



Opportunity competence contributes to successfully leveraging ideas for entrepreneurship and innovativeness in enterprises

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OPPORTUNITY COMPETENCE CONTRIBUTES TO SUCCESSFULLY LEVERAGING IDEAS FOR ENTREPRENEURSHIP AND INNOVATIVENESS IN ENTERPRISES

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Dr Thomas Lans, PhD, is an assistant professor at Education and Competence Studies, Wageningen University. His research interests include entrepreneurship education and (situated) entrepreneurial learning. From 2012-2015, he is one of the work package leaders in the European LLLight in Europe FP7 research programme, in which the relationships between learning situations (and their interactions), and learning and innovative performance in the food industry are studied. Furthermore, he coordinates the master track entrepreneurship and is actively involved in entrepreneurship awareness and acceleration programmes.

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How specific human capital relates to entrepreneurial employee activity and innovation?

Introduction

Why innovation and entrepreneurship?

In today's society, facing entrepreneurial challenges has become part of every-day's working life. According to the Global Entrepreneurship Monitor (GEM) almost one out of ten adults (18-64 years old) in Europe was in 2013 involved in the process of starting or already running a new businesses (Amorós & Bosma, 2014). Also daily work at more mature organizations is increasingly spiced with entrepreneurial challenges: a trend is discernible towards 21st century tasks that require innovation, more autonomy, and a decrease of routines (Autor, Levy, & Murnane, 2003; Hornsby, Kuratko, Shepherd, & Bott, 2009). The predominant form of innovation in firms is incremental, which points to the role of the broader workforce in the identification, pursuit, development and exploitation of opportunities (Toner, 2011), also referred to as the role of Entrepreneurial Employee Activity (EEA) (Bosma, Wennekers, Guerrero, Amorós, Martiarena, & Singer, 2013). In addition, the European Commission has set out entrepreneurship as one of the key competencies necessary for lifelong learning (EC, 2006). However, despite the growing importance of EEA in firms, the GEM results show that only 5% of employees are currently involved in creating and developing new activities for their employer.

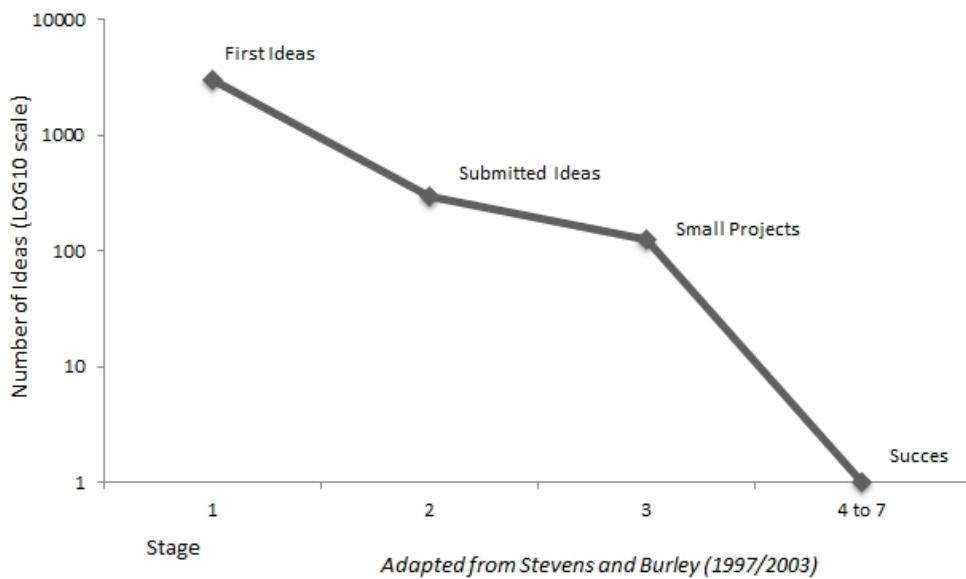
From idea to realisation

In general, from those who start, many do not even become established business owners: they drop out before they have been in business for three and a half years (Amorós & Bosma, 2014).

Similarly, from an established company perspective, Stevens and Burley (2003) estimated that out of 3000 raw ideas only one will eventually become a commercial success (see figure 1). Agri-food sector statistics from the Netherlands show for instance that only 2.5% of all Dutch horticulture companies introduce innovations truly new for the country (Pannekoek et al., 2005).

Apparently, the road from initial idea to realisation is far from straightforward. Figure 1 shows the pathway from initial idea to realisation within a large company context.

Figure 1: Pathway from initial idea to realisation within a large company context (adapted from Stevens & Burley, 1997/2003).



