



# Analysing, pursuing and networking: Towards a validated three-factor framework for entrepreneurial competence from a small firm perspective

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## Abstract

Moving beyond general personal traits as predictors for success, a growing volume of research acknowledges that entrepreneurial core processes are enabled by specific competencies which can be learned, further refined and developed. The research objective of this article is to develop a framework for entrepreneurial competence in a well-defined small firm sector by elaborating and empirically validating an existing categorization of entrepreneurial competence. The dataset includes 348 small firm owner-managers who participated in an educational programme, established to pursue new business opportunities in the Dutch agri-food sector. Exploratory factor analysis and confirmatory factor analysis revealed that three domains constitute the heart of entrepreneurial competence in this small firm context: 'analysing', 'pursuing' and 'networking'. These three competence domains provide professionals active in sector development, small business support and (vocational) education with an empirically valid framework of clearly discernible elements of entrepreneurial competence. This framework also encompasses insights on education and learning.

## Keywords

competence, education, entrepreneurial behaviour, small business

## Introduction

Contemporary research suggests that studying the nature and conditions of entrepreneurial processes in small firms is essential to understanding how small firms innovate, survive and grow in dynamic environments (Macpherson and Holt, 2007). An appealing domain for studying entrepreneurial processes in small firms is the Dutch agri-food sector. Covering an area of only 41,500 km<sup>2</sup>, the Netherlands is one of the smaller countries of the European Union, yet at the same time one of the most densely populated areas in the world. Nevertheless, it is among the world's three largest

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exporters of agricultural products (next to France and the USA) and accounts for nearly a quarter of European vegetable exports. The animal and plant production sectors are dominated by around 75,000 small firms that operate under highly comparable conditions with respect to climate, laws and regulations, financial institutions, market and availability of labour and technology. In this context, it has been argued that entrepreneurial competence really makes a difference (De Lauwere, 2005; Phillipson et al., 2004; Verhees and Meulenbergh, 2004). In the last decade, many of these small firms have initiated additional, non-agricultural, business activities in fields such as nature and landscape conservation, recreation, health care, education, new product and process innovation and internationalization (e.g. the creation of new and additional companies in Africa and Eastern Europe). Business performance figures show that this is by no means an exit strategy; on the contrary, it facilitates access to new physical, social and human capital and contributes to regional socio-economic development (Alsos and Carter, 2006).

A growing volume of research acknowledges that entrepreneurial core processes are enabled by specific competencies that can be developed (Baron and Ensley, 2006; DeTienne and Chandler, 2004; Ucbasaran et al., 2008). Entrepreneurial competence is not only a matter of predisposition, but also dependent on learning and experience. This notion is important for those involved in stimulating nascent entrepreneurship as well as those engaged in sector development and fostering entrepreneurship education and learning. Much competence research has been conducted since the 1980s (e.g. Bartram, 2005; Boyatzis, 1982), but this research tradition aims at the development of managers or employees in large firms. Limited attention has been given to the development of entrepreneurial competence in existing small firms (Rae, 2007; Sadler-Smith et al., 2003). Although some theoretical categorizations have been suggested for small business (e.g. Brinckmann, 2007; Collins et al., 2006; Man et al., 2002), quantitative empirical research to validate and enrich these categorizations further is scarce; or as Gibb puts it: 'There are many examples of lists of such behaviours but no universal agreement as to the core' (2002: 139). This is a major limitation for professionals active in sector development, small business support, and the education and training of future and existing small business owners, especially in their efforts to design intervention strategies to improve entrepreneurial competence in the context of competence-based learning in Europe (Brockmann et al., 2008; Mulder et al., 2006).

The objective of this article is to empirically construct an entrepreneurial competence framework in a small firm sector. This article is organized as follows: the first section discusses the key components of entrepreneurial competence in a small firm context. The second section describes a preliminary framework for entrepreneurial competence. The third section describes the methods applied in this study, followed by the presentation of our results in the fourth section. The article concludes with a discussion of the results, conclusions and recommendations.

## **The boundaries of entrepreneurial competence in the small firm context**

One of the first challenges to be faced in relation to entrepreneurial competence in a small firm context, is the multitude of definitions that can be found for the key concepts; the diversity of these definitions can lead to confusion, criticism and even cynicism (see for example Gibb, 2000; Sharma and Chrisman, 1999; Van der Klink and Boon, 2003). For example, the definition of entrepreneurship varies depending on the perspective, ranging from the creation of a new (additional) business to a matter of behaviour (e.g. being proactive), or even a type of culture (e.g. entrepreneurial spirit). Competence has also been defined in various ways, involving inputs, outputs, crossing levels of analysis or disciplines, and these definitions range in complexity from narrow, atomized descriptions to highly interpretive constructs (e.g. Delamare Le Deist and Winterton, 2005; Sandberg, 2000). In order to avoid confusion, we start here by explaining the main concepts in this study.

For the concept of competence, we follow Mulder et al. (2006), who argue that comprehensive interpretations of competence describe and use competence from a dynamic, integrated perspective. Competence in this definition entails the ability to apply clusters of knowledge, skills and attitudes in a certain professional context. This definition of competence follows recent streams of literature in the educational sciences and human resource development, showing a gradual shift from one-dimensional models of competence (e.g. merely behavioural, or merely functional) to multi-dimensional typologies (Cheetham and Chivers, 1996; Delamare Le Deist and Winterton, 2005):

Being entrepreneurially competent does not only refer to the know how to write a business plan, but it also implies recognising and acting on opportunities, taking initiative and action, for example by convincing investors to invest money in a project, and relate to potential suppliers and buyers. It implies that the competent entrepreneur is actually able to identify and further exploit an opportunity within a specific context. (Lans et al., 2008: 365)

Hence, competence in its most elementary form can be operationalized as a fit between existing ability and the demands of a certain task in a certain context (Brinckmann, 2007).

