to SF owner-managers as managers.

Strategic marketing management, and therefore the formation of performance expectations, is usually an annually recurring process. However, the small sales volumes of SFs do not warrant specialization of tasks and the acquisition of specialists to perform strategic marketing-management tasks. The manager of an SF performs managerial tasks, but is often also involved in tasks normally executed by employees. Therefore, the manager bases his/her performance expectations on the cognitive processing of easily available information. Since strategic marketing management in SFs is limited and relatively simple, we propose that the

formation of performance expectations is probably simple and that performance expectations are to some, sometimes even to a large, extent based on the SF's current success.

In SFs, some strategic marketing management tasks will have to be performed. Stewart et al. (1999) find that SF owners focussing on growth and change tend to engage more in planning than SF owners who focus more on stability. Therefore, managers engaged in the adoption of an RPI may put more effort into planning and performance expectations than managers focussing on their current product assortment. Furthermore, it is expected that long-term performance expectations are formed in RPI decision making, because RPIs normally have a long-term impact.

The acquisition of market information is an important element in the formation of performance expectations. A positive relationship between acquiring market information and performance has been firmly established in market-orientation literature (See for an overview: Cano et al. 2004; Deshpande and Farley 2004). Furthermore, a market orientation should continuously lead to superior profit (Narver and Slater 1990), which also suggests a positive relation between acquiring market information and performance expectations.

Market-intelligence generation in SFs is different from large firms, because SFs lack the financial means to gather their own independent market intelligence. General downstream market information is widely available for SFs, but, since commissioning marketing research, which is fine-tuned to the SF's specific interests, is hardly an option for SFs, general downstream market information is not considered as a cause for different performance expectations. Considering the importance for SFs of developing networks (Bessant 1999; Carson et al. 1995), two elements of market-intelligence generation are identified that seem relevant to the managers' formation of performance expectations; needs of current customers, and needs of potential customers.

- It is expected that current customers are an important source of market information for SFs and that current customer needs therefore influence manager's performance expectations. This information will be best, perhaps exclusively, known by an SF. Therefore, it may be an important cause for different performance expectations of SFs that operate in the same industry but have different customers.
- Needs of potential customers may vary between SFs, because managers do not consider all potential customers for the generic product equally relevant. This may depend on how the SF is integrated into business networks of potential customers.

Capabilities of SFs determine how well they can serve their current customers and how well they can respond to opportunities and threats in the market. Therefore, capabilities will influence performance expectations. Capabilities of SFs, particularly in relation to innovation, are mainly behavioral versus material capabilities of large firms, according to Rothwell and

Dodgson's (1994). Examples of SF capabilities are their flexibility and their personal relationships with suppliers and customers. Furthermore, entrepreneurial characteristics of managers are decisive variables in the success or failure of SFs (e.g. Zachariasse 1974). Therefore, entrepreneurial characteristics of managers are considered to be extremely important capabilities of SFs. They include innovativeness, autonomy, risk taking, proactiveness, and competitive aggressiveness (Lumpkin and Dess 1996). In SFs, innovativeness implies a willingness of the manager to learn about and adopt innovations, both in the input and output markets. For innovation in SFs, innovativeness seems to be the most important entrepreneurial characteristic of a manager, because it has a role in all stages of the adoption process. Innovativeness is also important, because it is a higher- order construct determined by more fundamental personality variables, such as risk taking (Mudd 1990) and may capture other entrepreneurial characteristics of managers. Therefore, the manager's innovativeness may be an important cause of positive performance expectations. The importance of innovativeness for innovation in SFs was confirmed for product innovation (PI) in chapter 3 of this thesis. However, chapters 4 and 5 of this thesis showed that innovativeness of managers was only marginally influential for RPI.

Specialization and dependence on current customers are also considered as determinants of the capabilities of SFs to respond to opportunities and threats. Specialization positively influences the manager's time spent on the opportunities and threats in this particular business. Therefore, specialization may be an important cause of positive performance expectations.

Dependence on current customers may restrict the choice options of SFs, and therefore cause negative performance expectations.

It is widely argued that, compared to large firms, small and medium-sized firms (SMEs) have limited resources to respond to market opportunities by innovation (Chandy and Tellis 2000; Galende and de la Fuente 2003; Kamien and Schwartz 1982). This seems to hold *a fortiori* for SFs. For SFs, many opportunities to create value for buyers may emerge in upstream markets. Rama (1996) shows that upstream industries are important sources for innovation, especially for commodity type industries. Furthermore, case studies for the food industry support the idea that a link to suppliers is important for process innovations (Traill and Grunert 1997). Carson, Cromie, McGowan, and Hill (1995) argue that through supplier intelligence, companies are able to detect new technologies and other types of input necessary for innovation. Chandy and Tellis (2000) propose that SFs can adopt off-the-shelve components from other industries to introduce RPIs in their own markets. According to Bessant (1999), in reality, SFs rarely scan for new technological opportunities or articulate their needs. Nevertheless, in our opinion, upstream market information can improve an SF's possibilities to respond to market opportunities and threats and consequently positively influence an SF's performance expectations.

6.3 The model

Based on the theory presented before a model is proposed where the manager's performance expectations are driven by:

- current success,
- introduction of RPI or not,
- market information, particularly expressed needs for RPI by current customers and expressed needs for RPI by potential customers,
- capabilities of SFs, particularly managers' innovativeness, their specialization and dependence on the current customer, and
- resources of SFs, particularly upstream market-information generation.

Figure 6.1 shows the proposed model. The dotted lines in the figure represent relationships about the determinants of RPI adoption that were confirmed in chapter 5. The solid lines in the figure represent relationships that are hypothesized in this chapter.

Figure 6.1: Model that explains SF's performance expectations
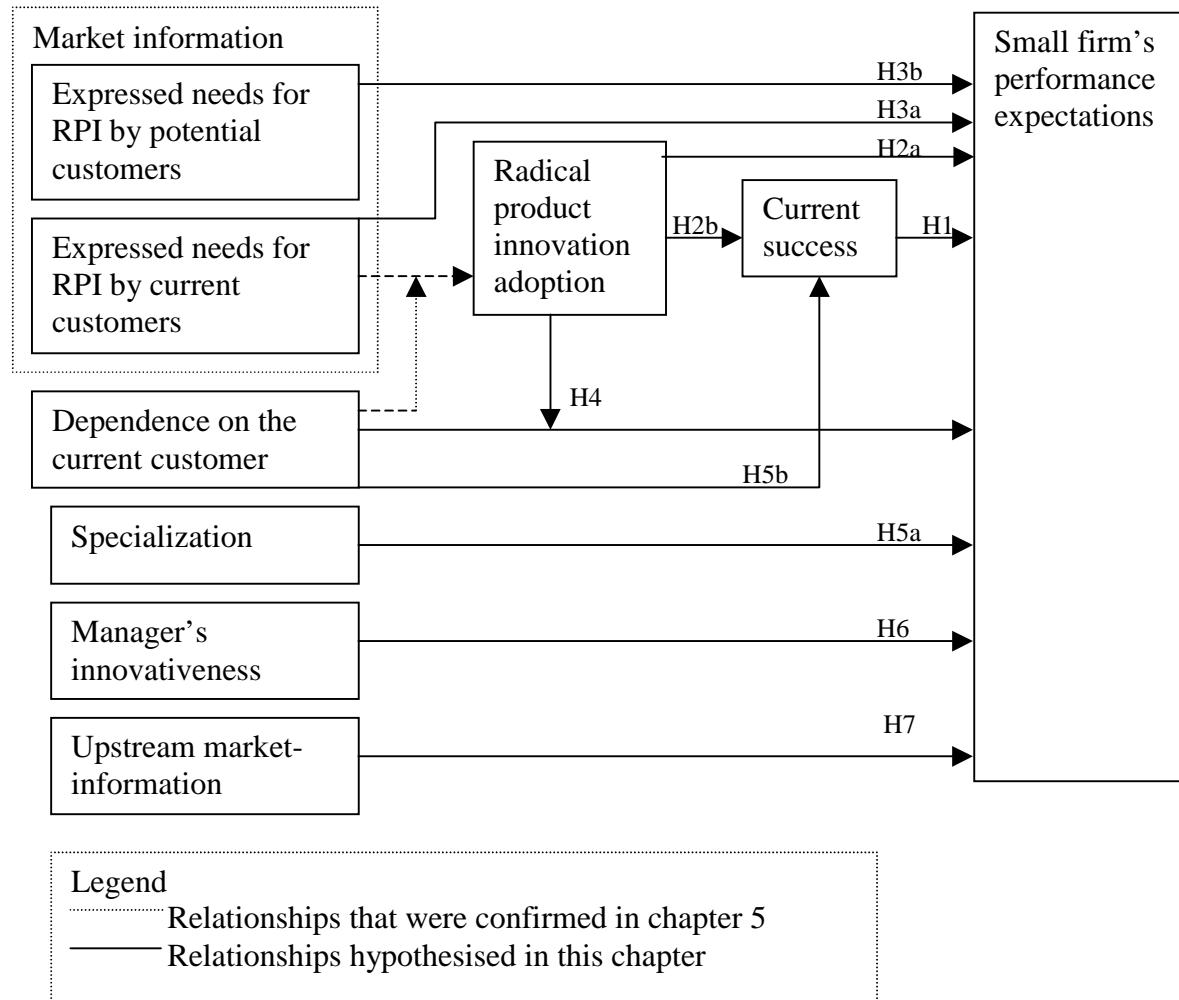
The model has performance expectations as the key dependent variable, but current success is also being explained. All determinants of current success and current success itself are hypothesized as determinants of performance expectations. Particularly for the variables RPI adoption and specialization, a direct influence and an indirect effect through current success on performance expectations is investigated, because these variables are hypothesized to influence current success (e.g. Geroski et al. 1993).

