

Identification of competencies for professionals in open innovation teams

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In the open innovation management literature, it is widely acknowledged that individuals play a crucial role in collaborative knowledge creation processes. However, the literature tends not to explore the human side of open innovation teams. The present article therefore examines the competencies that professionals need for working in open innovation teams (specific but not necessarily unique to open innovation) and to cope with the challenges they face. A qualitative study consisting of explorative interviews and focus group discussions was conducted, resulting in a competence profile for open innovation professionals. The profile adds a new perspective to the field of open innovation management by focusing on how individuals involved in open innovation teams can enhance open innovation success. It reveals, among other things, how professionals can generate new knowledge, build trust, and deal with low reciprocal commitment in open innovation teams. Especially, brokering solutions and being socially competent seem to be important for open innovation professionals. Companies should focus on these competencies when supporting their professionals in open innovation teams.

1. Introduction

A complex form of open innovation is pooled R&D or co-development in strategic partnerships. These partnerships embody mutual working relationships between two or more parties aimed at creating and delivering a new product, technology, or service (Chesbrough and Schwartz, 2007, p. 55). Open innovation teams are formed in which professionals from different organizations create new knowledge collaboratively. The diversity of organizational back-

grounds is a source of creativity and is considered a critical success factor for innovation projects (Ritter and Gemuenden, 2002). However, this factor can be a source of social and communicative dilemmas as well, which may result in conflicts and project failures (Tidd et al., 2001).

The question emerges as to why some open innovation projects succeed while other projects fail. Which challenges prevail and how can these be dealt with? Challenges mentioned in the literature are, e.g. the difficulty of balancing individual and alliance interests (Hamel, 1991), lack of trust

(Doz and Hamel, 1998), the problem of free riding (Dyer and Nobeoka, 2000), the difficulty of absorbing and communicating knowledge between partner organizations (Hansen, 1999), and the absence of traditional hierarchical lines (West and Gallagher, 2006). Important success factors and governance mechanisms for open innovation projects are mentioned as well. Governing the project by formal rules and contracts could avoid the problem of free riding and enhance the degree of trust between team members (Newell and Swan, 2000). However, most studies undervalue and underinvestigate the human side of innovation (Moss Kanter, 2006). What can professionals involved in open innovation teams *themselves* do to cope with challenges they face and manage the open innovation process successfully?

Research on innovation teams reveals that high-performance teams include members with a broad range of skills and experience (McCain, 1996), who are involved and committed to make the process a success (Paton and McCalman, 2000), and possess strong communication and relationship skills (Moss Kanter, 2006). Open innovation professionals have to deal with the above-mentioned challenges, by creating trust, matching their own goals with the goals of their partners, and dealing with power differences (see e.g. Hamel, 1991; Ring, 1997; Inkpen, 2000; Muthusamy and White, 2005; West and Gallagher, 2006). However, often, the description of these required capabilities remains vague. Lettl et al. (2006) were more specific in describing personal capabilities, but they only did this for users involved in open innovation projects and not for open innovation professionals working in, e.g., an R&D department of a multinational company.

Even in research areas focusing on individual factors in business, studies on required competencies specific to open innovation contexts are scarce. Yet, research in this area is needed, because the way in which partners manage collective learning processes is suggested to play a central role in the success and failure of strategic alliances (Larsson et al., 1998, p. 285). West et al. (2006) placed individual factors on the research agenda, because individuals are supposed to highly affect the success of open innovation processes, being the driving forces behind all organizational processes (Senge, 1990). Therefore, the central research question of this article is: which competencies do open innovation professionals need for working in open innovation teams (which are specific but not necessarily unique to open innovation) and to cope with

the challenges they face? First, the article elaborates on the concepts of competence, open innovation, and competencies necessary to deal with tasks and challenges in open innovation teams through an inter-disciplinary literature review. The literature study aimed at constructing a competence profile that could serve as a framework to interpret, categorize, and analyse the empirical data gathered in this study. Second, it describes the methods used for data collection. Next, the results are reported, followed by discussion and conclusions.

