Innovation Teams: Before Innovation Work is Begun

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Abstract: This paper focuses on innovation teams before innovation work is begun. Reason is that innovation teams are considered to be successful doing such work. However, prior studies show problems in innovation-related knowledge, knowledge gaps, information and awareness, why this research aims to understand these aspects and how they relate to newly formed innovation teams as they need to handle these aspects. Two case studies conducted during 1.5 years show that a newly formed innovation team is in a very complicated situation where the identified aspects relate not only to the individual members, but also to the team, its context and network within and outside the organization. Practical implications from this research could be used when planning-, creating- and starting up new innovation teams, helping management and team members to understand the complexity, for which a model is developed and described.

Keywords: Innovation team; innovation group; organization, innovation work; education; knowledge; knowledge gap; information flow; awareness; affordances.

1 Problem

Introduction

This is the forth paper from a research study, covering data collection spanning over 1.5 year conducted on two innovation teams in two Swedish SMEs where the focus is to better understand innovation teams’ situation before innovation work is begun. This paper is based on conclusions from the three prior papers generated within the same research.

Why innovation teams?

Innovative organizations are more successful than other organizations (Dobni, 2006; Patterson, 2009; Tidd and Bessant, 2009) but they need to reframe their organizations to support radical innovation, as complement to incremental innovation, to stay in business (Tidd et al., 2010).

Multifunctional and cross-functional teams perform better than single persons (Arranz and Arroyabe, 2009) because the broad range of knowledge stimulates the creation of new ideas and increase the spread of knowledge and favor creative performance (Ahmed, 1998; Backström and Olson, 2010; Kelly, 2005; Smart et al., 2007).

Problem clarification

I make the assumption within this research that innovation teams are suitable for both innovation work and to stepwise transform an organization into an innovative organization. However, an empirical study of innovation teams identifies problems as e.g. need of knowledge concerning innovation management, mistrust, complaints, conflicts, lack of incentives, stress syndromes, scepticism and learning problems which results in performance problems (Hallgren, 2009; Johannessen and Olsen, 2011; Kesting and Ulhöj, 2010; Kristiansen and Boch-Poulsen, 2010; Lundin and Söderholm, 1995; Zuidema and Kleiner, 1994).
Four major innovation related aspects appear within identified problems:

1. Knowledge; Research demonstrate lack of knowledge as affecting strategic decision-making, innovation management, management of conflicts (Kesting and Ulhöj, 2010), the need for fundamental knowledge regarding innovation and the need for an experienced facilitator to guide and manage a project (Hallgren, 2009) and stress caused by unfamiliarity with new situations (Zuidema and Kleiner, 1994).

2. Knowledge gaps; Problems associated with innovation-related knowledge gaps, identified using theories of change resistance and system complexity, are mistrust in management, conflicts between team-members (Zuidema and Kleiner, 1994), negative comments among employees (Hallgren, 2009), destructive criticism instead of collaboration, conflicts regarding project agendas, complaints about extended meetings and work overload, expressions of doubt, (Kristiansen and Bloch-Poulsen, 2010), tension between the temporary and the permanent in an organization (Johannessen and Olsen, 2011), lack of incentives (Kesting and Ulhöj, 2010), delay in the introduction and development of routines and organizational memory and learning and focus on immediate delivery (Lundin and Söderholm, 1995).

3. Information flow; Lack of communication hinders transfer of learning from one project to another (Johannessen and Olsen, 2011: Lundin and Söderholm, 1995).

4. Awareness; Cognitive bias hindered employees from thinking outside their ordinary routines (Kesting and Ulhöj, 2010), interpreted as a practical problem related to the incapacity of the employees to recognize (by means of innovation-related awareness) innovation opportunities.

Another problem identified from prior research is that one can observe a focus on groups or teams, with no distinction between the two terms despite the great difference between them (Wheelan, 2013), already performing innovation work without studying the formative stage before the group began innovation work. Research show, for which prior research does not explicit clarify in this context, is that it takes approximately 6-8 month for a newly formed working group to emerge through four phases to a high performing working team (Tuckmann and Jensen, 1977: Wheelan, 2013) where the first three steps consist of formations, conflicts and trust. The fourth stage is where the team is high performing but only about 15% reaches that level according to Wheelan (2013).

This research aim to clarify how members’ innovation related knowledge, knowledge gaps, information flow and awareness relate to a newly formed innovation group. Benefits would be to better organize innovation teams, resulting in better innovation performance.