In sum, EEA increasingly receives attention as being of crucial importance for innovation in firms, but the number of employees involved in EEA is still low. In addition, Stevens and Burley (2003) and Pannekoek and colleagues (2005) show how hard it is to realize innovations. Thus, getting more insight into the defining, initial steps in the early entrepreneurial process, the necessary competence, and support structures within companies seems to be valuable and necessary.

Initial steps explored: the identification of opportunities

From a theoretical point of view, studying the initial stages in entrepreneurship has become prominent in entrepreneurship literature (Shane and Venkataraman, 2000). Whether it concerns an independent start-up or innovation within a larger company, it all starts with the identification of high quality business opportunities and further transformation of them into something new, such as a product or a service, that creates value.

The identification and pursuit of opportunities, echoing a process perspective on entrepreneurship, opens up the door for studying entrepreneurship in relation to individual's perceptions of opportunities, their capacity to act upon them and the conditions in the (work) environment that hinder or foster this process.



For instance the idea to produce water-resistant biodegradable paper can turn into an opportunity when this new technology can be transformed into the production of gift-cards, or maybe even credit- or bank-cards, to decrease our dependence on polluting plastics and (indirectly) fossil fuels. The owner of Schut Papier, one of the participating companies from the fibre industry in our study, is currently exploring the business potential of this idea in close cooperation with his employees and external business partners.

It is in this early stage that individuals play a critical role in the outcome of a project. The ability of individuals to be successful in this stage is referred to as opportunity identification & evaluation competence: *The ability of individuals to identify and evaluate ideas for new products, processes, practices or services in response to a particular pain, problem or new market need.*

The importance of human capital?

Knowledge, skills and competencies and their development are often claimed to be crucial for independent as well as employee-driven entrepreneurship. Literature on innovation seems to agree on a general level that innovation and human capital are interdependent and seem to influence each other positively (CEDEFOP, 2012; Lundvall & Lorentz, 2012).

However, more fine-grained, interdisciplinary, research to the relationship of innovation and human capital is necessary, as their relationship seems to be more subtle than often claimed in research and policy reports (CEDEFOP, 2012; Toner, 2011). As Jones and Grimshaw (2012) state, the conceptual interest on human capital in the innovation literature stays at a rather implicit, superficial level. As they phrase it: "Notions of 'in-house capacity', 'knowhow' and 'human capabilities' are theorized in preference over more real-world notions such as on-the-job training, apprenticeships, graduate training and shared training programme." (Jones & Grimshaw, 2012, p. 3).

In this policy brief we, hence, zoom in at the role of a key individual competence for independent entrepreneurship and EEA, namely opportunity competence. It is assumed that those who are able to identify entrepreneurial opportunities can contribute significantly to personal, professional, and/or business development (EC, 2006; Ireland, Camp, & Sexton, 2001).

Results from 257 latent, early-stage entrepreneurs (i.e. those thinking about it still at university) and 234 employees from 12 different companies from the agriculture, food, and fibre industry were used as the basis of this policy brief. The participants worked on a newly designed task, individually and in groups, in which they had to move from generating initial ideas to evaluating ideas on their business potential. In addition, participants completed a questionnaire that consisted of questions related to their background knowledge and skills. Finally, a sub-sample of the early-stage entrepreneurs from university (N=154) also completed the Complex Problem Solving computer-based assessment.

Key observations

Measuring opportunity identification and evaluation

As stated opportunity competence is mentioned to be a key competence by scholars and policy-makers. However, empirically studying opportunity competence is still in its infancy due to conceptual ambiguity and a heavy dependence on self-assessment instruments known to be vulnerable to all sorts of measurement biases. Therefore, in LLLight-in-Europe, initial steps were taken to develop a performance-based assessment for opportunity competence, theoretically sound, but also with practical relevance.

This developed assessment consisted of two practical tasks:

1. Task 1 focussed on the ability to generate business ideas. The instrument as proposed by Corbett (2007) was used as a starting point. In his study, Corbett (2007) asked participants to generate business ideas related to (Bluetooth) technology. For the formulation of the particular problem case, a complex, ill-defined problem was searched for, that is familiar for many people. For this study we focussed on sustainability as topic. The issue of sustainability is a real challenge for the agri-food sector. Sustainably not primarily from the perspective of meeting increasing environmental regulations on national or international levels: rather, from the perspective of taking (competitive) advantage of the increasing need for sustainably produced products and services that move beyond the level of compliance (Lans et al., 2014). The participants were asked: 'Imagine that you are asked to give input for business ideas for new startups, in the area of sustainable development. These business ideas can concern people, planet and/or profit, and may lead to social, environmental and/or economic gains. What ideas for new startups come up in your mind?' A startup was defined as a new independent venture or a new project within an organization.



