GREEN NETWORKS: INNOVATIVE CAPACITY OF SMES IN THE DUTCH GREENHOUSE HORTICULTURE INDUSTRY

Henk J. Schout, Saskia J.M. Harkema

The Hague University of Applied Sciences, Centre for Innovation and Entrepreneurship

Abstract: The Dutch greenhouse horticulture industry is characterized by world leadership in high-tech innovation. The dynamics of this playing field are innovation in production systems and automation, reduction in energy consumption and sharing limited space. However, international competitive advantage of the industry is under pressure and sustainable growth of individual enterprises is no longer a certainty. The sector's ambition is to innovate better and grow faster than the competition in the rest of the world. Realizing this ambition requires strengthening the knowledge base, stimulating entrepreneurship, innovation (not just technological, but especially business process innovation). It also requires educating and professionalizing people. However, knowledge transfer in this industry is often fragmented and innovation through horizontal and vertical collaboration throughout the value chain is limited. This paper focuses on the question: how can the grower and the supplier in the greenhouse horticulture chain gain competitive advantage through radical product and process innovation. The challenge lies in time- to-market, in customer relationship, in developing new product/market combinations and in innovative entrepreneurship. In this paper an innovation and entrepreneurial educational and research programme is introduced. The programme aims at strengthening multidisciplinary collaboration between enterprise, education and research. Using best practice examples, the paper illustrates how companies can realize growth and improve the innovative capacity of the organization as well as the individual by linking economic and social sustainability. The paper continues to show how participants of the program develop competencies by means of going through a learning cycle of single-loop, double-loop and triple loop learning: reduction of mistakes, change towards new concepts and improvement of the ability to learn. Finally, the paper illustrates the importance of combining enterprise, education and research in regional networks, with examples from the greenhouse horticulture sector. These networks generate economic growth and international competitiveness by acting as business accelerators.

Keywords: entrepreneurship, innovation, greenhouse horticulture, knowledge transfer network, growth

Greenhouse horticulture dynamics

If we consider the greenhouse horticulture industry in a wider perspective, a distinction can be made between Food and Flowers, where Flowers represent the production end of the value chain – from seed to produce – and where Food indicates the processing element of the value and supply chain; from harvested product to consumer. Food cannot be seen independently from Flowers, therefore both should be considered as one value chain. Throughout this chain we find (technology) suppliers of resources, equipment and services (*Krebbekx,* 2008). Both growers and suppliers manifest themselves mostly as small scale organizations. Together, growers and suppliers constitute a solid beginning (Flowers) of the value chain. The Food end of the chain, however, is characterized by companies that operate on a much larger and often multinational scale. This holds true for both producers and suppliers. It makes linking both ends of the value chain complicated (*Scheepbouwer,* 2009).

The fact that export is growing in absolute terms suggests continuing success in the greenhouse horticulture industry. This should not be confused with economic strength. On the contrary, it could prove a weakness, as the processing industry related to greenhouse horticulture is relatively small in The Netherlands, export might be the only option (*Snijders* 2007). The growing European market and favourable economic developments in Asian countries such as China present market opportunities, for instance for cut-flowers and plants. In emerging markets with fast growing wealth, local population can afford more and more luxury food and flower items from the greenhouse horticulture industry. Food shortages strengthen these dynamics (*Krebbekx,* 2008). Yet, international competitive advantage of the Dutch greenhouse horticultural industry is under pressure – as is the case in other countries – such as the US and Japan. Also China and India recognize the importance of innovation and invest in it. More and more serious competition is felt from non-EU, low-wage countries (*Kleijn,* 2006). However, when comparing the Dutch greenhouse horticulture industry's added value to that of other countries, the sector out-performs the international average by more than 50% (*Krebbekx,* 2008).

The dynamics of the greenhouse horticulture playing field focus on innovations in production systems and automation, in sharing limited space, in reducing energy consumption and finding alternative sources and in finding solutions for the fragmented value chain and time-to-market. The sector's ambition is to innovate better and faster than the competition in the rest of the world. Internationally speaking, The Netherlands rank among the top 3 countries as far as the ability to innovate is concerned. This is especially apparent in large and multinational companies. However, many companies fail to valorise opportunities and strengthen their ability to compete (*Volberda et al.,* 2011). To complement this trend, innovation programmes that are specifically geared to getting SMEs to innovate or to raise the level of their innovative capacity are particularly encouraged by Dutch national and regional governments (SenterNovem, 2008). However, research shows that knowledge transfer is often fragmented and innovation through collaboration takes up a mere 25-30% of the opportunities (*Krebbekx,* 2008).