In addition to the notion that competence is more than just knowledge, skills or attitudes, studies on competence also emphasize the importance of the malleability of competence (i.e. the possibility to change or shape it; Bird, 1995). The notion of malleability of competence raises interesting questions such as which components still constitute competence and which do not, and what are important moderators. Are relatively stable dispositional (e.g. traits) or motivational (e.g. self-efficacy) constructs still elements of competence (as for example, the work of Boyatzis, 1982 suggests), or should they be treated differently? We follow Markman (2007) in this matter who, to avoid conceptual confusion, argues that rather than being an element of competence, these constructs actually influence competence. Personal goals, aspirations and motivations of subjects may influence and shape competence development, and therefore should be included in studies on competence development. Small business research conducted as far back as the early 1980s explicitly raised the issue of motivational differences between entrepreneurial and 'normal' small business owners (see for example Carland et al., 1984; Smith and Miner, 1983). Recent empirical work confirms the mediating effects of motivation on the relation between competence and firm performance (c.f. Baum and Locke, 2004).

Besides being influenced by motivational and dispositional factors, entrepreneurial competence will be influenced by a broad compilation of contextual factors such as the organizational life-cycle (Kazanjian, 1988) and, on an even higher level, economic, institutional, demographic and cultural factors (Wennekers, 2006). For example, Baron and Markman (2003) found that the importance of social competence depended on the sector that they studied. Whereas perceiving others accurately seemed to be related to financial success in both of the industries that they studied (cosmetics and high-tech), social adaptability and expressiveness showed differences between sectors. Social adaptability was related to financial success only in the cosmetics industry, and expressiveness was related to financial success only in the high-tech industry. Moreover, studies on work-related learning have stressed the impact of situational differences on the development of knowledge and experience (Billett, 2002). Therefore, in studies on entrepreneurial competence in existing small firms, contextual differences such as sector should be controlled for, or at least taken into account.

Finally, since competencies are latent constructs, judgements about the level, quality or development of competence are always connected to and embedded in the activities that individuals perform. To judge entrepreneurial competence, it is therefore vital to define the core activities that are considered entrepreneurial. Do these include being active in innovation and strategic renewal, or is the concept limited to the creation of new businesses? We follow the general

entrepreneurship literature, in which there seems to be a high level of consensus in defining entrepreneurial processes as the identification and development (also referred to as pursuit) of opportunities (Shane, 2003). This definition has been gaining ground in the small firm literature (Macpherson and Holt, 2007). Since the firms in our study already exist, the pursuit of opportunity does not necessarily lead to the establishment of a new venture, but more often to innovation and strategic renewal (Sharma and Chrisman, 1999). Therefore, we define entrepreneurial activities within small firms as the 'identification and development of opportunities aiming towards new ventures, innovation or strategic renewal'.

## Theoretical framework

Our framework builds on the work of Man et al. (2002). They explicitly connect entrepreneurial behaviour in small firms to individual competence with a definition of competence which comes close to our conception of it. On the basis of an extensive literature review, they assert that entrepreneurial competence consists of six domains, namely: opportunity, relationship, conceptual, organizing, strategic and commitment. Although at first sight these domains do not appear to be mutually exclusive, their theoretical grounding made us hypothesize that they would demonstrate empirical validity in a study of small firms in the agri-food sector. In order to test this hypothesis, the six competency domains were operationalized in detail and supplemented based on more recent entrepreneurship and sector-specific literature when available.

### *Opportunity competencies*

According to Man et al. (2002), this set draws heavily on the idea of being able to recognize and develop opportunities. Currently, opportunity-orientation conceptualizations of entrepreneurship are attracting attention (Shane and Venkataraman, 2000). What post-hoc may be called a real business opportunity is, in its rudimentary form, often an ill-defined market need, a technology or invention for which no market has yet been defined, or an idea for a product or service (Ardichvili et al., 2003). Depending on the underlying theoretical assumptions of the opportunity concept, different aspects of the opportunity process are placed at the core. Although Man et al. (2002) do not elaborate on the underlying ontological underpinnings of the opportunity concept (e.g. objective versus constructed; Companys and McMullen, 2007; DeTienne and Chandler, 2004), different aspects of opportunity recognition are accentuated in this domain. In line with proponents of the active search viewpoint on opportunities, Man et al. (2002) address the importance of an individual's superior search and assessment strategies: examples include identifying the goods or services that people want and scanning the environment for potential opportunities (Chandler and Jansen, 1992). Man (2001) also includes notions which represent a more passive, fortuitous view on opportunities in this domain, referring to the concept of entrepreneurial alertness as the ability to notice without searching (Gaglio and Katz, 2001) and consequently being able to spot opportunities, for example in business relationships, the market and broader environment.

### *Relationship competencies*

This set refers to the competencies relating to interactions with others. In identifying and exploiting opportunities, networks play an essential role in generating and developing new ideas, and in gaining resources and legitimacy (Elfring and Hulsink, 2003; Jack et al., 2010). Since external contacts and relationships are often established from scratch, the ability to perceive others accurately seems to be an important underlying element (Baron and Markman, 2003). Furthermore, issues of trust

and power are likely to play a role in these interactions; negotiation skills are needed to make successful deals. Finally, research increasingly acknowledges the importance of teamwork, either in the successful creation of a new business or the development of new innovative practices as owner-manager of a firm (Cooney, 2005). For example, Sadler-Smith et al. (2003) described in their model the importance of consultative and collaborative working arrangements and heterogeneity in teams for an entrepreneurial management style in small firms.