6.4   Hypotheses

The simple planning activities performed in SFs may make SFs myopic for changes in their environment that will affect their future performance, such as changes in demand and competition. Current market conditions are simply extrapolated to the future. This mechanism was already identified a long time ago in the hog cycle (Hanau 1928), where farmers make production decisions based on current prices as the forecast of future prices. Furthermore, small firms may sometimes wrongly assume control over their performance and assume that current success results from a competitive advantage. Since competitive advantages do not disappear overnight, it is hypothesized that successful SFs also have positive performance expectations.

H1:   Current success positively influences a small firm's performance expectations

It is widely recognized that product innovation, particularly RPI is important for a firm's prosperity (Geroski et al. 1993). Moreover, SFs adopt RPI because they expect it to improve their future performance. SFs that have adopted an RPI will be positive about the future. Even if the RPI is not successful yet, managers might hold on to positive expectations about performance, to avoid cognitive dissonance (Festinger 1957). Therefore, a positive direct relationship between RPI adoption and an SF's performance expectations is hypothesized.

H2a: The adoption of radical product innovation positively influences a small firm's
*   performance expectations*

Although it is widely recognized that product innovation, particularly RPI, is important for a firm's prosperity (Geroski et al. 1993), Sandvik and Sandvik (2003) find that only new-to-the-market products have a positive influence on performance, and not new-to-the-firm products. Since RPI of SFs that operate in a purely competitive market are often only new-to-the-firm products, the positive relationship between RPI adoption and current success may not be supported. Nevertheless, it is questionable whether the results of Sandvik and Sandvik (2003) for the hotel industry can be generalized to other industries. It is hypothesized that SFs only adopt RPIs that provide more value for money to customers than existing products and,

consequently, that RPI adoption positively influences a small firm's current success. The following hypothesis is proposed.

H2b: Radical product innovation adoption positively influences a small firm's current success

Managers know that satisfying customers is very important for the prosperity of their firm in general (Cooper and Schendel 1976; Foster 1986; Pfeffer and Salancik 1978) and for successful product innovation in particular (Cooper 1999; 1993). Furthermore, managers expect successful innovation to be important for their survival, which has long been argued in the management literature (e.g. Drucker 1954). Since many managers are expected to perceive innovation, particularly RPI, as important for the performance of their SFs, and because expressed customer needs for RPI facilitate RPI in SFs, a positive influence of "expressed needs for RPI by current customers" on "SFs performance expectations" is hypothesized.

H3a: Expressed needs for radical product innovation by current customers directly and positively influence a small firm's performance expectations

It has been argued in hypothesis 3a that expressed needs for RPI by current customers increase an SF's performance expectations. But SFs might also be able to target new customers and, consequently also making successful RPI possible when potential customers express a need for RPI. Therefore, a positive influence of "expressed needs for RPI by potential customers" on "SFs performance expectations" is hypothesized.

H3b: Expressed needs for radical product innovation by potential customers positively influence a small firm's performance expectations

On the one hand, the SF's dependence on its current customers might reduce its possibilities to respond to market opportunities in general, which will decrease performance expectations. For example, the SF may not be able to abandon its current customers and serve other more profitable customers. Previous chapters even indicated that dependence on the current customer might hamper the SF's responsiveness to expressed needs for RPI by current customers. On the other hand, firms, particularly SFs, are dependent on their customers to be able to introduce RPI (Cooper and Schendel 1976; Foster 1986; Pfeffer and Salancik 1978). Therefore, it is hypothesized that dependence on the current customers reduces an SF's performance expectations when the SF has not yet adopted the RPI and is serving the current customer with the traditional product.

*H4:	Dependence on the current customers negatively influences a small firm's performance expectations when the SF has not yet adopted the RPI*

Specialization may have a positive or a negative influence on performance expectations. On the one hand, specialization increases an SF' s planning activities in relation to the activity specialized. As a result, specialization speeds-up the identification of threats and opportunities and the development of plans about how to respond. Consequently, specialization may increase an SF's performance expectations. On the other hand, specialization also increases the volatility of an SFs success. Volatility in results is evaluated negatively by managers. Consequently, specialization may decrease the manager's performance expectations. The following hypothesis is proposed.

H5a: Specialization directly influences a small firm's performance expectations

Specialist knowledge is limited in SFs. Specialization can reduce this limitation, because SFs become specialized by focusing on one product market combination. It is expected that SFs can employ their resources more efficiently if they specialize in one product, thus increasing their competitive advantage. Therefore, it is hypothesized that specialization increases an SF's current success.

H5b: Specialization positively influences a small firm's current success

Innovativeness is defined as "…the notion of openness to new ideas as an aspect of a firm's culture" (Hurley and Hult 1998). In a small firm, innovativeness implies a willingness of the manager to learn about and adopt innovations, both in the input and output markets. These definitions of innovativeness do not refer to the actual value of an innovation, which suggests that innovativeness may stimulate the adoption of innovations irrespective of their value for the SF. In previous chapters, innovativeness has been shown to increase the influence of attitude towards RPIs on both the behavioral intention to adopt RPIs and RPI adoption. This suggests that the manager's innovativeness stimulates the SF's responsiveness to opportunities. Therefore, the manager's innovativeness is expected to increase his perceived ability to seize opportunities and to avoid threats, consequently increasing his performance expectations.

H6: The manager's innovativeness positively influences a small firm's performance
       expectations

Upstream market information is expected to reveal possibilities for improving the firm's performance, because suppliers are considered to be an important resource for innovation in SFs (Carson et al. 1995; Chandy and Tellis 2000; Rama 1996; Traill and Grunert 1997). Increasing the effort to learn from upstream market information will speed-up the

identification of possibilities to improve the SF's performance, which will make the SF more positive about the future.

H7:   *Upstream market information positively influences a small firm's performance expectations*

6.5   Methodology

6.5.1   Sample

The proposed model will be tested for firms in the Dutch layer industry. Thus, testing refers to real decision-makers in a real decision-making context as opposed to testing respondents in an experimental laboratory setting, which seems important to understand market behavior of SFs (e.g. Smith 1982). Firms in the Dutch layer industry are suitable for this research, because they have to decide about all aspects of their enterprise, because they bear all the risks and gains of the enterprise, and because they have performance expectations about their firm.

A random sample of 220 poultry farmers was drawn from a list including all firms with more than 1000 layers in the Netherlands. The respondents were first contacted by phone to ask for their participation. Over 90% of the respondents agreed to participate. Face to face interviews were conducted, using a computer-guided questionnaire. Exactly 200 interviews were completed.

6.5.2   Scale development

All items of the measurement scales are shown in the appendix A (In Dutch and in English). Sum scores were calculated for the scales. All independent variables that were scored on scales were standardized, meaning that the average sum score was subtracted from the sum score and then divided by the standard deviation. Subtracting the mean of the independent variables makes the interpretation of the results easier, particularly the coefficients for the variables that are also included in the model as moderators (Irwin and McClelland 2001).

Small firm's expectation was measured with one negatively formulated item; i.e. "I am negative about the future of my poultry farm". Respondents rated this item on a seven-point semantic differential scale. The semantic differential scale was anchored by "completely disagree" versus "completely agree". The scores were re-coded by subtracting the original score from 8 to make the interpretation of the results easier. Consequently, a higher score should be interpreted as more positive performance expectations. Notice that the scores on this variable were not standardized, because it is a dependent variable only.

Small firm's current success was measured with five items. Success was discussed during three group interviews with members of the research population. Keywords that came-up during the discussions about firm success were profitability, financial results, income, margin

per egg, and performance relative to competitors. Five items were generated including these key words. All items load higher than 0.63 on the first component, before rotation and were maintained in the final measure. The reliability of the measure (Cronbach's alpha) was 0.79 (*n*=200).