2. Theoretical framework

2.1. The concept of competence

Researchers have found the concept of competence attractive for describing essential human knowledge, attitudes, and skills at work, because of the concept's focus on the relation between person and work (Sandberg, 2000). Competencies are assumed to be recognizable, assessable, and relevant for practice (Caird, 1992). Moreover, competencies can be developed, learned, and described at different levels, and are supposed to have a strong relationship with organizational effectiveness (Prahalad and Hamel, 1990).

For identifying competencies, a rationalistic approach using a multi-oriented method focusing both on work and on worker is often used (Sandberg, 2000; Delamare Le Deist and Winterton, 2005). In line with this approach, competence is viewed as a specific set of attributes, combining functional competence (knowledge and skills) and behavioural competence (metacognition and attitudes) (Delamare Le Deist and Winterton, 2005). Consequently, competence is defined as the integrated set of knowledge, attitudes, and skills of a person (Mulder, 2007). A competence profile can be described as the overview of the essential elements of professional competence required for effective performance. The multi-oriented method identifies competence by identifying the activities central for accomplishing specific work, transforming those activities into personal attributes, and identifying competencies (the underlying characteristics of people causally related to effective or superior performance in a job) (Spencer and Spencer, 1993). The next section will first explore the activities that professionals should be able to perform in order to be considered competent for operating in open innovation teams. After this, the underlying

characteristics or competencies, necessary to be able to perform these activities, will be explored.

2.2. Competences: activities in open innovation teams

Teams are defined as a collection of individuals who are interdependent in their tasks, share responsibility for outcomes, and see themselves and are seen by others as an intact social entity embedded in one or more larger social systems (Cohen and Bailey, 1997, p. 241). This means that, in the context of open innovation, two or more partners are mutually engaged in a coordinated effort in order to create new ideas and transform them into an innovation, by combining different types of technology, concepts, skills, and means (Fagerberg, 2004). Du Chatenier et al. (2007) performed an extensive literature study on the activities professionals have to perform in open innovation teams, revealing three main tasks: (1) managing the inter-organizational collaboration process, (2) managing the overall innovation process, and (3) creating new knowledge collaboratively. Additionally, there are various challenges that open innovation professionals should deal with. These challenges are mentioned in the first column of Table 2. It is assumed that open innovation teams can only benefit optimally from the advantage of the diverse organizational backgrounds of its members, if the team members involved possess the competencies to deal with these challenges. The next section will elaborate on the competencies that are vital to deal with the tasks and challenges open innovation professionals are confronted with.

2.3. Competencies: underlying characteristics to perform activities

Competencies for open innovation professionals are defined by the behavioural characteristics underlying the activities or tasks and challenges described above. In order to identify these competencies, studies on learning, (inter)-organizational learning, collaboration, (open) innovation management, creativity in organizational management, and HRM/D were reviewed. From these data sources, relevant competence lists were selected for each task and challenge. The selection criteria were that they should match with the given definition of competence, that they should fit the task or challenge at hand, and that there should be empirical evidence indicating their relevance for the task or the challenge.

The selected competence lists for managing the inter-organizational collaboration process, the overall innovation process, and the collaborative knowledge creation process were the boundary spanner competence (Williams, 2002), the novelty generating competence (Schweizer, 2006), and the learning competence (Bolhuis and Simons, 2001). The negotiating competence (Friedman and Antal, 2005) was selected for dealing with high diversity and cognitive distances. The 'facets of trust' (Tschannen-Moran and Hoy, 2000) were selected for dealing with lower social cohesion and an unsafe learning climate. The coping with chaos competence (Eoyang, 1997) was selected for dealing with low team stability and high levels of uncertainty. The political competence (Ferris et al., 2005) was selected for dealing with low reciprocal commitment, power differences, no learning history, longer learning future, and low resource availability. The self-directed learning competence (Knowles, 1990) was selected for dealing with the absence of traditional hierarchical lines. The teamwork competence (Stevens and Campion, 1994; adapted by Miller, 2001) was selected for dealing with low proximity, structural team composition, and functional team composition.

3. Methods

The selected competence lists were placed in a framework consisting of two layers: the competence itself and its underlying competencies. Next, the competences and competencies were clustered by the main task: interpersonal management (managing the inter-organizational collaboration process), project management (managing the overall innovation process), and content management (managing the process of collaborative knowledge creation). A fourth cluster, self-management, was added, because this appeared to consist of the basic competencies that are necessary to perform all other activities. Consequently, a first competence profile for open innovation professionals was constructed, based on the identified tasks and challenges and selected competence lists, consisting of four clusters, 13 competences, and 34 competencies.