2. Secondly, we wanted to measure the ability of individuals to evaluate business ideas, for which we used the work of previous researchers (Baron and Ensley, 2006) who showed that experienced and novice entrepreneurs used different evaluation criteria to determine the potential for success of a business opportunity. According to these prototypes, experienced entrepreneurs focus more on elements directly related to actually starting the project or business. Novice entrepreneurs pay more attention to the 'newness' or 'uniqueness' of ideas.



Results from latent, early-stage entrepreneurs

Our study with latent, early-stage entrepreneurs from universities suggest that:

1. Opportunity identification and evaluation are distinct abilities

It suggests that some individuals perform better at generating business ideas, which involves creativity and divergent thinking, while others perform better at evaluating business ideas for their potential for success. This result is in line with the opportunity identification process, in which business idea generation and evaluation are commonly described as different parts of the opportunity identification process (Lumpkin & Lichtenstein, 2005; Wood & McKinley, 2010).

2. Elaboration and flexibility do not correlate with each other. This means that if an individual is good at generating concrete business ideas, this does not necessarily mean that the individual is also good at generating a high variety of business ideas. In other words, generating concrete business ideas and generating business ideas that belong to different categories, are distinct abilities.
3. No significant differences were found in opportunity evaluation, a mixture of arguments were used.

Role of complex problem solving?

Besides well-known, contextual factors such as prior knowledge and social capital, known to influence opportunity identification, we also looked specifically at the role of complex problem solving for opportunity identification and evaluation.

Although such a relationship has been suggested several times, conceptually linking and empirically studying them is to our best of knowledge scarce. Conceptually, both concepts have in common that:

- individuals aim to find successful strategies and make the right decisions (Dunbar, 1998; Sarasvathy et al., 2010)
- effective problem solvers, entrepreneurs, and intrapreneurs seem to share a critical attitude towards their environment, an ability to search for complete information (Dörner, 1989; Kirzner, 1997)

Entrepreneurial employee activity & innovation

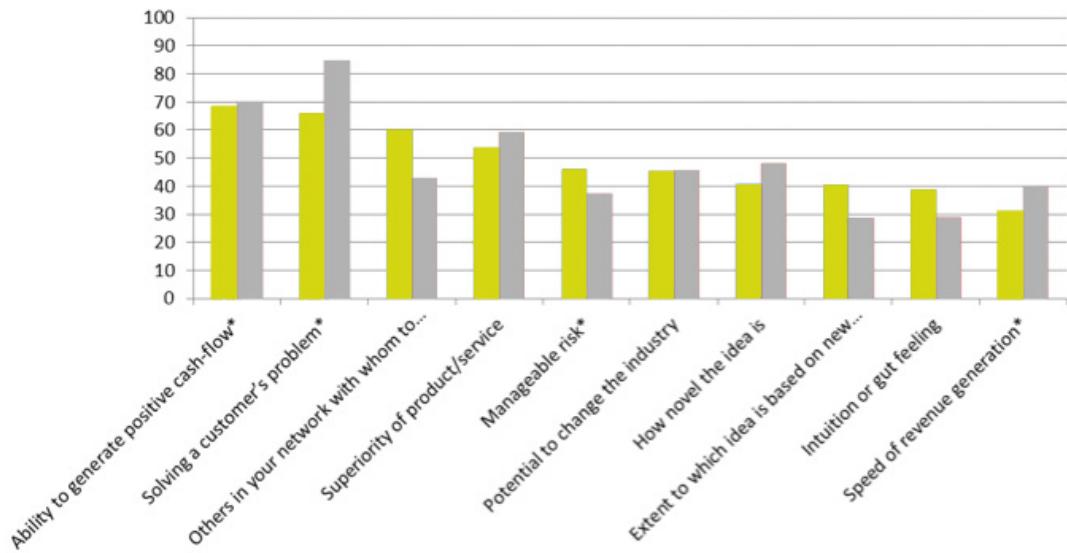
In terms of their relationship we argue that the identification of a first, rudimentary idea provides the set-up for a complex problem situation. CPS is relevant for the further objectification of the idea into an opportunity and the development of the opportunity into a concrete prototype, plan, format, and so on (i.e., opportunity enactment). Indeed, CPS incrementally predicted the abilities to identify and evaluate opportunities, explaining 2.3% to 5.7% additional variance.