The Dutch greenhouse horticulture sector is generally characterized by small scale, often family-run businesses. Growers have historically depended on the Dutch auction system for their revenues and (technology) suppliers operate mainly independently. Horizontal and vertical collaboration throughout the value chain is relatively limited. Traditionally companies were established around the physical marketplace of the Dutch auctions, resulting in concentrated greenhouse horticultural areas. This type of concentration was never managed or planned; growers opted for a place close to their point of sale. Greenhouse horticulture concentration hence resulted from individual entrepreneurship decisions.

Branch organizations play a limited role in innovation, with a notable exception in the cut-flower business, where separate clusters have been formed and with the Productschap Tuinbouw serving as an umbrella organization, especially where joint or collective research is concerned. Furthermore, fragmentation can be observed in horticultural vocational training and education at applied sciences level; which infrequently interacts with other sectors (*Snijders,* 2007).

The innovation playing field

Considering the above dynamics of increasing complexity and global dependency, the need for innovation and entrepreneurship is becoming more and more important (*Harkema,* 2004). This requires true flexibility and adaptability of people and organisations. Recognising opportunities and translating these into new products, processes and services is as essential as integrating these in innovative organisations.

Andrew et al. (2009) find that the most widely tracked components of innovation are overall company profitability, overall customer satisfaction and incremental revenue from innovation. Companies consider themselves most effective at measuring innovation *outputs* (such as revenue growth, shareholder returns and brand impact). They consider themselves far less successful at tracking innovation *inputs* (for example dedicated resources, such as people and funds invested) and the quality of their innovation *processes*. This suggests that organizations can truly influence their profitability and incremental revenue from innovation as well as influence customer satisfaction. For the greenhouse horticulture industry this appears not to apply to the same extent, considering the Dutch auction system prevents the grower from meeting his consumer. Also considering that it is extremely difficult for the grower to match his supply to the demand and the difficulty the individual grower experiences with brand positioning.

Ultimately, improving a company's innovation performance boils down to leadership and leaders' willingness to put in place the necessary processes and tools to help employees deliver on the targeted objectives (*Andrew et al.,* 2009). In this respect innovation is no different from any other company priority. And, like other things that matter, innovation can and must be measured and linked to both financial and non-financial incentives to ensure that it receives the attention and focus it requires. Here the greenhouse horticulture industry appears to conform to generally applicable findings in the sense that greenhouse horticulture is a production industry, struggling with international competition, problems relating to economies of scale and a considerable reduction in product range. The impact of leadership on process and product innovation in the greenhouse horticulture industry might be of a different nature compared to other industries, considering the fragmented value and supply chain. Subsequently, Lans (2009) suggests that for leaders in an agricultural environment to be successful three domains constitute the heart of entrepreneurship competence: analysing occupational challenges, pursuing new opportunities as well as management practices and networking. *Lans* (2009) defines networking not only as the social competence to relate to others in an entrepreneurial context, but also as the ability to cooperate with other entrepreneurs and being open to suggestions and feedback from others.

In The Netherlands the various actors in the innovation playing field are mostly 'stuck in self-created institutions' (*Scheepbouwer,* 2009), so there is an urgent need for more knowledge management and knowledge circulation within the greenhouse horticulture sector. Great value may be added to innovation networks by innovation brokers, especially when the innovation broker takes the lead in innovation initiation, network composition and innovation process management (*Batterink et al.,* 2008). Within the greenhouse horticulture industry several players are active, such as Productschap Tuinbouw, LTO Glaskracht, Syntens or SIGN, often operating within their own associated networks.

In times of negative economic growth it is essential for entrepreneurs to take difficult decisions and to boldly tread unexplored, innovative paths. Maintaining the status quo is generally not the road to sustainable business development.