Radical product innovation adoption

Three group discussions were conducted to obtain a list of all innovations that were under consideration by managers of SFs in this industry or had been under consideration in the past 5 years. Five innovations from this list were considered to be RPIs in line with our conceptual definition of RPI in Chapter 4. The participants in the group discussions formulated these RPIs as production technologies, i.e., the birdcage stable with or without chicken run, the free range stable, with or without chicken run and the biological production of eggs[10]. These production technologies require the acquisition of new technological know-how by the SF. Furthermore, it is not clear how these production technologies will perform and the investments involved are very large for SFs. Moreover, these production technologies all add "animal friendly" as a radically new product attribute for eggs, a product attribute for which some consumers are willing to pay. Therefore, the adoption of these production technologies is used as an indicator for RPI.

RPI adoption was measured by asking respondents whether they had already adopted one of the RPIs. Note that this is a dichotomous variable, with 0 if the answer is no, i.e. the SF only produces eggs in a traditional system and 1 if the answer is yes, i.e. the SF has adopted one of the animal-friendly production systems. Notice that the scores for this measure are not standardized, because it is a nominal variable.

Expressed needs for RPI by current customers

Our respondents provided the name and address of their main customer at that time, which allowed an assessment of the effect of specific customers on the SF's performance expectations. A total of 54 different customers were identified.

The customer's turnover in radically new products was used as an approximation for "expressed needs for RPI of current customers". The customer's turnover in radically new products was estimated based on the percentage of eggs that had the "animal friendly" product attribute in the customer's assortment. The number of eggs sold to each customer by the respondents was calculated in the computer-guided interviews, as well as the number of these eggs that had the product attribute "animal friendly". Then, the percentage of eggs with the "animal friendly" product attribute was used as a proxy for the expressed needs for RPI of

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[10] A free-range stable is referred to in the Netherlands as 'scharrelstal'. A birdcage stable is referred to in the Netherlands as 'volière', which is in fact a French name

current customers. Note that the scores for this measure are not standardized, because it has not been measured on a scale.

Expressed needs for RPI by potential customers
In the Netherlands, most SFs with layers sell their eggs to traders, usually called egg-packaging stations, because packaging for consumers is an important task of these traders. All egg-packaging stations were assumed to be potential customers for SFs with layers. To measure the "expressed needs of potential customers", respondents rated the following statement on a seven-point semantic differential scale anchored by "very unlikely" and "very likely": "Egg-packaging stations think I should produce free-range eggs". This measurement is suggested by East (1997) to measure referent beliefs in the theory of planned behavior. For further analyses, the scores were standardized.

Upstream market information
Jaworski and Kohli's (1993) measure for market orientation, particularly the market-intelligence component, was used as a starting point to measure upstream market information. Discussions with managers of SFs indicated that suppliers of feed were the most important suppliers in this industry. Therefore, items were adapted to measure the extent to which a manager generates information about the feed market. Five items were included to measure "upstream market information". PCA was used to test the dimensionality of the measure. Based on the scree-plot criterion, a one- component solution was selected (Hair et al. 1992). The reliability of the measure (Cronbach's alpha) was 0.75 (*n*=200), which could not be improved by removing one of the items. For further analyses, the scores were standardized.

Manager's innovativeness was measured with five items taken from Pallister and Foxall (1998). With the items, the respondent indicates whether the manager considers him/herself as creative and inventive and whether (s)he is willing to try innovations before other people do. All items load higher than 0.59 on the first component, before rotation and were maintained in the final measure. The reliability of the measure (Cronbach's alpha) was 0.71 (*n*=200), which could not be improved by removing one of the items. For further analyses, the scores were standardized.

Dependence on the current customer is defined as the firm's need to maintain a relationship with its current customer to achieve its goals (Kumar et al. 1995). Replaceability of the current customer is used to measure the SF's dependence on the current customer (Heide and John 1988; Kumar et al. 1995). Three items were taken from Kumar, Scheer and Steenkamp (1995) and adapted for use in this study, based on discussions with potential respondents. All items loaded higher than 0.68 on the first component, before rotation. The reliability of the measure (Cronbach's alpha) was 0.65 (*n*=200).

Specialization was operationalized with three items, where respondents indicated what part of their firm constituted the production of eggs in terms of turnover, labor demand, and income. All items loaded higher than 0.95 on the first component, before rotation. The reliability of the measure (Cronbach's alpha) was 0.95 (*n=200*) .

6.5.3 Estimation procedure

Ordinary least squares (OLS) regression is used to estimate the coefficients for the independent variables in our model on the basis of the total sample (N = 200). OLS regression is used because it provides consistent and asymptotically efficient estimators in a fully recursive model (Greene 2003).

It may be difficult to empirically identify the effects of each independent variable in our model, because many of the independent variables in our model are correlated, albeit to a different extent. To check whether this causes multicollinearity problems in our data, the condition number is calculated, which should be smaller than 20 (see for example Greene 2003). The variance inflation factor (VIF) of each coefficient is also considered. The VIF is calculated as $1/(1-R_k^2)$, where R_k^2 is the R^2 for a regression of the kth independent variable on all other independent variables. Klein (1962) suggested that when R_k^2 exceeds the overall R^2 for a regression, multicollinearity is severe. In terms of VIFs, this suggestion means that the VIF of each coefficient should be smaller than $1/(1-R^2)$.

6.6 Results

Table 6.1 shows the results of OLS regression of the SF's performance expectations on the hypothesized explanatory variables.

The condition number of this regression model is 5.38, which does not indicate a multicollinearity problem for the model. Since the R^2 is 0.33, the VIF of each coefficient in the model should be smaller than (1/(1-0.33=) 1.5, to provide some assurance that multicollinearity is not a serious problem for a specific coefficient. All coefficients in table 6.1 had VIFs smaller than 1.5, except for the coefficient of the interaction term. The VIFs for this coefficient was below 1.7, which we still consider acceptable. Therefore, multicollinearity does not seem to be a problem for the model.

A "small firm's current success" has a positive influence on a small firm's performance expectations, as hypothesized (b=0.32, *p*=0.01), which confirms that SFs expect to some extent that business conditions will stay as they are.

Hypothesis 2a is also confirmed. "RPI adoption" has a highly significant, positive impact on an "SF's performance expectations" (b=1.14, *p*<0.01).

Hypothesis 3a, which states that "expressed needs for RPI by current customers" has a positive influence on a "SF's performance expectations" is confirmed by the significant coefficient (b=0.99, p=0.05) for "expressed needs for RPI by current customers". It suggests that RPI is perceived as important by SFs for their performance.

Hypothesis 3b is not confirmed, because the coefficient for "expressed needs for RPI by potential customers" (b=0.12, p=0.34) in table 6.1 is not significant. This finding offers support for Conner's (1999) arguments that SFs may only respond to current customer needs and not to the needs of potential customers.

Table 6.1: Results of OLS regression of "manager's performance expectations" on the hypothesized explanatory variables

	SF's performance expectations
Small-firm's current Success (H1)	0.32***
RPI adoption (H2a)	1.14***
Expressed needs for RPI by current customers (H3a)	0.99**
Expressed needs for RPI by potential customers (H3b)	0.12
Dependence on the current customer	-0.37**
Dependence on the current customer x RPI adoption (H4)	0.81***
Specialization (H5a)	-0.13
Manager's innovativeness (H6)	0.39***
Upstream market information (H7)	0.42***
Constant	8.24
N	200
F	10.19***
R^2 (adjusted R^2)	0.33 (0.29)

* p<0.1, ** p< 0.05, *** p<0.01

Hypothesis 4 that "dependence on the current customer" negatively influences an "SF's performance expectations" when the SF has not adopted the RPI, is confirmed by the significant, negative coefficient for dependence on the current customer (b=-0.37, p=0.02). The coefficient for the interaction term between "dependence on the current customer" and "RPI adoption" is positive and significant (b=0.80, p<0.01), which means that "dependence on the current customer" has a positive influence on "SF's performance expectations" for firms that have already adopted the RPI (b=0.43, p=0.03)[11]. "Dependence on the current customer" guarantees an outlet for the new product in case of RPI adoption.

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[11] p values are calculated using *Simple Slope Analysis by Computer* as described by Aiken and West (1991, p.18)

Hypothesis 5a, that specialization has a positive influence on an "SF's performance expectations", is not confirmed. A possible explanation is that the positive influence of specialization, and consequently increased planning, on SF's performance expectations is offset by the higher risk of specialization versus diversification.

Hypothesis 6 is confirmed by the positive coefficient for "manager's innovativeness" in table 6.1 (b=0.39, $p<0.01$), which confirms that a manager's innovativeness makes SFs optimistic about the future.