After that, two empirical studies were conducted to validate the profile: explorative interviews and focus group discussions. Because there are no existing competence profiles for open innovation professionals, qualitative methods were chosen to identify and elaborate the competencies empirically. To enhance the reliability and validity of the study, a two-stage research method was chosen.

Table 1. Goal, method, subjects, and numbers of empirical data collection units per study

Goal	Study 1: identifying competencies empirically	Study 2: identifying and converging competencies empirically	
Method	Explorative interviews	Focus Group 1	Focus Group 2
Subjects			
OI Professionals			
Retailer	2 (2 interviews)	1	2
Processor	8 (7 interviews)		
Producer	2 (2 interviews)		
Knowledge inst.	1 (1 interview)		
Stakeholders	2 (2 interviews)		
HRM/D Professionals			
OI Experts	5 (3 interviews)	2	2
HRM/D Experts		2	2
OI Scientists		2	1
HRM/D Scientists		2	1
Total <i>n</i>	20 (17 interviews)	9	8

The two empirical studies aimed at discovering the competencies following a bottom-up approach in two different ways.

3.1. Explorative interviews

Seventeen interviews were conducted with professionals representing organizations and intermediaries (see Table 1), who initiated, facilitated, and participated in open innovation projects in the Dutch agribusiness sector, well known for its innovativeness. The main selection criterion was that they must have been involved in open innovation teams, where new products, services, or markets were co-developed with at least one external partner. The kind of partner and the type of innovation goal were no selection criteria. In this study, 12 innovation projects were co-developed with vertical partners (i.e. with customers and/or suppliers), one with a horizontal partner (with a competitor), and four with both horizontal and vertical partners. Examples of open innovation projects were the development of a glass house that not only consumes but also produces energy involving various partners in Dutch horticulture and a project with several supply-chain partners that aimed at finding solutions to diminish the loss of fresh products in the biological pig supply chain. The interviews took about 1½ h and were semi-structured, using the critical incidents method. The main questions asked were: what was the open innovation project you participated in, what were the challenges/critical situations (typical for open innovation projects), and how did you deal with them?

3.2. Expert focus group discussions

Two focus group discussions were held to gain an insight into the degree of consensus on competencies required for operating in open innovation (OI) teams. The focus group discussions were organized with representatives of multiple groups that were involved in different aspects of open innovation (see Table 1). This wide variety of respondents guaranteed a broad range of expertise and more reliable insight into the degree of consensus on required OI competencies. The focus group discussions were semi-structured with open questions using the critical incidents method. The main questions were: can you give an example of a typical open innovation project, what makes this project different from normal teamwork (resulting in challenges/critical incidents), which competencies or personal qualities are needed for OI professionals, and how important are they? Examples of the mentioned OI projects were the development of an environment-friendly product label in collaboration with multinationals in the food sector and the government, and the development of a marketing strategy for (expensive) Dutch vegetables in collaboration with retailers and growers. The discussions were held in a Group Decision Room, using group decision software (Morgan and Krueger, 1997). Each focus group discussion lasted about 3 h.

3.3. Data analysis

The data derived from the interviews and focus group discussions were interpreted and coded based on the competence profile derived from the literature study. Direct references to competencies

Table 2. Challenges for open innovation teams as derived from the literature and mentioned in the explorative interviews and focus groups (frequencies)

	Explorative interviews (<i>n</i> = 20)	Focus group (<i>n</i> = 2)
1. High diversity and cognitive distances	6	2
2. Lower social cohesion and unsafe learning climate	8	2
3. High level of uncertainty	4	2
4. Low reciprocal commitment	10	1
5. Absence of traditional hierarchical lines	2	2
6. Power differences	3	1
7. Structural team composition	0	0
8. Functional team composition	0	0
9. Low proximity	2	0
10. Low team stability	1	0
11. No learning history	0	0
12. Longer learning future	0	0
13. Low resource availability	4	1

in the reports of the interviews and focus group discussions were placed in the framework next to the corresponding competence. The quotes per competency were counted and noted in the framework. Only those competencies that the focus group agreed upon as being important were used. Competencies mentioned in the empirical studies and not in the theoretical framework were added.