It is furthermore suggested that relatively few people have a clear image of what goes on in the greenhouse

horticulture industry, resulting in limited interest among school leavers and graduates to work in this industry. It is expected that in ten years' time the sector will experience a lack of qualified employees. Closely related to this aspect of negative image is the difficulty experienced by current owners of greenhouse horticulture companies in finding adequate succession. Equally crucial to a sustainable business are the problem of fragmentation and the lack of space for growth; not only in literal terms of square footage but also in a figurative sense: restrictive regulations. Another important challenge facing the horticultural greenhouse industry is internal greenhouse climate management. The use of (alternative) energy sources for lighting, electricity, heat, water and CO_2 require innovative strategic thinking.

Many growers realize the key to innovative entrepreneurship lies not only in knowledge of the produce they grow. They indicate that knowledge of shortening time-to-market, improved customer relationship management, developing new product/market combinations, using less (alternative) energy sources and state-of-the art production automation are just as vital to innovative entrepreneurship. Managers and owners of companies in this industry suggest that they are able to make choices at a strategic level, but not quite able to translate these into new products or processes (*Volberda et al.,* 2011). Neither are they able to implement their strategy satisfactorily. One of the more important issues in the horticultural greenhouse industry is what Nooteboom (2000) characterizes as the 'cognitive discrepancy' with SMEs between the (lack of) knowledge of end-users' demands and the (in-)ability to recognise opportunities and implement viable business proposals. *Klerkx* (2008) suggests that contractual research planning may be well-designed for operationalising end-user demand steering. Following Lans (2009), who indicates that the networking domain represents social competence in relation to the entrepreneurial task, we hope to contribute to the notion that in the horticultural greenhouse industry knowledge of end-user demand should be used for research steering.

The KITE120 research programme

Against this background we are interested to learn how the grower and the supplier in the greenhouse horticulture industry can gain sustainable competitive advantage through product and process innovation. Our main research objective is to arrive at an understanding which interventions in leadership, organisational structure and culture contribute to a more innovative capacity. This is visualised in Fig.1.

The answers to these questions illustrate how companies can realize growth and improve innovative capacity of both the organization and the individual in that organization by linking economic and social sustainability. Resulting from these answers we hope to find support for two hypotheses:

– The bigger the innovative capacity in the greenhouse horticulture industry, the stronger regional development.
– The stronger regional development, the bigger the innovative capacities in the greenhouse horticulture industry.

Starting from the research questions, the current programme aims at strengthening multidisciplinary collaboration between enterprise, education and research. Using an analysis of a group of 30 companies in the greenhouse horticulture industry based in the western part of The Netherlands, a model is developed that might serve as a driving mechanism for process and product innovation and that fits the nature and characteristics of the companies in this industry. The research in progress is longitudinal and explorative and aims to gain a practical insight in the day-to-day operations of the participating companies and to elicit claims that prove valid for the entire greenhouse horticulture industry and possibly for other industries as well. In short, it is a way of looking at current operations and combining them with entrepreneurs' ambitions in order to arrive at generally applicable theories.

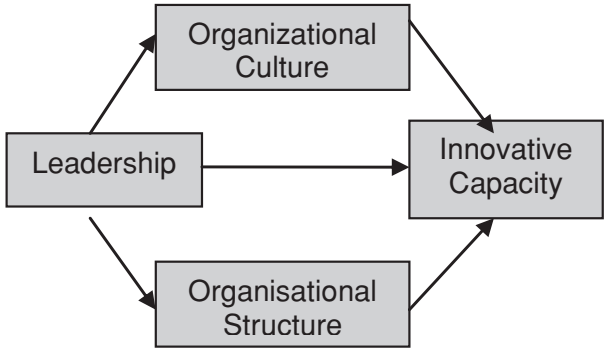

Figure 1: Research model visualised

The activities in the greenhouse horticulture industry are embedded in a wider research programme that is partly funded by a grant from the European Fund for Regional Development (EFRO) and encompasses three other sectors that are of importance to the regional economy in and around the town of The Hague in The Netherlands: the service industry, the legal and paralegal cluster, and the ICT/multimedia industry. The programme is known by the name of KITE120, which is an acronym for Knowledge and Innovation Towards Entrepreneurship. 120 Companies in the four clusters serve as research objects for the research programme. Its aim is to stimulate innovative capacity within organisations and to stimulate regional economic growth.