Applying the same two opportunity tasks to 234 employees from small to medium-sized companies in the agri-, food and fibres industry provided more insight into which contextual factors contribute to EEA.

The results of the employees on the same two opportunity tasks show that this group generates on average 4.8 ideas, which is in between the average of latent (2.3) and the early-stage entrepreneurs (6.4) we found in our university student samples.

The results from the companies also show that the employees individually select, on average, 2.7 arguments in line with an experienced entrepreneur. As a group, the employees select, on average, 3.1 arguments in line with an experienced entrepreneur, which is significantly higher. This suggests that groups outperform individuals when it comes to evaluating business opportunities. This seems to underline the importance of the team level in companies. Secondly, employees seem to attach more value to their network in the evaluation of business ideas than students. In contrast students tend to include more the customers' perspective as well as attaching more value to novelty and superiority of the product or service. (see figure 2).

Figure 2: Percentage of employees (N=245) and students (N=253) that use the mentioned arguments for idea evaluation in task 2. Green bars are employee responses, grey bars the student responses.



Outcomes

Outcomes of EEA and innovation were operationalised in this study as 'the number of new ideas that have been adopted by the management over the last three years'. This measure serves as an indicator of the employees performance in the initial stages of opportunity process rather than as a record of all types of innovations that are implemented by the company (Hurley & Hult, 1988). In the earliest phases of the innovation process, the idea moves from key individuals within the organization towards the corporate decision-making level (Reid & De Brentani, 2004). According to Reid and de Brentani (2004) this means it has to move through three critical decision-making interfaces, the boundary (ideas gains ground in the company), gatekeeping (idea is leveraged to corporate level decision makers) and project interface (a project is organised). The project interface encompasses the concrete organization of a first project; a first screening phase of an innovation which usually rest with senior managers at the organizational level. At this point the idea is considered to be a potential new product, service or process and becomes part of the innovation portfolio of the firm.

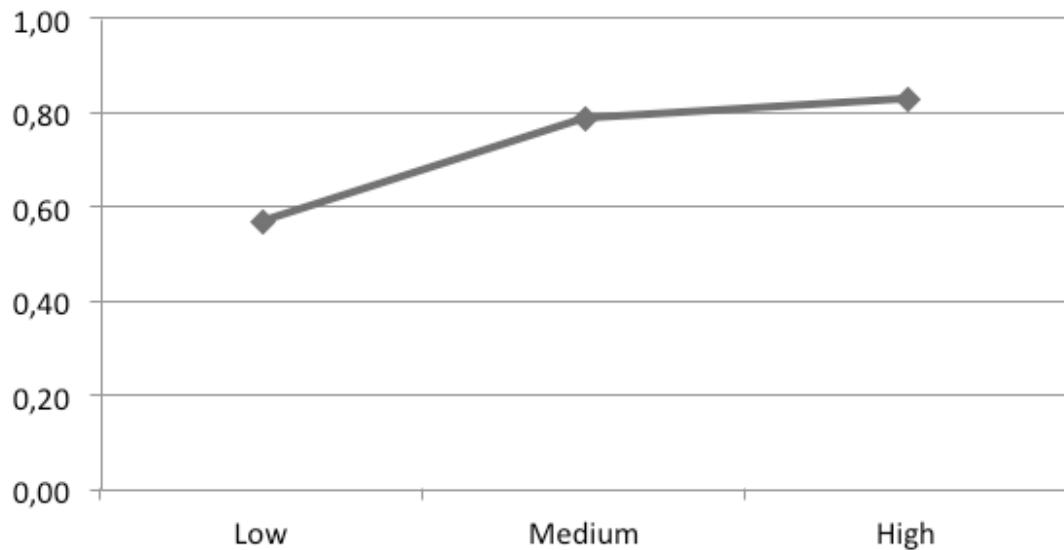
Thus, whereas final innovations outcomes are company-wide implemented products, processes, or methods, early innovation outcomes are new projects for a new or a significantly improved product, process or method.

The results suggest, at first glance, that there are differences between employees who successfully introduce many ideas (i.e. 3 or more) versus those who introduce only a few in terms of crude human capital proxies such as educational level and work experience.

However, looking at the results more in depth suggest that differences between employees are mainly explained by innovative work behaviour of employees. Innovative work behaviour includes all work activities carried out in relation to innovation development in an organization (De Jong & Den Hartog, 2010) (which refers more to what the GEM defines as the first phase of entrepreneurial employee activity, see Bosma et al. 2013).

In our questionnaire we asked how often employees were actively involved in innovation related tasks such as idea generation, optimization, product development and strategic change. Logically, those who engaged in these tasks more frequently also more often saw their ideas being adopted by the management in their organization. (see figure 3).