### *Conceptual competencies*

Man et al. (2002) connect this domain to abilities such as problem-solving, separating facts from opinions and seeing the big picture. As we see it, it has an apparent linkage to the previously described opportunity domain. It is complementary in the sense that it focuses more on the systematic development of adequate solutions to complex problems: that is, emphasizing a more constructed view on opportunities, thus putting perception, interpretation and construction at the heart of opportunity identification. Also, the normative aspects in this process are stressed, namely, the degree of novelty (innovativeness, creativity) involved in arriving at such solutions (see Man, 2001). Competencies with empirical support associated with this domain include the ability to diagnose problems, connect and rearrange ideas (analysis) and carefully match new ideas with existing knowledge and capabilities (judgement) (Baron and Ensley, 2006; DeTienne and Chandler, 2004; Mitchell et al., 2000).

### *Organizing competencies*

The introduction of new goods, services or processes involves organizing different internal, external, human, physical, financial and technological resources. This domain comes closest to the managerial part of running a small firm. It involves internal versus external managerial activities (e.g. financial management, marketing) as well as primary versus secondary activities (logistics, personnel management). These fields include, in theory, a multitude of lower-level functional tasks and sub-tasks; they lack a clear structure and could easily constitute a study of their own (cf. Brinckmann, 2007). In line with Man (2001), this domain is viewed on a more general level, encompassing operational competence such as planning and organizing non-human resources (e.g. financial, physical and technological), and human competence such as delegation and leadership (e.g. staff, temporary employees, family). Concrete examples of such competencies mentioned in the literature are the ability to organize and motivate people, organize and coordinate tasks, and delegate effectively (Chandler and Jansen, 1992).

### *Strategic competencies*

This set of competencies focuses primarily on securing the performance of the small firm in the long run. Most important in this set are activities aimed at planning for the short and long term, looking ahead and anticipating (Ashurst et al., 2011; Nuthall, 2006). In their study on small firms, Sadler-Smith et al. (2003) found that 'managing vision' was related to an entrepreneurial style. Besides more opportunity-related activities (see opportunity competencies), managing vision concerns goal-setting aspects, as in the development of a shared vision and its translation to concrete objectives (result orientation) and strategies to guide the organization. It also encompasses an external perspective in terms of keeping an eye on the external environment (e.g. colleagues, competitors, customers) (strategic orientation).

### Commitment competencies

Commitment, in our opinion, has a volition connotation (as in ‘engagement’, ‘drive’, ‘say one will’) as well as a moral connotation (as in ‘duty’, ‘responsibility’, ‘the right thing’). Concerning the volition connotation, there are important links with motivational constructs such as perseverance (overcoming adversity) and self-efficacy (belief in one’s own competence) (Baum and Locke, 2004; Markman and Baron, 2003). Although motives, motivation and some traits are important factors influencing commitment competencies, they do not fit in our definition of competence. The moral connotation of commitment gains importance in times of increased attention to social responsibility and sustainability: that is, ‘green’ management. Small firms are increasingly confronted with dilemmas concerning the balance between people, profit and planet. Running a business is more than just doing things right; it also concerns the question of whether the owner or manager is doing the right things. Therefore, it encompasses critical reflective behaviour, which is an important vehicle for higher-order individual and organizational learning processes (Van Woerkom, 2004). Commitment competencies, as we define them, are not so much dispositional as focused on the task and situation at hand. Although there is little empirical work that directly assesses the impact of competencies such as self-management on performance outcomes, qualitative studies do suggest the often self-reported importance of learning abilities (e.g. learning from mistakes, reflection, critical incidents and observation) (Collins et al., 2006, Deakins and Freel, 1998; Man and Lau, 2005; Mulder et al., 2007).

A summary of the preliminary framework of entrepreneurial competence based upon Man et al. (2002) is provided in Table 1.

**Table 1.** Competence Domains, Definitions and Underlying Dimensions of Entrepreneurial Competence

Competence domains <sup>a</sup>	Definition <sup>a</sup>	Underlying dimensions
1 Opportunity competencies	Competencies relating to recognizing and developing market opportunities through various means	Proactive searching Alertness
2 Relationship competencies	Competencies relating to person-to-person or individual-to-group interactions	Teamwork Social perception Negotiating
3 Conceptual competencies	Competencies relating to different conceptual abilities reflected in the behaviour of the entrepreneur	Diagnosing problems Analysis Judgement
4 Organizing competencies	Competencies relating to the organization of different internal, external, human, physical, financial and technological resources	Personnel management Planning and organization
5 Strategic competencies	Competencies relating to setting, evaluating and implementing the strategies of the firm	Result orientation Strategic orientation Vision
6 Commitment competencies	Competencies that drive the entrepreneur to move ahead with the business	Learning orientation Self-management

<sup>a</sup> (Man et al., 2002)

Thus, from our earlier hypothesizing, our overarching research question is as follows:

RQ1: Are the six domains of entrepreneurial competence, as put forward by Man et al. (2002) and further refined in this study, represented in an empirical analysis of entrepreneurial competence in our particular setting?

This overarching research question is specified further in the following sub-questions:

RQ2: Which competence domains have, in addition to their theoretical validity, empirical validity from a small agricultural firm perspective?