This research programme fits into the tradition of post-modernism that, as opposed to positivism, is not based on traditional scientific thinking but acknowledges the context related nature of knowledge following from experiences (*Harkema,* 2004). We believe that the behaviour of complex phenomena, such as innovation processes, confronts academics with particular insights that tear at the foundations of what till recently has been regarded as the mainstream academic tradition: the Newtonian equilibrium theory and the linear behaviour of systems. This implies that the future

can be predicted on the basis of experiences that occurred in the past. If we analyse and understand these occurrences we will be able to fathom the future. Especially companies are interested in predicting the future since it can give them certainty about something which within reason seems uncertain. Complex phenomena show that behaviour is dynamic and non-linear and that order emerges bottom-up through a process of self-regulation. This is contrary to how most companies operate and innovation processes are managed.

Besides the main research objectives, a number of enterprise objectives were formulated. These enterprise objectives primarily focus on the formation of networks and dissemination of knowledge, aimed at embedding sustainable results in the industry on completion of the programme. The main aim is to support enterprises and assist them in making an important step forward with their organisation by guiding them through the process from ambition to action. In KITE-terminology, we help them make a metaphorical 'Amazing Jump'.

Apart from the enterprise objectives, goals were formulated for students and faculty, who participate in the programme. These concern professionalizing and raising the quality of education and knowledge circulation. The latter aspect deserves separate attention as it is characteristic to research in the applied sciences. Professionalizing faculty should be seen in the light of the commitment of universities of applied sciences to stimulate knowledge circulation through practice-based research. Apart from knowledge of facts and figures and practical expertise, explanatory and conceptual knowledge are important to the professional.

Professionalizing staff is characterized by the development of knowledge and skills that allow faculty to better reflect on, define and conceptualize professional practice. Undertaking research is an important part of this. During that process lecturers apply knowledge and in so doing bring it up to date it. Subsequently, it is embedded in their teaching modules and curricula. It is vital for faculty and students to be critical consumers of scientific texts as well as to learn to apply practical and scientific knowledge for the purpose of developing new knowledge. In this way they not only improve their own capacities and capabilities as a lecturer, coach and student but also contribute to improving industry. Simultaneously, a process of knowledge circulation is created that is conditional to improved links between education and industry.

In the pursuit of these aims we contribute to the Lisbon agenda of the European Union in which entrepreneurship is considered a fundamental requirement for creativity and innovation (e.g. *Onstenk,* 2003 and *EU,* 2010).

Methodology

Considering these aims, we had to find a way of linking entrepreneurs, students and faculty. Our method consists of three elements:

1. a process model in which entrepreneurs, undergraduate students and faculty are brought together and collaborate,
2. a research model addressing several methods of data collection,
3. a theoretical model that provides a framework for companies.

The process model

The process model (see fig. 2) was developed to ensure that students are linked to entrepreneurs within a fairly rigid system of the academic timetable in universities of applied sciences. Periods of 20 weeks provide the basis for this model. In each of which one or two students are matched with one of the entrepreneurs in the greenhouse horticulture industry, following an intake by one of the faculty members.

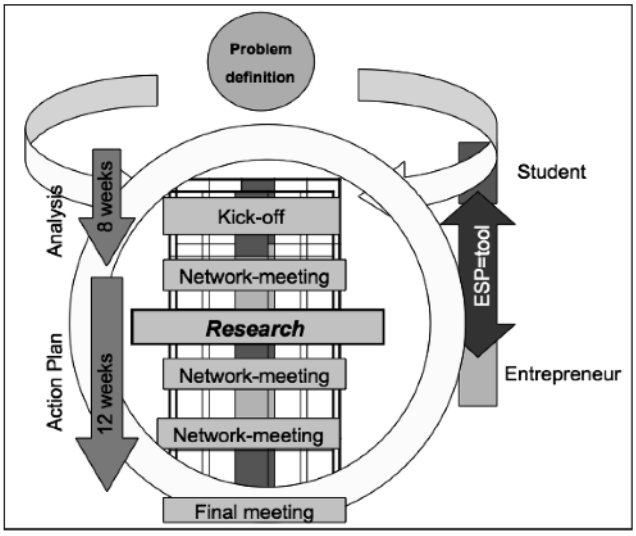

Figure 2: process model for innovation programmes linking universities and SMEs

In network meetings entrepreneurs, students and faculty gather to address topics that are relevant to more than one company or that can serve as best practice models to others. Preferably these meetings take place on location, i.e. at one of the participating organisations, rather than at the institute of higher education. Topics vary from leadership and innovation through lean production to multi-functional and multi-level use of space.