4. Results

In the interviews and focus group discussions, various challenges were mentioned that were considered typical for open innovation projects (see Table 2).

To a major extent, the competencies mentioned in the interviews and focus group discussions to deal with these challenges were similar to those found in the literature (see Table 3). Twenty-three out of 34 competencies were mentioned during the explorative interviews and both focus group discussions. Nine competencies were mentioned during the explorative interviews and one focus group discussion. There were also additions to the competencies derived from the literature (indicated in *italics* in Table 3). The three most frequently mentioned competencies are being able to: (1) combine: ‘creates a win–win situation’; (2) show social astuteness: ‘understands social situations’; and (3) socialize: ‘develops, maintains, uses effective networks’, and interpret: ‘listens actively’.

Surprisingly, some competencies mentioned in the interviews and focus group discussions seem to contradict each other. For instance, it was said that one needs to share his or her knowledge even if one is not sure, but it was also mentioned that one must ‘share with boundaries’. Similarly, one has to build on the ideas of others, but also to be critical. Apparently, there is not one single road to deal with some challenges.

5. Discussion and conclusions

Given the importance of open innovation projects for organizations, it is crucial to define the competencies required of professionals working in open innovation teams in order to enable companies to prepare their professionals for open innovation teams. The present article explored the competencies professionals need in open innovation teams through literature review and empirical validation, resulting in the competence profile presented in Table 3.

The activities of open innovation professionals consisted of three main tasks and 13 challenges. The main tasks were (1) managing the inter-organizational collaboration process (2) managing the overall innovation process, and (3) creating new knowledge collaboratively. Challenges typical for working in an open innovation context included low reciprocal commitment, lower social cohesion and unsafe learning climate, high diversity and cognitive distances, high level of uncertainty, low resource availability, absence of traditional hierarchical lines, and power differences. For all competencies identified from the literature (except for one), empirical support was found illustrating how open innovation professionals deal with these challenges. The competencies that seem most important for open innovation professionals concern brokering solutions and being socially competent and should therefore receive most attention when using the profile.

Companies could use the competence profile for selection and training of their professionals for open innovation teams under the responsibility of HRM/D staff. However, this ideal situation does not always exist. Often, HRM/D staff is not occupied with staffing and stimulating professional development within the context of open innovation. In that case, the profile can also be used as a diagnosis and intervention tool for ongoing open innovation team processes. Whenever problems arise, the team could reflect on the

Table 3. Competences and underlying competencies for dealing with the tasks and challenges (c) mentioned in the literature, the interviews (I), and focus groups (F) in frequencies