Hypothesis 7 stating that "upstream market information" positively influences an SF's performance expectations is confirmed (b=0.42, $p<0.01$). "Upstream market information" seems to speed-up the identification of opportunities that emerge in upstream markets, which makes SFs positive about the future.

Table 6.2, shows the results of OLS regression of an "SF's current success" on "RPI adoption" and specialization. Collinearity is not an issue in this part of the model, because differences in specialization between RPI adopters and non-adopters are not significant ($t=0.34$, $p=0.73$).

Hypothesis 2b is confirmed by the significant coefficient for RPI adoption (b=0.36, $p=0.01$). It implies that adoption of an RPI also influences performance expectations indirectly via the SF's current success.

Finally, hypothesis 5b that specialization has a positive influence on an SF's current success is confirmed (b=0.36, $p<0.01$). It implies that specialization has an indirect influence on performance expectations via its influence on the SF's current success.

Table 6.2: Results of OLS regression where RPI adoption and specialization predict "Small firm's current success"

	SF's current success
RPI adoption (H2b)	0.36***
Specialization (H5b)	0.23***
Constant	-0.13
N	200
F	8.83***
R^2 (adjusted R^2)	0.08 (0.07)

* $p<0.1$, ** $p<0.05$, *** $p<0.01$

6.7   Conclusions

The results in this chapter show that performance expectations in SFs are only to a limited extent a naïve extrapolation of the SF's current success, because information about market

opportunities, the SF's capabilities, and information about the availability of resources also influence the SF's performance expectations.

RPI adoption has a direct influence on performance expectations, but also an indirect influence on performance expectations via current success. The long-term positive objectives formed during the planning for the RPI appear to have a long-lasting influence on performance expectations.

Information about market opportunities seems to have a positive influence on performance expectations to SFs. Particularly market information from current customers, specifically expressed needs for RPI by current customers, seems to offer market opportunities for SFs. Expressed needs for RPI by potential customers do not influence performance expectations. Apparently they do not reveal market opportunities for SFs.

SF capabilities also influence an SF's performance expectations. It can be concluded that the manager's innovativeness is an important capability of an SF that has a direct influence on the SF's performance expectations. Specialization has an indirect influence on performance expectations via the SF's current success. Dependence on the current customer has a negative influence on performance expectations when the SF has not yet adopted an RPI, and a positive influence when the SF has already adopted an RPI. SFs might feel themselves restricted in responding to market opportunities when they have not yet adopted the RPI, and this reduces their performance expectations. When SFs have adopted the RPI, dependence on the current customer increases performance expectations, possibly because the acceptance of the RPI by the current customer guarantees future sales.

Upstream market information has a direct positive influence on the SF's performance expectations. A possible explanation for this result is that upstream market information speeds up the identification of future opportunities that will be offered to the purchasing market of SFs.

6.8   Discussion
Performance expectations of firms appear only partly determined by expected market demand and therefore increasing performance expectations may not always indicate increasing demands for supplies. Specific actions of the firm, such as adopting RPI, also increase performance expectations, which may indicate a demand for new supplies. A change in performance expectations resulting from a change in capabilities is not always an indication of a change in the quantitative, but possibly in the qualitative demand for supplies.

Information from current customers, particularly expressed needs for RPI by current customers, influences performance expectations. However, information from potential customers, particularly expressed needs for RPI by potential customers, does not have an influence on performance expectations. In the terminology of Slater and Narver (1999), this suggests that SFs in this industry are not truly market oriented but customer led only, with respect to performance expectations.

6.9   Future research

As stated in the introduction this study only makes a first attempt to understand the formation of performance expectations.

Further research should address the determinants of performance expectations about strategic alternatives that firms have, since firms may consider several strategic alternatives at one point in time. The one with the highest performance expectations is most likely to be chosen. Therefore, research about the determinants of performance expectations about strategic alternatives improves our understanding about why different firms choose different strategic alternatives.

Another opportunity for further research is the formation of performance expectations in medium-sized and large firms. Medium-sized and large firms have more management and marketing expertise, and the formation of performance expectations is probably a group process. Therefore, our model will have to be extended to medium-sized and large firms. Finally, knowledge about the influence of dynamic determinants such as changes in market demand, would increase our understanding of the formation of performance expectations too.

Appendix A

Small firm's performance expectation
1. I am negative about the future of my poultry farm
   (Ik zie de toekomst van mijn legpluimveebedrijf somber in)

Current success
1. Compared to colleagues, I achieve a good margin per egg
   (Vergeleken met collega's haal ik een goede marge per ei)
2. Compared to colleagues, I achieve good financial results with layers
   (Vergeleken met collega's haal ik goede financiële resultaten in de legpluimveehouderij)
3. Compared to colleagues, I have a profitable layer business
   (Vergeleken met collega's heb ik een rendabel legpluimveebedrijf)
4. I acquire a good income from my layer business
   (Ik haal een goed inkomen uit mijn legpluimveebedrijf)
5. I achieve excellent financial results with my layer business
   (Ik behaal met mijn legpluimveebedrijf uitstekende financiële resultaten)

Manager's innovativeness
1. I am reluctant to introduce new ways of doing things until I've seen that they work for other poultry firms
   (Ik ben terughoudend met het doorvoeren van nieuwe werkwijzen totdat ik zie dat het goed werkt op andere pluimveebedrijven)
2. I have to see other people use something new before I will consider it
   (Ik moet eerst zien dat andere mensen iets nieuws gebruiken voordat ik het zelf overweeg)
3. I often find myself skeptical of new ideas
   (Ik merk dat ik vaak sceptisch sta tegenover nieuwe ideeën)
4. I consider myself to be creative and original in my thinking and behavior
   (Ik zie mijzelf als creatief en origineel in denken en doen)
5. I am an inventive kind of person
   (Ik ben een inventief persoon)

Upstream market information

1. I often meet feed suppliers to find out what products and services they are going to provide in the future
    Ik ontmoet vaak voederleveranciers om erachter te komen welke producten en diensten zij in de toekomst aanbieden

2. I do a lot of research into the supply of feed
    Ik doe veel onderzoek naar het aanbod van voeders

3. I hardly pick up changes in the product offer of feed suppliers (R)
    Ik pik veranderingen in het productaanbod van voederleveranciers nauwelijks op (R)

4. I regularly assess the quality of fodder and services of feed suppliers
    Ik beoordeel de kwaliteit van voeders en de diensverlening van voederleveranciers regelmatig

5. I regularly check whether the product offer of my feed supplier still matches my wants
    Ik controleer regelmatig of het productaanbod van mijn voederleveranciers nog aansluit bij mijn wensen

6. I regularly draw up plans to anticipate developments at feed suppliers
    Ik werk regelmatig plannen uit over hoe ik in kan spelen op ontwikkelingen bij voederleveranciers

Dependence on the current customer

1. There are other customers than my major buyer to whom I could sell my eggs (R)
    (Er zijn andere klanten dan mijn belangrijkste afnemer aan wie ik mijn eieren kan leveren)

2. It is costly for me to switch to another buyer
    (Het is voor mij kostbaar om om te schakelen naar een andere afnemer)

3. It would be difficult for me to replace my most important buyer without losing some income
    (Het zou voor mij moeilijk zijn om mijn belangrijkste afnemer te vervangen zonder dat mijn inkomen daardoor onder druk komt te staan)

Specialization

Which part of your firm consists of layers in terms of (in a normal year):

(Welk deel van Uw bedrijf bestaat uit legpluimveehouderij (in een normaal jaar))

1. Turnover   In omzet
2. Labor requirements   In arbeidsbehoefte
3. Income   In inkomen

Chapter 7

Conclusions, implications, and limitations

7.1   Conclusions

This thesis is concerned with product innovation decision making in small firms (SFs), specifically with the relationship between market orientation and PI in SFs. The study focuses on SFs supplying homogeneous products to the market, characteristics of a market structure of perfect competition. A special feature of the study is an in-depth analysis of radical product innovation (RPI) by SFs. Product innovation in these SFs is often an adoption process that requires coordination with marketing channel partners.

Chapter one emphasizes the importance of product innovation and market orientation for a firm's performance and the relationship between market orientation and successful product innovation that has been found for large firms. Furthermore, it highlights the need for research on the relationship between market orientation and product innovation in SFs.

In chapter 2, the literature on market orientation, PI, and the relationship between market orientation and PI is reviewed and SF characteristics are discussed first. Next, a general framework is developed to investigate the relationship between market orientation and PI in SFs. The complexity of the relationship between market orientation and product innovation is underlined by showing that market orientation may influence several aspects of product innovation, such as the new product development process, new product characteristics including product newness, new product success, and the number of product innovations in the firm.