The research model and theoretical framework

The research model is complementary to the process model. To determine the strategic themes and problems in the sector, key-players and stakeholders were interviewed. Knowledgeable people with proven expertise and experience within the greenhouse horticulture industry were interviewed by the research team to elicit key issues in the sector. A semi-

structured questionnaire was used to confirm (or reject) published sources or popular opinion. The strategic topics and trends were subsequently clustered into four research themes: internal greenhouse climate management, organisational growth, knowledge of entrepreneurship, and time-to-market.

The next step is to define problems and research questions related to the research themes. In general terms we are interested in establishing how SMEs in this sector innovate and what are barriers for innovation. For the theoretical model we used the broader definition of innovation put forward by *De Jong* (2006) that innovation is purposefully innovating products, processes and work methods. This definition fits in well with the one brought forward by Tidd and Bessant (2009), who speak of the innovation space within an organisation. Four types of innovation can be distinguished: paradigm, position, process and product innovation. These innovations can be incremental or radical and according to their contribution to organisational growth and continuity can be classified as more or rather less successful. Innovation according to them is directly linked to the entrepreneurial skills of the owner / managing director who needs to recognise opportunities and assess their innovation value.

After having defined the research question, data collection takes place through the inductive approach. Data triangulation is leading in the approach, as it contributes to the robustness and reliability of the data. We have selected several ways of collecting data. In spite of the inductive approach we decided to build a theoretical framework through desk research. Not so much as to validate that theory, nor geared at the development of a new theory, according to the method developed by Glaser and Strauss (1967), but to bring focus to the research and serving as 'a pair of glasses' through which to look at our study object. The innovation model of *Tidd and Bessant* (2009) acts as a framework for that purpose. They describe phases that an organisation should go through from strategic innovation to implementation. Four aspects are important according to the authors:

- looking for opportunities and recognising them
- selecting opportunities and formulating a strategy
- implementing the strategy
- learning from that implementation

We use a modified version of their model (see fig. 3) as we introduce reflection and learning stages after each of the steps in the model, thus introducing a continuous learning experience.

Innovation is seen as a continuous process supported by routines and methods that contribute to a successful process and outcome. Against the background of the research question this has proved to be a valuable method to observe reality in similar research projects we have undertaken in the manufacturing and construction industries. The aim of the research is to establish whether the findings of our research and the model developed for that purpose, are also useful within the greenhouse horticulture industry.

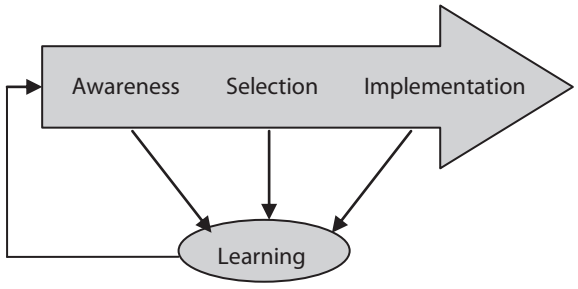

Figure 3: modified innovation management model based on Tidd and Bessant

It may prove equally useful in the greenhouse horticulture industry. Observations of interventions in organisational structure and/or culture are complemented with data collected from in-depth interviews based on a semi-structured questionnaire. This should lead to an understanding of what works and what does not.

From the data collected, the entrepreneur, the student and the member of faculty involved collectively select one or two aspects within the enterprise that can be formulated into an innovation action plan. Studying the implementation results, the entrepreneur can acquire knowledge and insight into radical innovation processes.