RQ3: What is the statistical robustness of the (newly) developed empirical model of entrepreneurial competence in terms of goodness of fit, and convergent and discriminant validity?

## Method

### *Setting and participants*

Our dataset includes 348 small firms in Dutch agriculture that are engaged in additional business activities (diversification), innovation or strategic renewal. At the time of the study, the business owners were all participating in a special training programme in the Netherlands that aimed to facilitate the pursuit of new product–market combinations. The participants were allowed to apply individually to do this training; however, many of the participants applied indirectly; they enrolled in the programme because they were a member of a group or network.

### *Procedure*

The small business owners who followed the training programme initially, had to complete an electronic questionnaire which was then used as the input for our study. The questionnaire required more than just ticking boxes, so the respondents were requested to take their time and give sufficient thought to the questions. They were aware of the fact that the survey served as the starting point for their training programme, therefore the results would influence course content.

The questionnaire consisted of three parts. The first part elicited general firm characteristics including size, number of employees, owner's age and the reasons why (motives and goals) they engaged in additional business activities (diversification), innovation or strategic renewal (Carland et al., 1984). The second part contained 57 items on entrepreneurial competence. Man et al.'s (2002) original clustering was interpreted as described earlier and used to formulate 7 to 14 statements per domain which were tailor-made and recognizable for this specific target group (see Lans et al., 2005), in order to avoid terms not commonly used in everyday speech and agricultural practice (e.g. typical management jargon such as resources, capabilities, competitiveness, commitment; Gill and Hodgkinson, 2007). To avoid self-reporting bias, we focused the self-assessment on concrete activities that the owners undertake in the context of their businesses. The advantage of focusing questions on actual activities is that such questions are recognizable for the respondent and easier to respond to than more socially desirable, ambiguous clusters of statements such as: 'As a small business owner I am able to...' The disadvantage of focusing on activities is that the results tend to be based only on overt behaviour, revealing very little about underlying cognitive considerations. To overcome this, we also included questions on 'thinking activities'. The statements were rated on a five-point Likert scale (where 1 = 'not at all' and 5 = 'a great deal'). To prevent a matrix completion effect, each statement was presented on a separate computer screen.

Finally, in order to collect data in the relation to generic human capital variables and entrepreneurship typologies, we included questions about education level and years of experience as owner-manager, as well as questions relating to the Smith and Miner's (1983) opportunistic/craftsman typology, using 12 of their original 14 items. The more opportunistic the small business owner is, the more likely it is that the firm will be adaptive and changing (Smith and Miner, 1983).

### Data analysis

Data were analysed using both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). In contrast with traditional exploratory factor analysis, CFA models provide better support for the convergent and discriminant validity of measured variables and identified constructs, and allow for testing of competing models (Curran et al., 1996). Since testing an identified model requires a new set of data, a holdout sample from the original study was taken randomly (Lattin et al., 2003). We refer to these two samples as the calibration sample and the validation sample. Calibration was conducted on two-thirds of the sample ( $n = 230$ ) and validation on one-third of the sample ( $n = 118$ ). Exploratory factor analysis (SPSS 12.0.1) was conducted using a Varimax rotation on the 57 items of the calibration sample in order to identify common factors (i.e. competence domains). As the formation of clear, distinct domains was an important objective, the EFA was conducted in an orthogonal rotation. Horn's parallel procedure was applied, and on the basis of Allen and Hubbard's (1986) regression equation it was estimated unambiguously how many factors should be extracted.

The extracted factor model was further developed through CFA. CFA was performed using LISREL 8.72. All analyses were performed on the covariance matrix. Since our data were collected on a five-point Likert scale, problems arose due to non-normality of the data (in these cases normal theory methods such as maximum likelihood and general least squares may result in seriously invalid statistical testing). Although asymptotic distribution free methods have been suggested in the literature to deal with the problem of non-normality of data, large,  $n = 500$  (Curran et al., 1996) to very large,  $n = 5000$  (Hu et al., 1992), samples are reportedly necessary. A second option for computing more accurate statistics under non-normal conditions in samples between  $n = 200$  to 300 is to adjust the normal maximum likelihood chi-square statistic, a procedure which is known in LISREL as robust maximum likelihood analysis (Curran et al., 1996). This analysis results in calculation of the Satorra-Bentler chi-square ( $SB \chi^2$ ), which corrects the normal theory chi-square.

The overall fit of the identified models was assessed as suggested by using fit criteria from various families of fit indices: absolute fit indices  $\chi^2$  ( $SB \chi^2$ ), root mean square error of approximation (RMSEA), goodness-of-fit index (GFI) and the adjusted goodness-of-fit index (AGFI) were used. From the family of comparative fit indices, the non-normed fit index (NNFI) and the comparative fit index (CFI) were used. As far as the quality of the models is concerned, it is generally assumed that to support a model, the  $\chi^2$ -value divided by the degrees of freedom should be smaller than 2, NNFI should be larger than 0.90, CFI should be larger than 0.90 and the RMSEA should be below 0.05 (Koufteros and Marcoulides, 2006). To examine whether the discerned factors were robust, the significance of each item's contribution to the factor was determined by checking the  $R^2$  values and the desired confidence interval of 95 percent, meaning that each item factor estimate should be at least larger than twice its standard error (Anderson and Gerbing, 1988). To test whether the proposed factor model – that is, the discerned competence domains – was more likely than competing models, a one-factor model (which is a naive model in which a solution with only one factor is enforced) was compared with the proposed factor analysis model; an orthogonal version of the model was tested (this is a model in which all correlations between the factors are set to 0); and the proposed factor model was tested against Man et al.'s (2002) original six-factor model for clustering the items.  $SB \chi^2$ -differences were calculated to disclose any significantly superior models.