The main elements of this general framework are the following. It is argued that PI decision making in SFs should be modeled as an individual decision-making process instead of a group process. Reasons for this are the central role of the owner-manager and the limited control of SFs over many elements of the marketing mix related to the PI.
Personal traits of the manager are supposed to be important for product-innovation decision making in SFs, because it is an individual decision-making process of the manager. In analogy with research findings for large firms, it is hypothesized that innovativeness, as an aspect of a firm's culture, influences an SF's market orientation and product innovation. In the context of PI, innovativeness is an important personal trait of the manager. Since the owner-manager makes most of the important decisions in an SF, his innovativeness is supposed to influence an SF's market orientation and product innovation, the latter both directly and indirectly through market orientation.

It is argued that PI in SFs is usually an adoption of a concept developed by customers or third parties. SFs do not have the means to employ specialists, such as market researchers and R&D scientists, for new product development. Furthermore, R&D departments also seem to have economies of scale, which puts SFs at a competitive disadvantage.

The limited possibilities of SFs to employ specialists and the importance of PI adoption as innovation put forward the important role of marketing channel partners for SFs. Marketing channel partners can provide SFs, among others, with the concepts and expertise knowledge that is required for PI. Suppliers may incorporate this knowledge in the products that they sell to the SF. It has been found that marketing channel partners are important for product innovation in SFs (Barringer 1997; Bessant 1999; Donckels and Lambrecht 1997; Freel 2000; Miles et al. 1999).

Marketing channel partners are also important for an SF's market orientation (Carson et al. 1995; Carson 1990; Freel 2000). Marketing and the firm's market orientation are often the responsibility of the owner-manager in SFs, because SFs usually do not employ marketing specialists. SF owner-managers often have a technical or production background and lack the broader perspective provided by marketing (Fuller 1994). Therefore, an SF's market orientation is expected to rely heavily on its current customers.

Dissemination of market information as part of market oriented behavior is hardly an issue in small firms, because the manager is responsible for most marketing decisions.

Elements of this general framework have been elaborated in specific models, which have been empirically tested for specific types of SFs. Table 7.1 gives an overview of the hypothesized relationships that have been tested in chapters 3, 4, 5 and 6.

In chapter 3, a model is proposed to investigate the combined influence of the manager's innovativeness and market orientation on PI and firm performance.

The results from testing the model on rose growers show that market orientation may inhibit or stimulate innovation, depending on the innovativeness of the firm in the respective product domain. On the one hand, innovation by SFs with highly innovative managers, who are keen on new products, is mitigated by customer market intelligence. On the other hand, owners who are less innovative in a specific domain are stimulated to innovate by customer market intelligence. Grunert, Harmsen, Meulenberg and Traill (1997b) suggest that product innovation is stimulated by a firm's enthusiasm for the product and a focus on the market. Our results elaborate on this view by specifying the relationship between the manager's innovativeness (innovativeness and innovativeness in the new product domain), customer market intelligence, and product innovation. As such, our results contribute to the debate about whether market orientation stimulates or inhibits innovation.

Innovativeness of the owner-manager, one dimension of an entrepreneurial orientation, appears to be an important characteristic of an SF, because it influences performance directly and indirectly via market orientation and product innovation. This result is in accordance with research findings from the past, which stress the entrepreneurial skills of farmers as the decisive variable in the success or failure of a farm business (Zachariasse 1974).

Also, our results confirm that customer market intelligence is positively related to company performance in SFs. This is in line with the growing amount of evidence about the positive impact of market orientation on company performance. The results also show that a market orientation is helpful in the selection of an attractive product assortment for small firms with relatively homogeneous products They confirm the value of market information about the generic product for small firms.

Chapter 4 and 5 of this study focus on RPI, which is very relevant for SFs because of the fundamental changes in the present society.

In Chapter 4, a model is proposed which analyzes the manager's intention to adopt an RPI. Intention to adopt an RPI is supposed to be driven by expressed needs for RPI by current and potential customers, the manager's attitude, dependence on the current customer, and the manager's innovativeness. Specific attention is given to the role of the SF's current success. Furthermore, the manager's attitude towards the RPI is analyzed.

The manager's attitude towards the RPI is supposed to be driven by market-related beliefs about the RPI and production-related beliefs about the RPI. Furthermore, beliefs about higher prices are supposed to mediate the long-term oriented market-related beliefs. Beliefs about costs are supposed to mediate beliefs about production problems and working conditions.

The results from testing the model for Dutch poultry farms confirm that the manager's intention to adopt RPIs is driven by the managers attitude towards RPI, the expressed needs of current customers, expressed needs of potential customers, and the SF's dependence on its current customers. Furthermore, it is shown that the relationship between the manager's attitude towards an RPI and the manager's intention to adopt the RPI is stronger when success with current products is smaller and when the manager is highly innovative.

Both market-related beliefs and production-related beliefs influence a manager's attitude towards the RPI. The influence of the manager's beliefs about consumers' perception, acceptance, and willingness to pay for the RPI on the manager's attitude towards the RPI is fully mediated by beliefs about prices. In other words, the consumer satisfaction expected by managers from an RPI will only stimulate the adoption of the RPI by SFs if it is expected to

result in higher prices. However, the influence of other long-term oriented market-related beliefs, such as "beliefs about competitive position and compliance with legislation" on the manager's attitude towards the RPI was not mediated by beliefs about prices. Competitive position and compliance of the RPI with regulations had a direct influence on the manager's attitude towards the RPI. Beliefs about how the RPI performed on traditional product quality dimensions, such as dirty eggs and broken shells, did not influence the manager's attitude towards the RPI. The influence of beliefs about technical production problems and working conditions, on the manager's attitude towards the RPI is fully mediated by expectations about lower costs.

Chapter 5 analyzes the adoption of an RPI by SFs, with particular attention to the role of current and potential customer's expressed needs, the manager's attitude, and the manager's innovativeness. The results from testing the model for Dutch poultry firms show that, in SFs with less innovative managers, RPI is driven by the expressed needs of current customers and not by the expressed needs of potential customers or the manager's attitude. Furthermore, the results show that attitude towards adopting the RPI and expressed needs by potential customers positively influence RPI adoption in SFs with highly innovative managers.

In Slater and Narver's (1998) terminology, the results suggest that RPI in SFs with less innovative managers is customer led only, because RPI adoption is only driven by expressed needs of current customers. Truly market-oriented RPI means that expressed needs and latent needs of current and potential customers drive RPI adoption. Latent needs can not be measured directly, because customers, by definition, do not express latent needs. SF managers with foresight about customer needs may identify and pursue latent needs. So, if latent needs influence RPI in SFs it is via the manager's attitude towards the RPI. SFs with highly innovative managers may be truly market oriented with respect to RPI adoption.

Furthermore, our results in chapter 5 show that the influence of a customer's expressed needs on the adoption of RPI in SFs is reduced by the SF's dependence on that customer.

Chapter 6 proposes a model to analyze the manager's performance expectations. RPI adoption and current success are hypothesized to be the key drivers of the manager's performance expectations. The roles of current and potential customers, the manager's innovativeness, and upstream market information in the manager's performance expectations are further analyzed.

The results from testing the model in chapter 6 show that performance expectations in SFs are only to a limited extent a naïve extrapolation of the SF's current success, because other variables also influence performance expectations.

RPI adoption has a long-term positive influence on performance expectations. Even when RPI adoption has a limited positive influence on current success, as in this case for Dutch farmers with layers, SFs seem to hold on to the positive performance expectations that they probably had when they decided to adopt the RPI.

Dependence on current customers has a negative influence on performance expectations when the SF has not yet adopted an RPI and a positive influence when the SF has already adopted an RPI. It is concluded that SFs feel restricted to respond to market opportunities when they have not yet adopted the RPI, and this reduces their performance expectations. When SFs have adopted the RPI, dependence on the current customer even increases their performance expectations; the SF is certain of a market outlet for its RPI.

Expressed needs for RPI by potential customers do not seem to influence performance expectations.

7.2   Discussion

It is interesting to compare the findings of chapters 3, 4, 5, and 6 presented in Table 7.1. This allows us to compare the drivers of *intention* to adopt an RPI and actual RPI *adoption*. Also, factors influencing PI can be compared with factors influencing RPI. These issues will be discussed below.

7.2.1   *Drivers of intention to adopt radical product innovation and radical product innovation adoption*

In the theory of planned behavior (Ajzen 1991), intentions are supposed to lead to behavior, which suggests that the drivers of the manager's *intention* to adopt an RPI are also the drivers of RPI *adoption* by SFs.