To illustrate the scope of our innovation programme, some of the KITE120-projects are given here as examples: They fit the designated problem areas in the greenhouse horticulture industry:

- developing an internal greenhouse climate control simulator. In conjunction with a grower and the installation industry we hope to develop a simulation programme to benefit the grower's climate requirements, unify existing programmes in use in the climate control industry and provide training facility for students and third parties
- promoting the use of direct current in the greenhouse horticulture industry. Together with a hardware producer we are looking for a stable infrastructure in and around the greenhouse to reduce installation cost and operational expenses for the grower.
- finding new business models for branding greenhouse horticulture produce in order to achieve competitive advantage for the grower
- developing new ways of reverse chain management in collaboration with a greenhouse horticulture consultant. Growers should benefit from this scheme through increased product demand
- finding a business model for innovative water reservoirs that solve problems deriving from the impending restrictions on reverse osmosis and waste brine disposal.

Discussion

If we observe changes and improvements within the industries of similar research programmes we have

undertaken, our findings show (*Van der Woude,* 2008, *De Pagter,* 2009 and *Boost et al.,* 2010) that innovation is both product and process innovation and in most cases incremental. Rather: what we do, we do a little better and / or faster. This is a recognizable pattern with entrepreneurs who develop their products to the demand of customers or end-users. Innovation here is re-active. The results so far suggest that the greenhouse horticultural industry does not innovate in this fashion, simply because there is a notable lack of knowledge of customer / end-user demand in comparison to the other sectors mentioned. Whether this means that this industry innovates pro-actively remains a matter for further research. Pro-active research in other sectors frequently goes together with larger companies having R&D departments. In the greenhouse horticulture industry this type of organisation is rare. Here the individual entrepreneur plays a crucial part, because it is the individual entrepreneur who started the company and consequently has an enormous impact on its development.

Although almost all companies innovate, our first observations show that there is no conclusive opinion on definition and importance of innovation for business growth among entrepreneurs. Most of them focus on product innovation. This is interesting, as it appears to be contradictory to Tidd and Bessant's finding that process and product innovation are closely interlinked, especially where the step form strategic innovation to implementation is concerned. Considering the model of *Tidd and Bessant* (2009) as the 'looking glass' and framework through which we research and analyse the sector the following observations can be made.

To most entrepreneurs in the greenhouse horticulture industry scanning external developments and looking for opportunities is not an integrated part of everyday entrepreneurship. And if it is, entrepreneurs have difficulty in adapting and applying their findings to their own situations. The question is why so little attention is paid to external influences, knowing that they are an important source of information and are the basis for recognising opportunities. There are several reasons for this attitude: it is not considered important enough, entrepreneurs pretend or presume to know developments, it is too great a burden on the entrepreneur due to lack of time, and competencies and interests of the entrepreneur quite often do not lie in the field of research or strategy.

During the next phase in the innovation process, that of selecting opportunities and formulating strategies, the entrepreneur should select opportunities and translate them into a strategy that fits his organisation. This requires not only looking at people's competencies, at financial feasibility, but also at processes that offer the best chance to realise the formulated strategy. Within smaller organisations it is the entrepreneur who is crucial to decisions taken and to the culture in the organisation that influences the innovation process. The smaller the organisation, the bigger the influence of the entrepreneur appears to be.

Klerkx (2008) suggests that innovation intermediaries assist agricultural entrepreneurs with innovation processes, bridging the managerial knowledge gap (*Bessant and Rush,* 1995). This is on the assumption that innovation is within the focus of the entrepreneur; that the entrepreneur is the "agent of change", who has sufficient absorptive capacity (*Cohen and Levinthal,* 1990) to learn how to innovate and be able to influence the innovative capacity of his organisation. *Klerkx* (2008) also shows the fragmentation in (types of) innovation intermediaries, from public to private, from for-profit to not-for-profit organisations. Klerkx does not focus on the role universities and colleges of higher education can play as both sources of knowledge and innovation intermediaries. Recent developments of this are the Green Knowledge Cooperative and the Greenport Campus Initiative.

Our research (*Van der Woude,* 2008, *De Pagter,* 2009 and *Boost et al.,* 2010) shows that in spite of an independent analysis or external advice, the entrepreneur easily disregards the outcome of the analysis or advice if it does not fit his own perspective. This would seem to reduce some of the added value of innovation brokers in the agri-food business as advocated by *Batterink et al.* (2008).