Competences is able to . . .	Competencies the open innovation professional therefore . . .	References	I	F
Cluster 1: Self-Management (basis for other tasks)				
Be committed	Appreciates the learning domain, has the motivation to learn, <i>has a sense of urgency, and wants to learn from others.</i>	Bolhuis and Simons, 2001	7	2
Govern oneself (c8)	Has self-confidence, <i>knows what his/her qualities are, does not take the position of the underdog.</i>	Bolhuis and Simons, 2001, Schweizer, 2006	1	2
	Is aware of, and regulates, own thinking <i>and feeling.</i>	Bolhuis and Simons, 2001, Friedman and Antal, 2005	1	1
	Has perseverance, <i>keeps on thinking positively, having end-goal in mind.</i>	Schweizer, 2006	7	1
	Manages tensions created by multiple accountabilities, <i>tasks and roles.</i>	Williams, 2002	1	0
Cluster2: Interpersonal management (main task inter-organizational collaboration)				
Build trust (c2)	Is honest: possesses high levels of integrity, authenticity, sincerity, and genuineness. Can be counted on to represent situations fairly.	Tschannen-Moran and Hoy, 2000, Williams, 2002	2	2
	Is open: shares information freely with others. <i>Even when he is not sure. With a feeling for boundaries, knowing value of knowledge.</i>	Tschannen-Moran and Hoy, 2000, Williams, 2002	6	2
	Is competent: able to perform the tasks required by ones position. <i>Is professional, takes a role in the group, works independently, clear about own role.</i>	Tschannen-Moran and Hoy, 2000	3	2
	Is benevolent has the best interests at heart for others, protects their interests, <i>shares successes, allows people to make mistakes. Trusts the other party.</i>	Tschannen-Moran and Hoy, 2000, Williams, 2002	3	2
	Is reliable: ensures that the others can depend upon him/her to come through for them, acts consistently, follows through.	Tschannen-Moran and Hoy, 2000	5	1
Have social astuteness (c4)	Understands social situations as well as interpersonal interactions. Is sensitive to the roles and responsibilities of all partners, aware of their collaborative motivations and expresses understanding and empathy. <i>Knows how to play the political game.</i>	Ferris et al., 2005, Williams, 2002	9	2
Have inter-personal influence (c6,13)	Appropriately adapts, calibrates ones behaviour to each situation in order to elicit particular responses from others. Uses influencing skills (as opposed to instructing): <i>position, coalition, stimulates, and knows who, when to inform.</i>	Ferris et al., 2005, Williams, 2002	7	2
	Is assertive, extrovert. <i>Phrases own perceptions and feelings (in a diplomatic way). Is sometimes straight forward.</i>	Schweizer, 2006	6	2
Be a social person (c11, 12)	Develops, maintains, uses effective networks. Is approachable, develops friendships easily and strong beneficial alliances and coalitions. <i>Develops a team spirit.</i>	Williams, 2002, Ferris et al., 2005, Miller, 2001	8	2
Cluster 3: Project management (main task: overall innovation process)				
Be inventive	Seeks novelties, <i>experiments.</i> Is sensitive to environment and market oriented. Manages ambiguous situations, takes risks, <i>is result oriented, pragmatic.</i>	Bolhuis and Simons, 2001 Williams, 2002	3	2
	Picks up signals, sees chances, <i>has intuition for innovation, creates a vision.</i>	Schweizer, 2006	3	2
	Is pro-active. <i>Comes up with ideas him/herself and takes initiatives.</i>	Schweizer, 2006	3	1

Table 3. (Contd.)

Competences is able to ...	Competencies the open innovation professional therefore ...	References	I	F
Control and coordinate (c5,7,9)	Establishes specific, challenging, accepted team goals. Diagnoses, formulates learning objectives in performance outcomes <i>not too soon</i> .	Miller, 2001, Knowles, 1990	6	1
	Coordinates and synchronizes activities, information, and tasks between team members. Designs a plan of strategies. Carries out the plan systematically and sequentially. <i>Feels responsible for the team and acts as such.</i>	Miller, 2001, Knowles, 1990	6	2
	Identifies human, material, and experiential resources for accomplishing various kinds of learning objectives. <i>Organizes complementarities.</i> Identifies situations for participative group problem solving, using the proper degree of participation, and recognizes obstacles and corrective actions.	Knowles, 1990, Eoyang, 1997	7	2
	Monitors, evaluates, and provides feedback on overall team and individual performance. Accepts feedback about his/her performance nondefensively. Collects evidence of accomplishments. <i>Asks many critical questions.</i>	Miller, 2001, Knowles, 1990, Eoyang, 1997	6	1
Cope with chaos and un-certainties (c10,3)	Has an overall picture of the project and influencing factors. Understands and manages complexity. Supports many things on his/her mind at the same time.	Williams, 2002, Schweizer, 2006, Eoyang, 1997	1	2
	Balances short and long term goals. Finds problem. <i>Discerns sub from main issues.</i>	Eoyang, 1997	2	1
	Deals with unexpected situations, is flexible with plans, deadlines, improvises. Is not too systematic, rigid. <i>Deals with a flexible team composition.</i>	Schweizer, 2006, Eoyang, 1997	6	2
Cluster 4: Content management (main task: collaborative knowledge creation process)				
Externalize (c1)	Communicates clearly and understandably. Recognizes open and supportive communication methods.	Williams, 2002, Miller, 2001	4	2
Interpret (c1)	Has good reflective skills, and techniques of analysis. <i>Is critical, but constructive.</i>	Bolhuis and Simons, 2001, Williams, 2002	4	1
	Possesses basic knowledge and perceptions, of various technical/professional areas <i>and languages</i> . Is experienced in partnership working.	Bolhuis and Simons, 2001, Williams, 2002, Schweizer, 2006	3	2
	Listens actively: listen with a view to being influenced, not closed. <i>Is curious.</i>	Bolhuis and Simons, 2001, Williams, 2002	8	2
Negotiate (c1)	Openness: treats differences as important opportunities. <i>Respects, values, appreciates people's ideas.</i>	Friedman and Antal, 2005, Williams, 2002	2	2
	Is competent in techniques of lateral thinking or divergent thinking.	Williams, 2002, Knowles, 1990	3	2
	Combines high advocacy (egocentrism) with high inquiry. <i>Is aware that he represents an organization, refuses to accept less.</i>	Friedman and Antal, 2005, Williams, 2002, Schweizer, 2006	6	2
	Explores assumptions by knowing when and how to interrupt automatic functioning and brings theories of action into awareness.	Friedman and Antal, 2005	0	0
Combine (c1)	Recognizes types and sources of conflict, encourages desirable, but discourages undesirable conflict.	Miller, 2001, Williams, 2002	5	1
	Employs integrative (win-win) negotiation strategies rather than distributive (win-lose) strategies. Brokers solutions or outcomes. Thinks in ways that differ from established lines of thought. <i>Agrees to disagree (lose-lose). Considers common goal as most important. Adapts without violating own ideas.</i>	Miller, 2001, Williams, 2002, Schweizer, 2006	12	2