Figure 3: Mean engagement in innovation related activities work plotted against number of ideas that have been adopted by the management during the last three years (low, medium and high).



Specific Human capital

Difference between high and low engagement in innovative behaviour by employees in the sampled companies, in turn, can be explained into more detail by specific human capital variables. Firstly, those who engaged frequently in innovation related activities (i.e. more than once a month) also performed better on the developed opportunity tasks. As figures 4 and 5 show, performance differences between the low (less than once a month) and high group (more than once a month) were significant for task 1, opportunity identification.

Figure 4: Number of ideas generated by employees (task 1) for low engagement (less than once a month) and high engagement (more than once a month) in innovative behaviour (differences are significant).

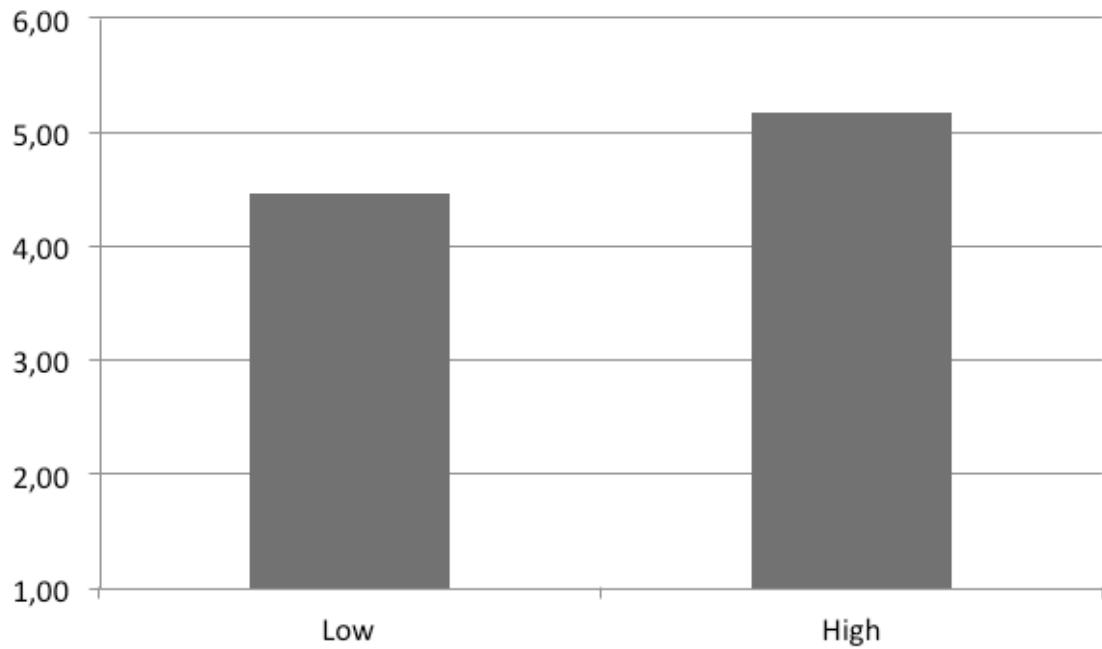
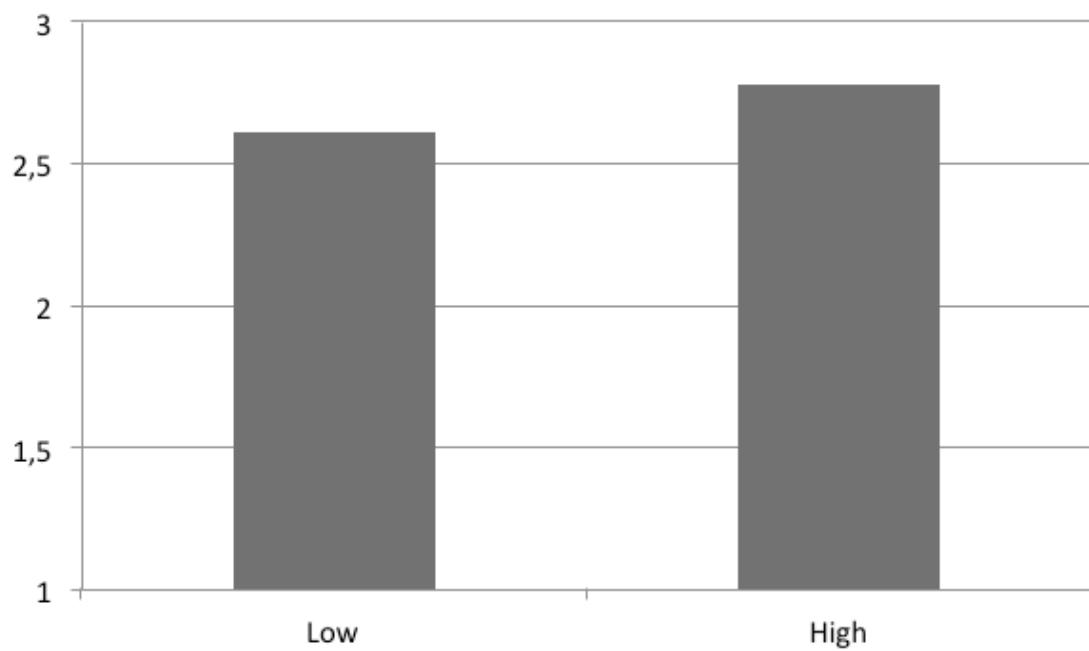
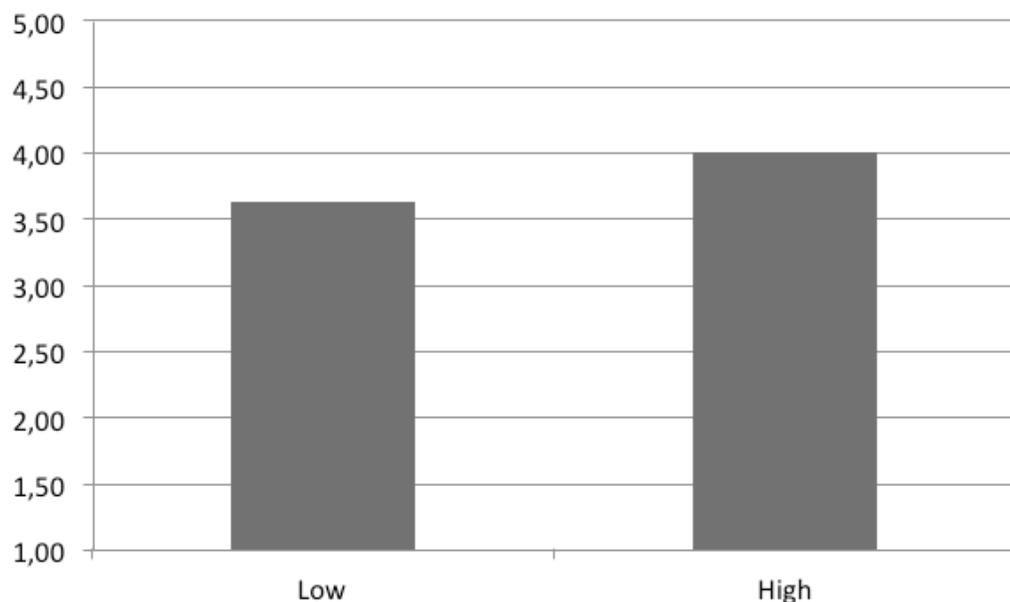