Finally, as mentioned, the complete model was retested on a different, validation sample ( $n = 118$ ) and benchmarked again against the original Man et al. (2002) clustering of the items.

To further examine the discriminant and convergent validity of the discerned factors, two additional analyses were conducted. Discriminant validity between the tested factors was measured by calculating SB  $\chi^2$ -differences of a competing convergent model (correlation between factors is equal to 1) and a discriminant model (one in which the correlations between the factors are freely estimated). The factors were tested two-by-two as suggested by Anderson and Gerbing (1988). Furthermore, composite reliabilities were calculated to assess whether the factors were sufficiently reliable.

Additionally, in order to test of the external validity of the developed model, Spearman correlations were calculated between the final factor scores (of the total sample,  $n = 348$ ) and the Smith and Miner (1983) scores, and between the factor scores and two available general human capital indicators (years of owner-manager experience and education level, ranging from 1 = pre-vocational to 6 = university).

## Results

### *Characteristics of the sample*

The e-questionnaire of 348 respondents did not allow items to be skipped, there are no missing values in the dataset. The average age of the participants was 45 years, with an average of 16 years' work experience as small business owners. Of the participants, 53 percent were female and 47 percent male. More than 75 percent of the participants indicated that 'taking advantage of opportunities' was their most or second most important motive to engage in new business activities, and less than 25 percent indicated that 'not being able to continue the business in this way' was their most important motive to engage in new business activities. Almost 50 percent mentioned 'growth' as either the first or the second most important goal for engaging in a new business activity, whereas 50 percent replied that 'keeping the current business going' was the most important goal. Other motives and goals mentioned were the significance of 'green management' initiatives (e.g. stakeholder engagement, social responsibility), the need for new challenges (personal drive), the establishment of new and additional networks, and in some cases, family business succession.

### *Latent competence domains*

Given that 89 percent of the small business owners who completed the questionnaire were micro-enterprise owners (defined as owners who have two or fewer full-time employees), the questions and responses that specifically addressed businesses with three or more employees were removed from the dataset (10 items). Furthermore, 10 items with very low correlations (none of the items correlated extremely highly) were removed from the dataset, resulting in a final set consisting of 37 variables, with a satisfying determinant of 1.46E-05, a Kaiser-Meyer-Olkin (KMO) measure of 0.81 and a significant Bartlett's test. Factor loadings less than 0.40 were excluded from interpretation. On the basis of Horn's parallel procedure (Allen and Hubbard, 1986), three or four factors should be extracted. The final factor solution resulted in three clearly interpretable factors (Table 2).

Factor 1 represents items that are closely connected to conceptual competence. It concerns cognitive abilities, in particular the analysis of occupational core challenges, their interpretation (thinking about their relative importance, their interrelationships and ability to be generalized) and making inferences (making predications based on trends, conditions and tendencies, for example) which are laid down in goals or strategies. This factor was labelled *analysing*.

Factor 2 represents items that concern the attitudinal component of entrepreneurial competence, such as taking initiative and being proactive. It concerns proactiveness in two different ways: in searching for new opportunities and in current management practices. This factor was labelled *pursuing*.

Factor 3 represents social competence. It concerns social competence on two levels: to 'get through the door' and to manage networks. Getting through the door is associated with being responsive, persuasive and able to adjust to others. Managing networks is related to the ability to cooperate with other entrepreneurs, and being open to feedback and suggestions from others. We labelled this factor *networking*.

Table 2 shows that typical meta-cognitive activities, such as reflection, self-awareness and self-evaluation, have relatively high loadings on both Factor 1 and Factor 3.

**Table 2.** Rotated Factor Solution: Underlying Items and Factor Loadings

		1	2	3
X1	I know how to describe the challenges in my enterprise (STRA)	<b>0.72</b>	0.16	0.10
X2	I keep an eye on the main issues and can point out the heart of a problem (CON)	<b>0.69</b>	0.10	0.22
X3	I am very aware of my own weak and strong points (COM)	<b>0.61</b>	-0.10	0.35
X4	I can name my business goals straight away (STRA)	<b>0.61</b>	0.17	0.09
X5	I have a clear idea about how my enterprise performs in relation to other enterprises in the sector (STRA)	<b>0.58</b>	0.22	-0.23
X6	I easily separate facts from opinions (CON)	<b>0.57</b>	0.10	0.23
X7	I have a clear idea of where my enterprise will be in five years (STRA)	<b>0.50</b>	0.26	0.00
X8	I can easily look at things from various points of view (CON)	<b>0.46</b>	0.15	0.35
X9	I easily identify problems on the work floor (ORG)	<b>0.44</b>	0.04	0.35
X10	I often negotiate with suppliers or buyers regarding our prices (REL)	0.22	<b>0.61</b>	-0.09
X11	I accept challenges more often than colleagues in my sector (COM)	0.10	<b>0.60</b>	0.10
X12	I am continuously looking for new possibilities (OPP)	0.14	<b>0.57</b>	0.27
X13	I am often the first to try out new things (OPP)	0.10	<b>0.51</b>	0.27
X14	I look for new information all the time (OPP)	0.12	<b>0.49</b>	0.38
X15	I consider the funding policy of (international) government to be an excellent opportunity (OPP)	-0.01	<b>0.48</b>	0.03
X16	I am not easily diverted from the goals I set myself (COM)	0.10	<b>0.46</b>	0.06
X17	My goals are laid down in written plans (STRA)	0.39	<b>0.41</b>	0.16
X18	Cooperation with entrepreneurs in my sector is important for me (REL)	0.11	0.07	<b>0.58</b>
X19	I try to incorporate feedback from the public in my products (COM)	0.01	0.22	<b>0.57</b>
X20	I am involved in activities that contribute to a positive image of my professional group (COM)	-0.10	0.18	<b>0.57</b>
X21	During my presentations I can put my ideas across easily to my audience (REL)	0.16	0.14	<b>0.54</b>
X22	I am open to criticism from others (colleagues, employees, etc.) (COM)	0.12	0.03	<b>0.47</b>
X23	I have many networks outside the agricultural sector (REL)	0.21	0.28	<b>0.43</b>
X24	I evaluate my own actions as much as possible (COM)	0.35	0.11	<b>0.43</b>