When implementing product innovation strategies, the entrepreneur should realise that process and people management play an equally important part. Through a clear implementation plan, such as the stage-gate model introduced by *Cooper* (1987) it is decided in advance which restrictions apply during product development stages and how to monitor progress. The process has built-in 'go' and 'no go' moments that should lead to successful market introduction of the new product of service. In fact this is the moment where ambition turns into action. This is quite a step where radical innovation is concerned, because there is a high degree of uncertainty about the success rate. In the case of incremental innovations the risk involved is considerably less.

However, earlier research (*Van der Woude,* 2008, *De Pagter,* 2009 and *Boost et al.,* 2010) also shows that in innovation processes in smaller enterprises a structured approach appears to be the exception to the rule. It is the entrepreneur who plays a pivotal role, at the expense of learning lessons and embedding experiences for future projects. It is our aim to develop the entrepreneur's competencies by means of going through a learning cycle of single-loop, double-loop and triple loop learning: reduction of mistakes, change towards new concepts and improvement of the ability to learn. This can more easily be effected when an entrepreneur withdraws from the daily routines and takes time to develop processes to professionalize his organisation and his employees.

Implications

In this paper we have described a model through which we aim to contribute towards regional development and improve the innovative capacity of SMEs in the greenhouse horticulture industry. The programme we developed to that end is aimed at gaining insight in the way SMEs in this sector innovate, and simultaneously professionalize

lecturers and involve students in research. The objective of our KITE120-programme is to try and eliminate innovation barriers among SMEs in the greenhouse horticulture industry and to develop instruments that are beneficial to organizations and individual entrepreneurs. A secondary aim is to help them make the step from ambition to action and from incremental to radical innovation. Metaphorically speaking we want entrepreneurs to make an 'Amazing Jump'.

Realizing this ambition requires strengthening the knowledge base, stimulating innovation, entrepreneurship and education. It also requires professionalizing people. It appears equally important to bridge the gap between the sub-sectors of Flowers and Food by developing and strengthening elements in the value chain, or conversely, by shortening the value chain. More interaction with sectors outside the glasshouse horticultural industry is welcome. This will bring on the need for more and better knowledge management and knowledge circulation.

We have illustrated the importance of combining enterprise, education and research in networks with a regional scope, with examples from the greenhouse horticulture industry. These networks generate economic regional and national growth and international competitiveness by acting as business accelerators. Subsequently, the need arises for programmes that focus on improving the image of the sector, if the sector is to remain attractive for entrepreneurs and their employees to work in. For the near and distant future most is to be gained from flexibly managing expectations and predictions and by reacting quickly to changing circumstances. Including organisational culture in times of innovation and including employees in the process are critical success factors. According to *McGuire and Rhodes* (2009) it is clear that effective innovation management starts at the top. Managers should never delegate innovation processes. Moreover, it is essential they themselves are committed to the change, if not success is highly unlikely. By changing first and setting an example, management itself becomes the instrument of change. It helps if teams and individuals are open to more than one opinion, set great store by collaboration with others and opt for experiment and growth.

An economy's ability to innovate is decided by a combination of the component parts of a national innovation system: its market, knowledge infrastructure, intermediary organisations and the collaborative interplay between these parts (*Hufen,* 2009). What we need are visionary entrepreneurs; people who are prepared to think out of the box and who can come up with radical alternatives, charismatic leaders, who inspire and help their organisation forward. Ongoing research is necessary to provide a better insight into the ways innovation processes can be organised, considering the size of the greenhouse horticulture enterprises, considering the limitations in human and financial resources and considering the options for collaboration across the value chain.

References

Andrew, James P., Haanæs, Knut, Michael, David C., Sirkin, Harold L., and Taylor, Andrew (2009), *Measuring Innovation 2009: The Need for Action*, The Boston Consulting Group, Boston.

Batterink, Maarten H., Wubben, Emiel F.M., Klerkx, Laurens, Gardère, Emmanuelle, and Molegnana, Françoise (2008), How do innovation brokers orchestrate SME-innovation networks in agri-food?, 8th Chain Conference, Ede

Batterink, Maarten (2009), *Profiting from external knowledge. How firms use different knowledge acquisition strategies to improve their innovation performance*, Wageningen UR, Wageningen.