Figure 5: Idea evaluation by employees (task 2) for low engagement (less than once a month) and high engagement (more than once a month) in innovative behaviour (differences are not significant).



In addition, those who frequently engaged in innovative behaviour also scored significantly higher on self-efficacy (i.e. believe in their own opportunity ability) as well as the importance they accredit to social networks. (see figure 6 and figure 7)

Figure 6: Importance of social networks scores for low engagement (less than once a month) and high engagement (more than once a month) in innovative behaviour (differences are significant).



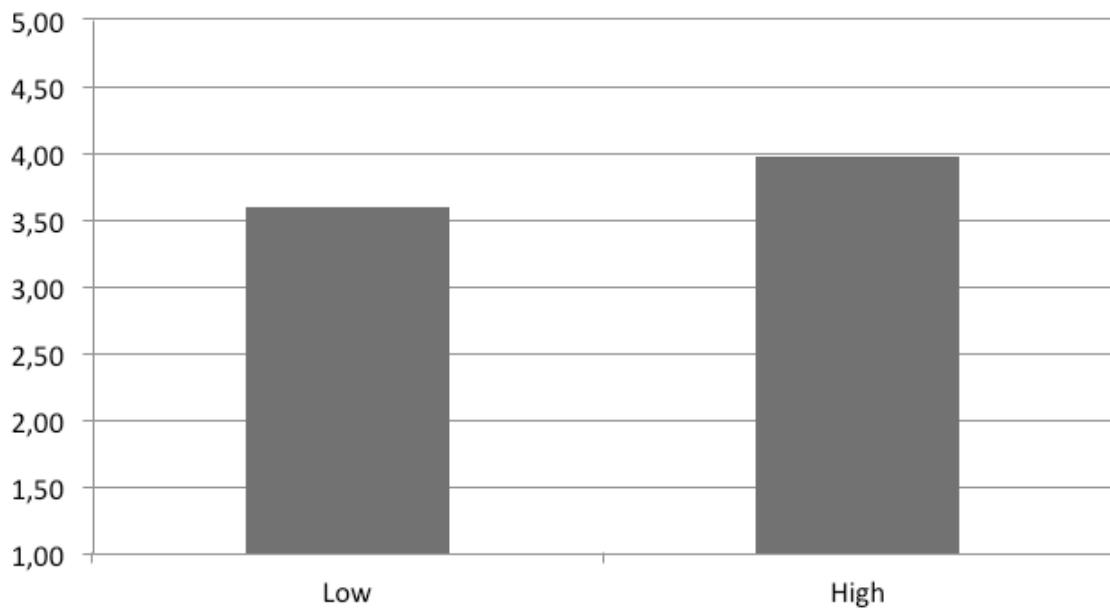
The meaning of social networks for innovation and entrepreneurship is well documented in the literature. Networks are important for all sorts of entrepreneurial events like start-ups, mergers and acquisitions. Social networks provide access to resources (e.g. finance, knowledge) and can create legitimacy for new activities (Anderson & Jack 2002). Social networks emphasise the relevance of social competence of individuals, next to cognitive abilities. Moreover, recent studies suggest that social networks are a result of specific social competence of individuals, rather than the other way around (Baron & Tang, 2009; Lans et al. 2015).



"Social networks are extremely important for my company", explains Rene Schut owner of the highly innovative Schut Paper Mill. He also explains that the potential of networks is not always seen by company management. For instance, while he was still employed, his previous boss asked him: "why are you always on the road and not focussing on optimization of processes in the factory?" Whereas his next boss told him: "René, please go outsides and develop networks." By visiting fairs, seminars, René expanded his network which has resulted now in the fact that when he took over the management five years ago people are able to find him when they start looking for innovative partners.

Finally, also self-assessed self-efficacy in identifying opportunities is significantly different between employees who score either low or high in innovative work behaviour. The importance of self-efficacy for (intended) behaviour is also not new and well documented in the literature. Belief in one's own (entrepreneurial) competence (Bandura, 1982) is one of the strongest individual level predictors for entrepreneurial success (Rauch & Frese, 2007).

Figure 7: Self-assessed self-efficacy scores for low engagement (less than once a month) and high engagement (more than once a month) in innovative behaviour (differences are significant)



In addition to social networks, the employees of Schut Papier also scored high on self-efficacy. As the managing director of Schut Papier explains when he talked about his continuous search for partners and social networks: "what I actually see is that for instance the lady from marketing and the guy from the technology department are enthusiastic about my approach and now start doing similar things." The example given here typically illustrates the power of observation learning (e.g. learning from the director as a role model) to increase specific self-efficacy (e.g. engage in opportunity production processes).

Moreover, the example also shows the centrality of the owner-manager in small and medium sized companies for unleashing the learning potential of the work environment (Lans et al. 2008).

So in sum, those employees who engaged most frequently in innovative behaviour also scored higher on opportunity identification, attributed more value to networks and had more belief in their own entrepreneurial abilities. Altogether, these above specific human capital variables (opportunity identification and evaluation competence, self-efficacy and social networks) together, explained almost 30% of the variance observed when controlled for less specific human capital variables such as work experience and educational level.

Finally the results suggest that adding work-related factors to the equation, in particular whether or not employees are confronted with complex tasks significantly improves the variance explained in the model. This underlines the importance of work-design for stimulating competence, innovative behaviour as well as employee performance (see policy brief on how organizational learning & work design relate to innovation performance HR). However, research on specific combinations of personal and work-environment factors deserves more attention as our data suggest more complex patterns here.

Recommendations for policy-makers

- Specific human capital, in particular opportunity competence, importance of social networks and specific motivation (i.e. self-efficacy) significantly contribute to engagement in innovative work behaviour, which, in turn, predicts innovative performance of employees. The results, hence, underline the complex interplay between human capital, EEA, innovation, and work-related learning. Stimulating innovation and entrepreneurship in its defining initial stage is not simply a matter of hiring high educated or experienced staff. Cooperation across the traditional disciplinary boundaries is hence called for in efforts to effectively combine lifelong learning, human capital, EEA, and innovation.