2 Current understanding

Current understanding of innovation teams is found as bits and pieces embedded in prior research demonstrating innovation success factors in all levels. For that reason this research will over organizational-, group/team-, and individual level to provide a more holistic picture of the situation of a newly formed innovation team before starting innovation work.

Innovative organizations could be identified by its setting of top management’s wish to involve employees and support innovation work (Ahmed, 1998), or by using system theory to understand the organization’s work system (Backström et al, 2011). Success factors when transforming an organization into an innovative organization (van der Panne, 2003) and innovation models are well demonstrated (Andersson, 1996: Johnsson, 2009: Tidd and Bessant, 2013: Trott, 2013), all including e.g. organizational levels, knowledge management, need of management skills and information of how innovation should be performed.
Groups and teams of different kinds are well known in research since the 1980’s, starting from the Self-Directed Work Groups (Zuidema and Kleiner, 1994) to today’s Employee Driven Innovation in Teams (Kristiansen and Bloch-Poulsen, 2010). Still, problems are noticed within identified groups/teams, validating research on innovation teams to be conducted.

Table 1: The table shows different innovation teams, their positive effects and problems that have occurred in the teams.

<table>
<thead>
<tr>
<th>Innovation team</th>
<th>Authors</th>
<th>Positive effects from team</th>
<th>Problems in team</th>
</tr>
</thead>
</table>
- Seeing the big picture.  
- Educating both members and management.  
- Encouraging trust by delegating.  
- Supporting mistakes  
- Guiding the group by coaching instead of supervision.  
- Encouraging communication and reflection.  
- Steering work towards company goals. | - Mistrust to management.  
- Conflicts between team-members.  
- Stress caused by unfamiliarity with new situations. |
| IS-Group (Innovation steering group) | Hallgren (2009) | - Learning was improved concerning innovation management.  
- The Members was from different department and levels started to change the organization by spreading knowledge by themselves.  
- Top management satisfied with project result.  
- Involving rest of the employees in project.  
- Improved energy, motivation, involvement, enthusiasm and communication.  
- Changing habits and routines in organization. | - In need of fundamental knowledge regarding innovation.  
- Negative comments among employees.  
- Need of facilitator that can learn and drive project. |
- Innovations can emerge from "ordinary employees", from shop floor to managers.  
- Innovation can emerge in any department.  
- Human capital => innovation capital | - Lack of incentives.  
- Cognitive bias hindered employees from thinking outside their ordinary routines.  
- Lack of knowledge concerning decision making as strategies, managing innovation, managing conflicts and prestige. |
| EDIT (Employee Driven Innovation in regular Team) | Kristiansen & Bloch-Poulsen (2010) | - Employees contribute to innovation, no matter of educational background or what department the employee is working.  
- Stress was reduced.  
- Improved cooperation  
- Improved efficiency. | - Looking for shortcomings and pitfalls instead of collaborating.  
- Fighting regarding project agendas.  
- Complaints about long meetings.  
- Complaints about work overload.  
- Expressions of skepticism. |
| Temporary group | Lindner & Wald (2011) | - Improved culture and climate.  
- Knowledge culture have positive effects  
- Informational network have positive effect on knowledge culture | - Hinders the emergence and development of routines and organizational memory and therefore impedes organizational learning.  
- Discontinuous working constellations and teams lead to fragmentation and disintegration of individual and organizational knowledge. |
Definitions used within this paper
Innovation within this paper is defined to be an “implementation of a new or significantly improved product (or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations” (OECD, 2005) with the extension to also have added value on an internal or external market (Anderson 1996; Lans, 1997; VINNOVA, 2012).
I define innovation work to include all necessary work required to launch and generate values out of the new e.g. product. In practice this means that innovation work include involvement from many different departments (Andersson, 1996: Baxter, 2002: Johnsson, 2009: Michanek and Breiler, 2004: Ottoisson, 1999: Tidd and Bessant, 2013).