Between brackets, the original Man et al. (2002) coding. In bold are the latent competence domains: OPP = opportunity; REL = relationship; CON = conceptual; STRA = strategic; ORG = organizing; COM = commitment.

### Additional analysis

The covariance matrix was used to conduct CFA. The first step was to check the completely standardized solution of the initial three-factor model derived from EFA. This first analysis resulted in reasonable fit indices:  $SB-\chi^2$  was 377.20 with 249 degrees of freedom, leading to a ratio of 1.51. Both CFI (0.97) and NNFI (0.97) indicate a reasonable to good fit of the initial model. The RMSEA of 0.047 supports this finding. All the factor loadings, variances (of common and unique factors) as well as the covariances among common and unique factors meet the criteria (factor loadings between 1 and -1; variances between 0 and 1 and covariances between 1 and -1).

Nevertheless, the factors and the underlying items were checked on their performance. The modification indices suggested that freeing the paths from six items to other factors would improve the fit. Since we were primarily interested in developing our identified constructs as unambiguously as possible (i.e. the core), these six items were left out of the final analyses. Furthermore, the standardized residuals showed that a substantial improvement in fit could be obtained by allowing covariances between the error terms of the variables. However, at first sight there did not seem to be a clear pattern suggested in the modification indices. Since we did not have any additional theoretical or empirical justification allowing for covariances between the error terms, we decided not to make these model modifications. Table 3 presents the completely standardized solution as was used in the subsequent analysis. Comparison of Table 2 with Table 3 shows that items with a relatively high loading on multiple factors were removed (X9, X17 and X24). Furthermore, specific situation-related items, such as X5, X15 and X20, did not return in the final model either.

**Table 3.** Completely Standardized Solution from CFA ( $n = 230$ )

Factor	Items	Completely standardized loadings
(1) Analysing	X2 I keep an eye on the main issues and can point out the heart of a problem (CON)	0.80
	X1 I know how to describe the problems in my enterprise (CON)	0.73
	X6 I easily separate facts from opinions (CON)	0.66
	X3 I am very aware of my own weak and strong points (COM)	0.64
	X4 I can name my business goals straight away (STRA)	0.61
	X8 I can easily look at things from various points of view (CON)	0.58
	X7 I have a clear idea of where my enterprise will be in five years (STRA)	0.51
	(2) Pursuing	X14 I look for new information all the time (OPP)
X12 I am continuously looking for new possibilities (OPP)		0.69
X13 I am often the first to try out new things (OPP)		0.63
X11 I accept challenges more often than colleagues in my sector (COM)		0.59
X16 I am not easily diverted from the goals I set myself (COM)		0.48
(3) Networking	X10 I often negotiate with suppliers or buyers regarding our prices (REL)	0.45
	X23 I have many networks outside the agricultural sector (REL)	0.60
	X21 During my presentations I can put my ideas across easily to my audience (REL)	0.57
	X19 I try to incorporate feedback from the public in my products (COM)	0.52
	X18 Cooperation with entrepreneurs in my sector is important for me (REL)	0.50
	X22 I am open to criticism from others (colleagues, employees, etc.) (COM)	0.44

Between brackets the original Man et al. (2002) coding: OPP = opportunity; REL = relationship; CON = conceptual; STRA= strategic; ORG = organizing; COM = commitment.

These decisions were supported by the various fit indices described previously. From Table 4, Model 1, it can be seen that the SB  $\chi^2$  was 182.10 with 132 degrees of freedom, leading to a ratio of 1.38. Both CFI (0.98) and NNFI (0.98) indicate a good fit of the model. The RMSEA of 0.04 supports this finding. The identified oblique model performs better than the two competing models (one factor and orthogonal). The SB  $\chi^2$  differences [ $\Delta\chi^2_{\text{model 1-2}} = 148.64$  ( $\Delta df = 3$ ),  $\Delta\chi^2_{\text{model 1-3}} = 85.31$  ( $\Delta df = 3$ )], all highly significant, demonstrate the construct validity of the suggested three-factor model (Model 1). This is further supported by the decrease in all the fit indices. Additionally, the model was tested against the original six-factor Man et al. (2002) model (Model 4, Table 4). Model 4 also reflects an inferior fit in the various fit indices compared to model 1.

In addition, the final model was tested on the validation sample ( $n = 118$ ) (Model 5). The validation model also resulted in a good SB  $\chi^2$  and  $\chi^2/df$  ratio (1.42), CFI (0.96) and NNFI (0.95). Only the RMSEA seems to be a bit higher than the suggested 0.05. To do a last check, the validation sample was tested against the original Man et al. (2002) clustering. Again, the three-factor validation model was superior to the six-factor clustering by Man et al. (2002) (compare Models 5 and 6 in Table 4), as suggested by the various fit indices.