A comparison of the results in chapter 4 and 5 (columns 3 and 5 of table 7.1) confirms that many drivers of the manager's *intention* to adopt an RPI are similar to those of RPI *adoption* by SFs. First, expressed needs by current customers are a strong driver of both the manager's *intention* to adopt an RPI and RPI *adoption*. Second, the influence of the manager's attitude towards the RPI on both *intention* to adopt the RPI and RPI *adoption* seems larger, the higher the manager's innovativeness. Third, social norm and age do not explain the manager's *intention* to adopt an RPI, nor RPI *adoption*.

Table 7.1: Confirmed and rejected relationships in our research

Independent variables	Dependent variables					
	Attitude towards the RPI	Intention to adopt the RPI	PI	RPI adoption	Performance	Performance expectations
Performance		(1)				+
RPI adoption					+	+
PI					+	
Intention to adopt						
Expressed needs for RPI by current customers	+			+ (5)	+	+
Dependence on the current customer	-			(5)		+/- (4)
Expressed needs for RPI by potential customers	+			+ (2)		0
Customer market intelligence			+ (3)			
Suppliers intelligence			+ (3)			+
Attitude towards the RPI		+ (1) (6)		+ (2)		
Market-related beliefs about the RPI	+ (7)					
Production-related beliefs about the RPI	+ (8)					
Manager's innovativeness	(6)	+ (3)		(2)	+ (9)	+

+ positive relationship confirmed, - negative relationship confirmed, 0 relationship not confirmed

(1) Current success has been shown to moderate the relationship between attitude towards the RPI and intention to adopt the RPI.

(2) Attitude towards the RPI and expressed needs for RPI by potential customers only influences RPI adoption when the manager is highly innovative

(3) Customer market intelligence and supplier intelligence only influence PI when the manager is not innovative in the new product domain.

(4) Dependence on the current customer has a positive influence on performance when the SF has adopted the RPI and a negative influence when the SF has not yet adopted the RPI.

(5) Dependence on the current customer reduces the influence of expressed needs for RPI by current customers on RPI adoption.

(6) Manager's innovativeness increases the influence of attitude towards the RPI on intention to adopt the RPI.

(7) Beliefs about prices and beliefs about competitive position and compliance with legislation directly influence attitude towards the RPI, beliefs about consumer's perception, acceptance, and willingness to pay for the RPI indirectly influences attitude towards the RPI via beliefs about prices.

(8) Beliefs about technical production problems and working conditions indirectly influence attitude towards the RPI via beliefs about costs because of production inefficiency

(9) Based only on chapter 3

Some differences were found as well between the drivers of the manager's *intention* to adopt an RPI and RPI *adoption*. First, expressed needs for RPI by potential customers systematically influence the manager's *intention* to adopt an RPI, while they only influence RPI *adoption* if the manager is highly innovative. Apparently expressed needs of potential customers for RPI can motivate managers to adopt RPI, but ultimately SFs require the support of current customers, particularly SFs with less innovative managers. This process is comparable to the process of resource allocation in large established firms, described by Christensen and Bower (1996), where projects for new products that serve the needs of potential customers are killed because current customers do not express a need for the innovation. Second, the manager's attitude towards the RPI influences RPI *adoption* only when the manager is highly innovative, while it influences the manager's *intention* to adopt an RPI for all levels of a manager's innovativeness. The manager's attitude towards RPI only does not influence *intention* to adopt an RPI when the SF is very successful. Third, specialization has a negative influence on *intention* to adopt an RPI, but not on RPI *adoption*. Managers of specialized firms might be less motivated to adopt the RPI, because it requires a complex restructuring of a firm, but eventually their negative motivation is of little influence compared to the influence of their current customers.

7.2.2 *Factors influencing product innovation and factors influencing radical product innovation*

Similarities exist in the drivers of PI and RPI, but some dissimilarities as well (Columns 4 and 5 of table 7.1). One similarity is that elements of a SF's market orientation drive both PI and RPI. In the case of PI, customer market intelligence ínfluences PI. SFs seem able to detect unfulfilled needs of customers by gathering customer market intelligence and they seem to respond with product innovation. Expressed needs by current customers stimulate RPI too.

There is dissimilarity in the influence of the manager's innovativeness. Customer market intelligence only stimulates PI when the manager's innovativeness in the product domain is low. The manager's attitude towards the RPI only stimulates RPI adoption when the manager's innovativeness is high. Another dissimilarity is that the manager's innovativeness in the product domain has a direct influence on PI. The manager's innovativeness does not have a direct influence on RPI.

Providing SF managers with market intelligence stimulates PI, while the expressed needs for RPI by current customers stimulate RPI. This suggests that SFs are more autonomous with respect to PI, while RPI requires the explicit support of current customers. Consequently, RPI in particular appears to be a chain process.

7.3   Implications

The research results have important implications for SFs. A major conclusion is that market orientation is important for PI in SFs. Therefore, it is important to stimulate and facilitate market orientation of SFs by making up to date general market information available about market trends and developments. Since most individual SFs cannot financially afford such market research themselves, they have to rely on collective bodies to generate this type of information. In fact, in many countries, industry members and the government finance the collection and dissemination of food and agricultural market intelligence at an industry level. However, these institutions are in many countries, such as the Netherlands, trimming their operations because of the financial challenges they face. Governments take increasingly the position that collecting market information is a task of industry members themselves. Industry members are less inclined to support collective operations for a variety of reasons. First because they may not have the financial capabilities. Second because they may prefer, as a special producer group or as a relative large enterprise, to collect customized market information instead of general industry market information. However, our results demonstrate that it remains important that SFs can make use of an adequate market intelligence structure at the industry level in order to be successful innovators.

It appears that expressed needs of customers play a crucial role in the adoption of radically new products by SFs. Therefore, communication and co-ordination between SFs and their customers in the market channel is extremely important to stimulate radical product innovation by SFs. Processing industries and retail chains, being important customers of farmers, have an important role to play in the market success of an RPI. This is particularly true for processing and marketing co-operatives. This role broadens co-operatives' basic tasks of translating consumers' wants and needs into marketable (food) products.

Innovativeness appears to be extremely important for successful innovation by SFs. Therefore, the mindset of the small entrepreneur should focus on developments in customer markets, new technologies that emerge and their opportunities for innovations. Farmers are known for being willing to exchange views and experiences. They do this by personal contacts, excursions, study groups, pilot plants, experimental stations and so on. Innovation in all its facets should be on the agenda of these activities. In the end, it is creating an entrepreneurial attitude, which matters most for innovation by SFs.

7.4   Limitations and future research

Data from only two industries were used. Each model was tested using data from one industry. Further research should test each model's applicability to a variety of industries.

Comparing the drivers of PI and RPI may be not straightforward since the drivers of PI and RPI were identified for different industries. While these SFs from different industries have the same basic characteristics such as being small and selling homogeneous products there might be differences in firm culture because of the different types of products they produce. Further research is needed to address whether the influence of market orientation on PI, and RPI in SFs differs by type of product, e.g. consumer versus industrial goods.

The test of our model through the analysis of radical product innovation by poultry farmers is context specific in two respects: (a) the radical innovation in our study is, in Ansoff's (1965) terminology, a new product for an existing market. We have not investigated a new product for a new market, the case of diversification in Ansoff's terminology; (b) the radical innovation in our study, animal friendly produced eggs, is in the consumers' perception an innovation of a credence attribute (Trijp, Steenkamp and Candel 1997). We did not test the model on the basis of radical innovations focusing on experience attributes.

The coefficients for the relationships in our models were estimated for the whole sample, but SFs may respond differently to drivers of (R)PI. It is possible to classify firms into segments, such that the influence of the drivers of (R)PI is the same within each segment but different across segments. Recently, such an analyses was successfully conducted for the determinants of derivative usage (Pennings and Garcia, 2004). Further research should test whether there is heterogeneity in the influence of the drivers of (R)PI.

Finally, the concepts in our models were measured using self-reported data. Accounting data, particularly for the measure of success, may provide new insights.

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Samenvatting (Summary)

Het onderwerp van dit proefschrift is productinnovatie door ondernemingen. Productinnovatie is een belangrijke ondernemingsbeslissing, vooral voor het marktbeleid van een onderneming. Er is al veel onderzoek verricht naar productinnovatie. Hierin komt onder meer naar voren dat marktgerichtheid van ondernemingen nauw gerelateerd is aan succesvolle productinnovatie. Onderzoek naar productinnovatie door kleine ondernemingen is echter nog beperkt. Dit onderzoek tracht de leemte op dit gebied aan te vullen. Kleine ondernemingen worden daarbij opgevat als ondernemingen die door de eigenaar worden geleid en bestuurd. Er wordt verondersteld dat de karakteristieken van kleine ondernemingen specifieke gevolgen hebben voor productinnovatie. Zo zijn deze ondernemingen als gevolg van hun bescheiden omvang niet in staat om voldoende personele en financiële middelen in te zetten voor zelfstandige productontwikkeling. Ook lijken de wetenschappelijke modellen en theorieën, die op het gebied van productinnovatie zijn ontwikkeld, moeilijk toepasbaar op kleine ondernemingen omdat de strategische planning en de implementatie ervan bij kleine ondernemingen vaak moeilijk onderscheiden kunnen worden van elkaar.