Bessant, J. and Rush, H. (1995), Building bridges for innovation: The role of consultants in technology transfer, *Research Policy*, Vol 24 (1), pp. 97-114.

Boost, Robbert, Geffen, Marcel van and Woude, Hatte van der (2010), *Van Idee naar Winst; de MKB-aanpak*, De Haagse Hogeschool, Den Haag.

Cohen, W.M. and Levinthal, D.A. (1990), Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, Vol 35 (1, Special Issue: Technology, Organizations and Innovation), pp. 128-152.

Cooper, R. (1987), *Winning at new products*, Kogan Page, London.

European Commission (2010), *Europe 2020*, EU, Brussels

Glaser, B. and Strauss, A. (1967), *A discovery of grounded theory. Strategies for qualitative research*, Sociology Press, Cambridge.

Harkema, S.J.M. (2004), *Ondernemend innoveren. Naar een herwaardering van de menselijke maat*, inaugural address, De Haagse Hogeschool, Den Haag.

Harkema, S.J.M. (2009), *The importance of social innovation in the Dutch manufacturing industry. A joint effort between research, education and business*, European Conference on Innovation & Entrepreneurship, Antwerp.

Hufen, J.A.M. (2009), Het Nationaal Innovatiesysteem. Zoekende naar een beleidsperspectief voor onze kenniseconomie, www.qaplus.info.

Jong, J.P.J. (2006), *Innovatie in het MKB,* EIM, Zoetermeer.

Jong, J.P.J., Bodewes, W., and Harkema, S.J.M. (2007), *Winst door innovatie. Hoe ondernemers kansen zien en pakken*, Academic Press, Den Haag.

Kleijn, Marcel (2006), *Innovation Intelligence Food & Nutrition*, SenterNovem, Den Haag

Klerkx, L.W.A. (2008), *Matching demand and supply in the Dutch agricultural knowledge infrastructure: the emergence and embedding of new intermediaries in an agricultural innovation system in transition*, Wageningen UR, Wageningen.

Krebbekx, J.A. and Wolf, W.J. de (2008), *Foto Sleutelgebieden 2008*, Berenschot, Utrecht.

Lans, Th. (2009), *Entrepreneurial competence in agriculture: Characterization, identification, development and the role of the work environment*, Wageningen UR, Wageningen.

McGuire, John B. and Rhodes, Gary B. (2009), *Transforming Your Leadership Culture*, John Wiley & Sons, Chichester.

Nooteboom, B. (2000), Learning by interaction: Absorptive capacity, cognitive distance and governance, *Journal of Management and Governance*, Vol 4, pp. 69-92.

Onstenk, J. (2003), "Entrepreneurship and vocational education", *European Educational Research Journal*, Vol 2(1), pp. 74-84.

Pagter, H. de and Harkema, S.J.M. (2009), *Enabling innovation within SMEs in the manufacturing industry*, IPDM Conference, Twente.

Scheepbouwer A. (2009), *Voortgang Sleutelgebieden en tussentijdse evaluatie Sleutelgebieden-aanpak*, Innovatieplatform, Den Haag.

SenterNovem (2008), *Monitoringsrapportage innovatie-programma Food & Nutrition Delta*, SenterNovem, Den Haag.

Snijders, Hendrik, Vrolijk Hein, and Jacobs, Dany (2007), *De economische kracht van agrofood in Nederland*, Rijksuniversiteit Groningen, Groningen.

Tidd J. and Bessant, J. (2009), *Managing Innovation: integrating Technological, Market and Organisational Change*. Wiley & Sons Ltd: Chichester.

Volberda, H., Jansen, J., Tempelaar, M., and Heij, K. (2011), Monitoren van sociale innovatie: slimmer werken, dynamisch managen en flexibel organiseren, *Tijdschrift voor HRM*, vol 2011 (1), pp 85-110.

Woude, H.H. van der and Harkema, S.J.M. (2008), *Innoveren binnen handbereik. Een exploratie naar innovatie bij MKB-bedrijven in de maakindustrie*, De Haagse Hogeschool, Den Haag.