The discriminant validity of the three factors in the final model was calculated by comparing the factors two-by-two. The results are presented in Table 5. As can be seen, the SB  $\chi^2$  differences are all significant (d.f. = 1). This suggests that although the three factors correlate with each other, they are also clearly different from one another, therefore representing different elements (Table 5). Finally, the reliability of the established factors was assessed and calculated, based on the completely standardized solution (Table 6). The composite reliability for analysing was 0.84, for pursuing, 0.77 and for networking, 0.66.

### A glimpse of criterion-related variability

The scores of the three factors were subsequently correlated with items on entrepreneurial type, education level and years of experience. Table 7 reveals that there is a positive relationship between

**Table 4.** Fit Indices for the Tested Models

Model type	SB- $\chi^2$	d.f.	SB- $\chi^2/$ d.f.	GFI	GFI adjusted for d.f.	CFI	NNFI	RMSEA
(1) 3-factor oblique ( $n = 230$ )	182.10	132	1.38	0.86	0.82	0.98	0.98	0.041
(2) 1-factor <sup>a</sup> ( $n = 230$ )	330.74	135	2.45	0.78	0.72	0.93	0.92	0.080
(3) 3-factor orthogonal <sup>b</sup> ( $n = 230$ )	267.41	135	1.98	0.82	0.77	0.95	0.94	0.065
(4) 6-factor original ( $n = 230$ )	932.07	614	1.52	0.72	0.68	0.96	0.96	0.048
(5) Validation <sup>c</sup> ( $n = 118$ )	187.54	132	1.42	0.76	0.69	0.96	0.95	0.060
(6) Validation <sup>c</sup> 6-factor original ( $n = 118$ )	893.12	614	1.45	0.65	0.60	0.92	0.91	0.062

<sup>a</sup> Single factor model in which a one-factor solution has been enforced.

<sup>b</sup> Three-factor model in which all the inter-factor correlations were constrained to equal zero.

<sup>c</sup> Validation sample ( $n = 118$ ). SB- $\chi^2$  = Satorra-Bentler chi-square.

**Table 5.** Discriminant Validity Based on Intercorrelations, and  $\chi^2$  Differences between Fixed and Free Models [SB  $\chi^2$ ] (d.f. = 1)

Factor	(1) Analysing	(2) Pursuing
(2) Pursuing	0.549 [ $\Delta\chi^2$ 122.71]*	–
(3) Networking	0.652 [ $\Delta\chi^2$ 34.88]*	0.642 [ $\Delta\chi^2$ 35.19]*

\*  $p < 0.0001$ **Table 6.** Composite Reliability Scores, Number of Items, Means and Standard Deviations (SD) of the New Factor ( $n = 230$ )

Factor	Composite reliability	Number of items	Mean (SD)
(1) Analysing	0.84	7	3.30 (0.86)
(2) Pursuing	0.77	6	3.38 (0.88)
(3) Networking	0.66	5	3.60 (0.85)

**Table 7.** Spearman's Correlation of the New Scales with Smith and Miner's (1983) Type of Entrepreneur, Education Level and Years of Owner-manager experience ( $n = 348$ ).

Factor	Type of entrepreneur	Education level	Years of experience
(1) Analysing	0.28**	0.23**	– 0.05
(2) Pursuing	0.35**	0.07	0.08
(3) Networking	0.36**	0.17**	– 0.13*

\*  $p < .05$  level (2-tailed) \*\*  $p < .01$  level (2-tailed)

the three factors and an opportunistic style (type of entrepreneur), showing the strongest effect for Factor 2 (pursuing) and Factor 3 (networking). Education level seems to correlate mostly with Factor 1 (analysing) and Factor 3 (networking). Years of experience has the highest negative correlation with Factor 3 (networking).

## Discussion and conclusion

In this study we developed and tested a framework for entrepreneurial competence in a well-defined small firm setting, building further upon the work of Man et al. (2002). In order to discuss the results, we refer to our original research question: 'Do the six domains of entrepreneurial competence, as put forward by Man et al. (2002) and further refined in this study, present themselves in an empirical analysis of entrepreneurial competence in our particular setting?'

From the way in which we operationalized the original domains of Man et al. (2002), we must conclude that our analyses suggest a different configuration than the six domains they originally proposed, specifically: 'Which competence domains have, in addition to their theoretical validity, empirical validity from a small agricultural firm perspective?'

The factor analyses suggest three distinct factors, which we labelled analysing, pursuing and networking. This division is empirically elegant, since it matches quite well with various schools of thought on competence (Bartram, 2005; Delamare Le Deist and Winterton, 2005). Generally speaking, the factor solution makes a distinction between competencies that focus on 'getting ahead', and competencies in the social domain, that is, 'getting along' – a well-known distinction in generic competence modelling (Bartram, 2005). In line with Delamare Le Deist and Winterton (2005), the findings also suggest that cognitive and social processes are at least as important to consider as behavioural aspects of competence. More specifically, the proposed model challenges the mutual exclusiveness of the opportunity, conceptual and strategic domains as originally formulated by Man et al. (2002). The items associated with these domains essentially come together in two distinct factors, analysing and pursuing. These two factors underline the distinction between a cognitive, constructivist view on opportunity identification, and the more behavioural, active-search view on opportunity identification. Moreover, what we conceptualized as commitment competencies (involving self-reflection) did not seem to constitute a separate factor, but elements of this domain returned in all three factors. This makes sense as well, since this competence domain predisposes the acquisition of other substantive competencies. Similarly, organizing competence, involving planning, organization and personnel management, did not constitute a separate factor in our model. This could be explained by the fact that most of these firms had two or fewer full-time employees (i.e. context-specific). In line with this context-specificity argument, general planning and organizing competence can be seen as a threshold competence domain rather than as a distinctive competence domain (Bird, 1995).