Het doel van deze studie is, om meer inzicht te verwerven in de factoren die productinnovatie door kleine ondernemingen beïnvloeden. Hierbij gaat de aandacht in het bijzonder uit naar de invloed van marktgerichtheid.

Dit onderzoek richt zich op kleine ondernemingen die min of meer homogene producten voortbrengen, zoals landbouwbedrijven. Deze ondernemingen zetten hun producten af in een markt waarvan de marktvorm bij benadering kan worden getypeerd als volledige mededinging. Het onderzoek richt zich niet op kleine ondernemingen die heterogene, op de behoeften van de klant afgestemde, producten en diensten leveren. Dit type onderneming komt met name in de dienstverlening veel voor.

Deze studie start in **hoofdstuk 2** met de ontwikkeling van een algemeen theoretisch kader om de relatie tussen marktgerichtheid en productinnovatie in kleine ondernemingen te onderzoeken. De hoofdelementen van dit kader zijn de volgende. De besluitvorming over productinnovatie in kleine ondernemingen is een individueel beslissingsproces en de persoonlijke eigenschappen van de manager-eigenaar spelen hierin een belangrijke rol. Er wordt verondersteld dat de innovativiteit van de manager zowel de marktgerichtheid als productinnovatie beïnvloedt. Aangezien kleine ondernemingen vaak de financiële en personele middelen missen om zelfstandig een nieuw product te ontwikkelen, wordt ervan uitgegaan dat productinnovatie door kleine ondernemingen meestal plaatsvindt in de vorm van de adoptie van een concept, dat ontwikkeld is door klanten of door derden. Dit onderstreept het belang van de partners in het marketingkanaal voor de productinnovatie door

kleine ondernemingen. Marktgerichtheid van kleine ondernemingen is de mate waarin de ondernemer algemene informatie over de markt verzamelt en de behoeften en wensen van zijn klanten volgt.

Onderdelen van dit algemeen theoretisch kader zijn in de volgende hoofdstukken uitgewerkt in specifieke modellen. Deze modellen zijn empirisch getoetst bij rozentelers en legpluimveehouders.

In **hoofdstuk 3** wordt een model ontwikkeld om de invloed van innovativiteit en marktgerichtheid van een kleine onderneming op productinnovatie en ondernemingsprestatie te onderzoeken. Er wordt verondersteld dat innovativiteit en marktgerichtheid in onderlinge samenhang productinnovatie beïnvloeden. Enerzijds wordt aangenomen dat marktgerichtheid bij minder innovatieve ondernemers een positieve invloed heeft op productinnovatie. Deze ondernemers worden door marktinformatie, met name door informatie over hun klanten, gestimuleerd om wenselijke vernieuwingen door te voeren. Anderzijds is het denkbaar dat productinnovatie bij zeer innovatieve ondernemers door marktgerichtheid wordt afgeremd; marktgerichtheid behoedt de ondernemer voor te snelle vernieuwingen voordat duidelijk is dat die de behoeften van huidige en potentiële klanten bevredigt**.** Deze hypothesen worden in empirisch onderzoek bij rozentelers bevestigd.
Het model gaat ook ervan uit dat de innovativiteit van de manager-eigenaar de ondernemingsprestatie zowel direct als indirect, via marktgerichtheid en productinnovatie, beïnvloedt. Het onderzoek bij rozentelers bevestigt deze hypothesen. Het laat zien dat informatie over klanten positief gerelateerd is aan de bedrijfsresultaten. Marktgerichtheid bevordert de selectie van een aantrekkelijk productassortiment. Deze onderzoeksresultaten tonen de waarde aan van algemene marktinformatie voor kleine ondernemingen.

De **hoofdstukken 4 en 5** van deze studie richten zich op radicale productinnovaties. Onder radicale productinnovaties worden, in overeenstemming met de gevestigde benadering in de literatuur, productinnovaties verstaan die nieuwe technologische kennis vereisen die grote investeringen vereisen en die gepaard gaan met grote onzekerheid over de prestaties van de nieuwe technologie. Bovendien voorziet radicale product innovatie in nieuwe behoeften of in de behoeften van nieuwe klanten zodat nieuwe marktkennis vereist is. Ook bij kleine ondernemingen neemt de betekenis van radicale productinnovatie toe, omdat zich met regelmaat fundamentele nieuwe behoeften en wensen van afnemers aandienen, respectievelijk zich nieuwe technologieën van (potentiële) leveranciers voordoen.

In **hoofdstuk 4** wordt een model ontwikkeld ter verklaring van de intentie van een manager tot radicale productinnovatie. Er wordt verondersteld dat deze intentie wordt beïnvloed door de houding van de manager ten aanzien van deze radicale productinnovatie, door de kenbaar

gemaakte behoeften van huidige en potentiële klanten, respectievelijk door de mate waarin de onderneming afhankelijk is van huidige klanten. Tevens wordt verondersteld dat de relatie tussen de houding van de manager ten aanzien van radicale productinnovatie en de intentie van de manager om deze innovatie door te voeren wordt beïnvloed door de mate van succes met de huidige producten en de mate van innovativiteit van de manager. De invloed van succes met het bestaande assortiment is mogelijk positief, omdat de onderneming hierdoor over middelen beschikt om nieuwe producten te ontwikkelen. Het is echter ook denkbaar, dat juist weinig succes met het huidige assortiment de intentie tot radicale productvernieuwing stimuleert. Slechts door radicale productvernieuwing heeft een onderneming met weinig succesvolle producten een levensvatbare toekomst. Bij toetsing van dit model voor de mogelijke introductie van diervriendelijke productiemethoden door legpluimveehouders blijken de houding van de manager tegenover deze radicale productinnovatie, de kenbaar gemaakte behoeften van bestaande en potentiële afnemers en de afhankelijkheid van de huidige afnemer een significante invloed te hebben op de intentie tot introductie van deze radicale innovatie. De relatie tussen de houding van de manager tegenover deze radicale productinnovatie en de intentie tot de introductie ervan is sterker wanneer het succes van de onderneming met het huidige productassortiment geringer is, en wanneer de manager zeer innovatief is. Ook blijken verwachtingen van de manager over de markt en productiemethode van deze radicale productinnovatie, zoals over consumententevredenheid en doelmatigheid van de productie, de intentie tot introductie te beïnvloeden.

Terwijl in hoofdstuk 4 de intentie tot radicale productinnovatie is onderzocht, is in **hoofdstuk 5** de adoptie van radicale vernieuwingen nader bezien. Er is een model ontwikkeld waarin radicale productinnovatie wordt gestimuleerd door kenbaar gemaakte behoeften van bestaande en potentiële klanten. Adoptie wordt beïnvloed door de houding tegenover de radicale productinnovatie. Aangenomen wordt dat de innovativiteit van een manager de positieve samenhang tussen de houding tegenover en de adoptie van een radicale productinnovatie versterkt. Toetsing van dit model voor diervriendelijke productiesystemen bij legpluimveehouders toonde aan dat bij minder innovatieve ondernemingen deze radicale productinnovatie wordt gestimuleerd door de kenbaar gemaakte behoeften van bestaande klanten, echter niet door die van potentiële klanten en niet door de houding tegenover deze innovatie. Bij zeer innovatieve managers hebben de houding tegenover deze innovatie en de kenbaar gemaakte behoeften van potentiële klanten een positieve invloed op radicale productinnovatie.