- The results illustrate the importance of team work. As the results of this study show, business idea generation and business idea evaluation are separate abilities. For that reason, innovation teams should include team members that perform well on different abilities. In addition, groups seem to outperform individuals on opportunity evaluation. Hence, programs as well as organizations themselves should invest in team activities and team incentives. Also, by getting insight in the specific innovation abilities of teams, employers could get more grip on the strengths and weaknesses of the personnel and provide the right training to improve the organization's innovative capacity.
- The results, furthermore, show the importance of specific human capital, rather than general human capital. Typically this set of specific human capital is a result of social mediated, informal, work-related learning activities, such as learning-by-doing, vicarious learning, experiential learning and action learning. This result supports the recommendation drawn by CEDEFOP (2012) to support programmes that invest directly in specific human capital as well as those that are geared towards relational capital.
- The engagement in innovative work behaviour was, by far, the strongest predictor of outcomes of entrepreneurial employee activities (i.e. number of ideas adopted by the management), which underlines the importance of task characteristics of employees. This finding supports the recommendation in the CEDEFOP (2012) study to invest in programmes that address organisational structures and processes with a focus on the workplace level.
- The key to get such programs running is in the hands of the management in small and medium sized firms.

Thus, albeit human capital and task characteristics are often treated as an individual matter, in the context of innovation and entrepreneurship at any point of time they should be treated as a shared responsibility between the individual and his or her organization (employer/management).

Research parameters

Data collection

Student, latent, early-stage entrepreneurship, data was collected via the opportunity competence assessment test (OCAT) (see also section on measuring opportunity identification and evaluation). The OCAT was conducted on an individual level with N=115 students in the Netherlands and N=142 students in Portugal (total 257).

Company data was also based on the opportunity competence assessment test (OCAT). The OCAT for companies comprised a similar individual task as the latent entrepreneurs, but in addition included group tasks in which employees were asked to generate business ideas, to evaluate business ideas for their potential to become a successful start-up, and to develop a business case based on the Business Model Canvas (Osterwalder & Pigneur, 2010) (individually and in a group). Next to working on the assignments, the employees filled in a questionnaire which encompassed questions related to work design in general and to learning on an individual, group and organizational level. 12 companies from the agricultural, food and fibre sector; from the Netherlands, representing a total of 234 participants working in 53 groups were used for this analysis.

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Project Identity

LLLLight'in'Europe is an FP7 research project supported by the European Union, which has investigated the relevance and impact of lifelong learning and 21st century skills on innovation, productivity and employability. Against the background of increasingly complex tasks and jobs, understanding which skills impact individuals and organizations, and how such skills can be supported, has important policy implications. LLLLight'in'Europe pioneered the use of an instrument to test complex problem solving skills of adults in their work environment. This allowed for the first time insights into the development of professional and learning paths of employed individuals and entrepreneurs and the role that problem solving skills play. Additionally, LLLLight'in'Europe draws on a series of databases on adult competences from across the world to conduct rich analyses of skills and their impact.

These analyses were conducted in concert with different disciplines. Economists have been analyzing the impact of cognitive skills on wages and growth; sociologists have been investigating how public policies can support the development of such skills and lifelong learning; innovation researchers have been tracking the relationships between problem solving skills, lifelong learning and entrepreneurship at the organizational level; educational scientists have investigated how successful enterprises support their workforce's competences; cognitive psychologists have researched on the development and implications of cognitive skills relevant for modern occupations and tasks; and an analysis from the perspective of business ethics has clarified the role and scope of employers' responsibility in fostering skills acquisition in their workforce. The team has carried out its research and analyses on the value of skills and lifelong learning in EU countries, USA, China, Latin America and Africa.

The result is a multi-disciplinary analysis of the process of adult learning and problem solving in its different nuances, and of the levers which can support the development of these skills for both those who are already in jobs, and for those who are (re)entering the labor market, as well as the development of effective HR strategies and public policy schemes to support them.

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This policy brief is part of the publication suite of the FP7 Project LLLight'in'Europe. The publication suite consists of 21 policy briefs, 6 thematic reports and 1 synthesis report. The 21 policy briefs discuss findings and policy implications proceeding from the project's research; they are organized along three level of analyses (persons; enterprise; country) and seven topics.

	01	Resources of society for learning
	02	Institutions of learning
	03	Circumstances of learning
	04	Role of transversal skills
	05	Role of job-specific skills
	06	Productivity of skills
	07	Outcomes of skills

This policy brief discusses findings related to **Productivity of skills** at the analysis level **enterprise**. For further publications and multimedia material related to the project, please visit www.lllightineurope.com