Regarding the research question 'What is the statistical robustness of the (newly) developed empirical model of entrepreneurial competence in terms of goodness of fit, and convergent and discriminant validity?', the framework for entrepreneurial competence developed in this empirical study successfully passed multiple empirical validation tests. The randomly selected holdout sample that was used in the CFA showed that the model and factors elicited in the EFA were, within our context, superior to several alternative models. As was described in the results section, the structural equation models came up with suggestions for modifications to achieve an even better fit of the model (such as allowing for correlated error terms). However, since there is no theoretical support for all modifications, a slightly adjusted original model from the EFA was considered to be superior. Convergent as well as discriminant validity suggest that, although the factors representing three domains are related to each other, they are clearly distinct.

On a detailed level, the items in the three factors seem to indicate that they encompass on a theoretical level more than just one clear-cut element. For example, the first factor, analysing, encompasses at least two theoretically discernable abilities: the analysis of situations, and their interpretation. Despite this theoretical differentiation, the fact that these items do correlate well suggests that they are empirically concurrent. Rather than being a weakness, this could be seen as a strength, suggesting that such factors display higher construct validity than factors whose items are in fact rephrases of each other (so-called 'bloated specifics'; Gill and Hodgkinson, 2007).

In order to become certain about the boundaries and impact of these new domains, additional statistical analyses should be done. These analyses should follow two tracks with the aim to enhance researchers' understanding of the nature and importance of entrepreneurial competence in small firms. First, how do the identified domains behave in relation to other theoretically related constructs (i.e. convergent validity)? Although this was not the objective of our study, it would be interesting to correlate these domains to more specific constructs than generic human capital proxies: for example, by correlating the domain 'pursuing' to the construct of new-resource skill, as examined by Baum and Locke (2004) in North American architectural woodwork firms, or to

measures of proactive personality researched by Crant (1995) among real-estate agents. A candidate for 'analysing' would be the more generally defined construct of cognitive ability (Unger, 2006), or more task-specific constructs such as venture diagnostic ability and ability/opportunity fit, as described and used by Mitchell et al. (2000) in a diverse sample of start-up ventures in the Pacific Rim. Convergent validity for the domain 'networking' could be tested by correlating it with general social skill constructs such as social adaptability and social perception, which were used by Baron and Markman (2003) in the cosmetics and high-tech industry.

Second, we were not able to ascertain the extent to which the identified domains are related to entrepreneurial performance criteria. The preliminary analysis we conducted already suggested that the three domains correlate to opportunistic small business owners based on the classic craftsmen/opportunistic dichotomy. However, more sophisticated measures are necessary: for example, firm-level entrepreneurial characteristics such as entrepreneurial orientation (Lumpkin and Dess, 1996), or more tangible entrepreneurial performance outcomes such as growth and innovation (Murphy et al., 1996), hence including criterion-referenced measures as suggested by Gill and Hodgkinson (2007).

Moreover, as in this study our results were derived from a specific sector with specific features, they are context specific. Baron and Markman (2003) as well as Man and Lau (2005) report that competence scores do differ significantly among sectors and, since the differences in Table 4 are small, the Man et al. (2002) six-factors framework may be the dominant one in other contexts. We suggest that in further research our findings should be tested in and for other small firm sectors, including the possibility of relating the findings to measures of entrepreneurial and firm performance. Doing so will strengthen further the application of these findings to enhancing small firm entrepreneurial competence.

### *Implications for practice*

This article has presented a framework for entrepreneurial competence which will be of special interest to professionals active in sector development, small business support and the education and training of future small business owners. With regard to sector development, the framework will be especially interesting for those who are involved in entrepreneurial skill development programmes in agricultural and rural settings. These have been put in place all over the European Union to encourage a reduction in agricultural dependence on public sector support and reorientation towards the market and portfolio entrepreneurship (e.g. Rudmann, 2008). For small business support the underlying identified competence-related activities (i.e. the items in the questionnaire) can help to specify recognizable entrepreneurial learning related activities as well as to design formative assessments (assessments *for* learning, rather than *about* learning) that strongly relate to agricultural entrepreneurship.

In relation to education and training, the suggested framework is helpful for educational policymakers who are involved in designing competence-based education in the transitioning national vocational education qualification structures that will be aligned to the overall European qualification framework in 2010 (Brockmann et al., 2008). For example, in Dutch vocational education and training, which includes agriculture, the role of manager-entrepreneur is explicitly defined. Avoiding the functional-behaviouristic trap of formulating endless lists of fragmented behaviours (which characterized the heavily criticized competency movement in the 1970s in the USA), the three broad – though distinct – domains can provide educational policymakers active in vocational education and training with a first empirically validated framework of clearly discernible elements of entrepreneurial competence in a specific small firm context. Consistent with the

comprehensive, context-specific view on competence adopted in this study, usage of the framework implies that the formulated domains should be considered as guidelines rather than a prescription, and that its meaning is obtained through discussion and interpretation with relevant stakeholders (Lans et al., 2008).

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