Additional competencies in empirical studies in italics.

profile and analyse where there is room for improvement, and decide which specific interventions could help them to enhance the quality of their work. However, the involvement of HRM/D staff in open innovation teams can be recommended because open innovation processes deal with highly complex social and communicative dilemmas. It is not only an opportunity for open innovation teams to integrate knowledge about inter-personal aspects of collaboration and prepare for working in open innovation contexts but also a chance for HRM/D to realize its strategic potential in the organization. The profile may thus serve as a good point of departure for both open innovation professionals and for HRM/D professionals with respect to strategic workforce planning, selection, training and development, and performance management. However, more research is needed in order to be able to give advice on how to use the profile most effectively.

In our study, a qualitative rationalistic approach was used to identify the competencies. Inevitably, this implies that the resulting competence profile neglects the context dependency of the competencies (Sandberg, 2000). The variety of answers from the interviews and the (seemingly) contradictory competencies could be explained by the context dependency of the competencies. For instance, many challenges in open innovation teams are dilemmas, requiring professionals to show opposing behaviours at different times. Additionally, the respondents participated in different open innovation projects, varying in the way they were financed, initiated, and facilitated, and in innovation goal. Moreover, respondents came from different organizations fulfilling different team roles. Team theory states that effective teams need a set of competencies and not all competencies need to be held by each individual team member. For example Belbin (1993) and Reid and De Brentani (2004) suggest that innovation teams need roles regarding championing, boundary spanning, gate keeping, and pattern recognition. Thus, the specific set of competencies a person needs may depend on his or her team role. It may, for instance, be enough for a team when one person knows how to develop a machine and the other knows how to create team spirit. Further research should address how the set of competencies depends on team roles and context.

Second, the competence profile does not provide information about which competencies are crucial to make an open innovation team successful. It is suggested that individual competencies affect open innovation team success, but this relation was not shown empirically. The impact

of individual behaviour on the success of open innovation projects, in interaction with, e.g. the institutional environment, would be an interesting topic for further research as well.

Third, one could wonder whether the set of competencies is unique to open innovation, which was a topic of discussion in one focus group. The participants were asked to mention the challenges that would not occur in closed innovation projects or other team projects. Typical challenges were mentioned, which indicates that working in an open innovation context is (in some aspects) different from working in closed innovation or other contexts. However, the competencies mentioned for dealing with these challenges do not necessarily have to be unique to open innovation projects. It might be a matter of skill level more than of uniqueness. For example, being able to combine different views is also necessary in closed innovation projects, but the required skill level of this competency in open innovation projects might be higher than in other projects. Moreover, the competencies as such may not be unique for open innovation projects, but their combination might. Further research comparing open and closed innovation teams is needed to reveal how required competencies for open innovation settings differ from closed innovation settings.

To conclude, this article has defined a competence profile for open innovation professionals, which adds a new perspective to the field of open innovation management. However, further research is needed to determine how useful the profile is, how context dependent the competencies are, which competencies are crucial for the success of open innovation teams, and how unique these competencies are for open innovation projects.

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