In **hoofdstuk 6** wordt aandacht besteed aan de wijze waarop verwachtingen van kleine ondernemingen over hun toekomstige prestaties tot stand komen. Het wordt algemeen erkend dat toekomstverwachtingen van ondernemingen invloed hebben op de investeringsbereidheid van ondernemingen. Om die reden is het van belang te weten waarvan dergelijke

toekomstverwachtingen afhankelijk zijn. Inzicht hierin biedt de mogelijkheid om toekomstverwachtingen van kleine ondernemingen in positieve zin te beïnvloeden. Er wordt een model ontwikkeld ter verklaring van de verwachtingen van kleine ondernemingen over hun toekomstige prestaties. Deze toekomstverwachtingen worden afhankelijk gesteld van het succes van het huidige assortiment, van de eventuele introductie van een radicale productinnovatie, alsmede van de afhankelijkheid van de tegenwoordige afnemer en de mate waarin marktinformatie wordt verzameld. Toetsing van dit model bij legpluimveebedrijven laat zien dat het huidige succes van de onderneming een positieve invloed heeft op toekomstverwachtingen, maar deze niet exclusief verklaart. De vorming van toekomstverwachtingen van kleine ondernemingen blijkt complexer dan een extrapolatie van het huidige succes. Ook andere factoren zijn hiervoor van betekenis. De introductie van een radicale productinnovatie blijkt eveneens toekomstverwachtingen positief te beïnvloeden, ook al is het succes van deze innovatie bescheiden. De ondernemingen houden kennelijk vast aan hun positieve verwachtingen die zij hadden bij de introductie van de radicale productinnovatie. De mate waarin de onderneming afhankelijk is van zijn afnemer blijkt een positieve invloed te hebben op de toekomstverwachtingen bij ondernemingen die een radicale productinnovatie hebben doorgevoerd. Deze ondernemingen voelen zich door hun sterke band met hun afnemer zeker van de afzet van het radicaal nieuw product, in dit geval diervriendelijk geproduceerde eieren. Daarentegen heeft deze afhankelijkheid een negatieve invloed op de toekomstverwachtingen bij ondernemingen die nog geen radicale productvernieuwing hebben doorgevoerd. Mogelijk verwachten de kleine ondernemingen in het laatste geval dat deze afhankelijkheid hen belemmert om tijdig in te spelen op de (in dit onderzoek) onafwendbare radicale vernieuwing naar diervriendelijk geproduceerde eieren.

In **hoofdstuk 7** worden de gerapporteerde resultaten uit de voorafgaande hoofdstukken samengevat en worden op basis van deze resultaten een aantal algemene gevolgtrekkingen gemaakt. Zo wordt geconcludeerd dat marktgerichtheid bij kleine ondernemingen productinnovatie beïnvloedt. Dit geldt ook voor radicale productinnovatie. Informatie van klanten blijkt productinnovatie te beïnvloeden. Behoeften die bestaande klanten kenbaar maken blijken radicale productinnovatie te stimuleren. Voor potentiële klanten geldt dit alleen indien de ondernemer innovatief is. Wel beïnvloeden kenbaar gemaakte behoeften van potentiële klanten de intentie van de manager om radicale productvernieuwing door te voeren. Er wordt geconcludeerd dat het beschikbaar stellen van informatie over algemene marktontwikkelingen van groot belang is voor productinnovatie door kleine ondernemingen. Deze informatie moet betrekking hebben op algemene marktontwikkelingen, zoals trends in het consumentengedrag, veranderde maatschappelijke opvattingen en technologische ontwikkelingen.

Voor succesvolle radicale productinnovatie is van groot belang dat de bestaande klanten hier positief tegenover staan. Dit houdt in dat radicale productinnovatie door kleine ondernemingen in belangrijke mate een ketenproces is.

De verkregen onderzoeksresultaten hebben belangrijke beleidsimplicaties. Zo is het van belang dat kleine ondernemingen kunnen beschikken over informatie betreffende algemene marktontwikkelingen en technologische ontwikkelingen op voor hen relevant terrein. Het verzamelen en beschikbaar stellen van dergelijke informatie steunt vaak op financiering door sectororganisaties en overheid. Laatstgenoemden lijken echter in afnemende mate bereid om eraan bij te dragen dat deze informatie beschikbaar komt. De overheid huldigt in toenemende mate het standpunt dat sondering van de markt een taak is van het bedrijfsleven zelf. Anderzijds lijken kleine ondernemingen vanwege hun moeilijke financiële positie minder bereid om financieel bij te dragen aan de verwerving en verspreiding van informatie over marktontwikkelingen. Echter ons onderzoek toont aan dat informatie over ontwikkelingen in markt en technologie onontbeerlijk is voor productinnovatie door kleine ondernemingen. Aangezien innovatie noodzakelijk is voor de levensvatbaarheid van kleine ondernemingen, zullen bedrijfstak en overheid ook in de tegenwoordige geïndividualiseerde samenleving zich ervoor moeten inzetten dat algemene informatie over trendmatige ontwikkelingen in markt en technologie beschikbaar blijft komen.

Uit het onderzoek blijkt dat radicale productinnovatie in belangrijke mate wordt gestimuleerd door de interesse van afnemers voor de betreffende vernieuwing. Dit betekent dat radicale productinnovatie bij kleine ondernemingen in belangrijke mate een ketenvraagstuk is. Afnemers van kleine ondernemingen, zoals de verwerkende industrie en detailhandel, vervullen dan ook een belangrijke rol in radicale productinnovatie. Met name voor coöperaties die producten van landbouwers verwerken en vermarkten betekent dit een verdieping van hun missie, om de producten van hun leden zo goed mogelijk te valoriseren. De coöperaties zullen in samenspel met hun leden de marktontwikkelingen moeten vertalen in succesvolle (radicale) productinnovaties.

Innovativiteit van de manager blijkt een belangrijke stimulans voor productinnovatie door kleine ondernemingen. Het is van belang dat de manager alert is op marktontwikkelingen en nieuwe technologieën, die mogelijkheden bieden voor productinnovatie. Kleine ondernemingen, zoals land- en tuinbouwbedrijven, wisselen doorgaans veel ervaringen en inzichten uit. Ze doen dit onder meer door persoonlijke contacten, studieclubs, studiebijeenkomsten, bezoeken aan bedrijven en onderzoekstations. Het thema innovatie, in al zijn facetten, moet in dergelijke informatievergaring en gedachtewisselingen systematisch aan de orde komen. Dit stimuleert de innovativiteit van de kleine ondernemer.

Dit afsluitend hoofdstuk eindigt met het signaleren van een aantal beperkingen van dit onderzoek en met suggesties voor verder onderzoek. Een beperking van deze studie is onder meer dat het empirisch onderzoek betrekking heeft op productinnovaties, die in bestaande markten worden afgezet. Typisch voor het onderzoek onder pluimveehouders is tevens dat de vernieuwing betrekking heeft op een "credence" attribuut, te weten een diervriendelijk geproduceerd ei. Toetsing van de ontwikkelde modellen voor andere typen productinnovaties is daarom gewenst, om de algemeenheid van de gevonden resultaten te kunnen beoordelen. Men kan hier denken aan onderzoek van productinnovaties voor nieuwe markten, respectievelijk aan producten, die de consument in onverwerkte vorm bereiken tegenover producten die een belangrijke verwerking ondergaan voordat zij de finale consument bereiken. Als onderwerp voor verder onderzoek wordt tenslotte genoemd het vraagstuk of kleine ondernemingen kunnen worden gesegmenteerd ten aanzien van hun beleid op het gebied van productinnovatie.

Curriculum Vitae

Frans J.H.M. Verhees was born in Eindhoven, the Netherlands, on June 22, 1969. In 1986 he received his high school diploma (HAVO) from the "Hertog Jancollege" in Valkenswaard and subsequently attended the practical agricultural poly tech (Middelbare Agrarische School) in Boxtel in order to take over his parent's farm. He graduated in 1988. After military service, which used to be mandatory in the Netherlands, he studied Dutch agriculture in 's-Hertogenbosch at the Agricultural College. In 1993, he received his BSc., with honors. He then studied agricultural economics at Wageningen University. In 1996, he received his MSc., with honors. After having completed his studies he started as a Doctoral Candidate in the Marketing and Consumer Behavior Group at Wageningen University.

As from January 1999, he is employed as an assistant professor at the Marketing and Consumer Behavior Group. He has developed and taught courses on internet marketing and strategic marketing and is currently teaching introductory and advanced marketing courses.

His current research includes market orientation and product innovation with particular focus on food products, agriculture, and small firms. Publications appeared in Journal of Small Business Management, "Tijdschrift voor Sociaal wetenschappelijk onderzoek in de Landbouw", and in proceedings of international conferences like Marketing Science, American Agricultural Economics Association and EMAC.

Training and Supervision Plan

During the period of the appointment the educational program within Mansholt Graduate School (MGS) is completed. One credit is equivalent to 40 hours of course work.

Name of the course	Institute	Year	Credits
Research methodology	NOBEM/ LNBE	1996/ 1997	10
Marktkunde	NOBEM/ LNBE	1997/ 1998	4
Mansholt Multi-disciplinary Seminar	Mansholt Graduate School	2000	1
Other presentations at international conferences etc.	EMAC conference, Stockholm, Sweden	1998	2
	EMAC conference, Bergen, Norway	2001	
	AAEA conference, Denver, USA	2004	
Didactics	Onderwijs-ondersteuning WU		1
Studygroup on Consumer Behavior and Marketing Strategy	Mansholt Graduate School/ Marketing and Consumer Behavior group	1996-2004	2
		Total	20

LNBE: landelijk netwerk bedrijfseconomie

NOBEM: Netherlands Organisation for Business Economics and Management

EMAC: European Marketing Academy

AAEA: American Agricultural Economics Association