Groups and teams are not the same. A group is defined as a complex social system of two or more people embedded in an organization (Hoegl, 2005). A group strives towards common goals and a structure to fulfill the goal (Wheelan, 2010). The members may not yet have “found each other” (Backström and Olson, 2010), have not yet developed efficient ways of working together (Wheelan, 2010) and they may not perceive oneself or other members as in a team according to Hoegl (2005). A team is a social system of people embedded in an organization, whose members perceive themselves as such and are perceived as members by others (Hoegl, 2005: Wheelan 2010). However, in this paper I will use the term team regardless of its status in order to not confuse if it’s not necessary to be very explicit of the difference for some reason. Another reason for using team instead of group, which relate to the prior reason, is that this paper could be used when working to organize a new innovation team (including the time for emergence of groups into team) in an organization, which ease the communication.

Small and Medium sized Enterprises (SME) are defined as companies with 10-250 employees, an annual turnover of maximum 50 million Euros and a balance of not more than 43 million Euros (VINNOVA, 2012).
3 Research question

The overall Research Question (RQ) within this paper is: “What would a model that describes the innovation-related knowledge, knowledge gaps, information flow and awareness of a newly formed innovation look like and be described?

Four sub-questions addressed to each one of the identified aspects have been used in two embedded case studies when developing the answer to the overall RQ.

Rq1: What innovation-related knowledge do the members of a newly formed innovation team and the senior managers have, regarding their companies’ innovation-related Strategy, Process, Organization, Linkages and Learning of their company?

Rq2: Are there innovation related knowledge gaps within a newly formed innovation team and the senior managers that could be identified, affecting the innovation team? If yes, how? If not, why?

Rq3: Are there innovation related information flow in the members’ of a newly formed innovation team’s daily work? If yes, what kind of information flow is most prominent? If not, why?

Rq4: Are the members of a newly formed innovation team able to detect innovation opportunities in their daily work. If yes, what have they detected? If not, why?

4 Research design

The research has been conducted in two case studies on two newly formed innovation teams in two SMEs in Sweden. Research involving SMEs is of relevance as SMEs represent 99.8% of all companies in Europe, providing employment for over 88 billion people. Sweden is no exception, SMEs representing 99.9% of all companies (http://www.svenskttnaringsliv.se, 2011).

The research has been conducted in two case studies on two newly formed innovation teams in two Small and Medium sized Enterprises (SME) in Sweden. The two companies, Company A and Company B, were selected on the basis of four criteria, (1) being located in Eskilstuna as the financier of this research support research on owner-driven SMEs located in Eskilstuna, (2) having their own development and production, (3) not competing in the same business area as the other participating SME and (4) being one of the leaders in their niche. Company A is an OEM (Original Equipment Manufacturer) in the car component industry with customers spread all over the world. Company B develops and produces electronic components to be incorporated in other products for customers that are active on the global market. Two innovation teams and one managerial team consisting of 21 of 103 possible respondents at the both companies have participated in five case studies, generating results from a total of 12 workshops, 840 audit statements, 2234 interview questions and nearly 8 hours of visual observation.

The research was executed in an iterative and cyclic way in accordance with Blessing and Chakrabarti (2009), were the first phase in Case study 1 led to a second phase, which resulted in a second embedded case study consisting four case studies (Case study 2-5). Case study 1 (Rq1 and Rq2) gave a deeper understanding of innovation-related knowledge and knowledge gaps of the members of the participating innovation teams. Rq1 was conducted by an interview-supported audit on 21 respondents answering in total 840 self-assessment audit statements and 103 open-ended questions in which the answers from Rq1 inspired to Rq2 in which how innovation-related knowledge gaps affected innovation was studied via 12 workshops. 18 respondents answered in total 1170 open-ended questions. Results from Case study 1 inspired to Case study 2 (Rq3 and Rq4) in which innovation-related information flow and awareness of four members in one innovation team was studied by observation of their daily work and the participants answered in total 216 open-ended questions. All together, the studies contribute to the understanding of members’ innovation-related knowledge, knowledge gaps, information flow and awareness of the newly formed
innovation team, for which conclusions were made.

Case study 1 was conducted in two phases at Companies A and B. The first phase was an interview-supported audit that resulted in a paper (Paper I) by Karlsson and Johnsson (2010). The second phase, which was a workshop series, resulted in another paper (Paper II) by Johnsson and Karlsson (2011). The second study, an embedded case study, (Case study 2-5) was conducted as verbal interviews and verbalized observations of four members in an innovation team at Company B that resulted in a third paper (Paper III) by Johnsson (2011). Table 1 demonstrates which paper contributed with data to which Rq.

Table 2: Relation between conducted case studies, papers and RQ’s.

<table>
<thead>
<tr>
<th>Research question</th>
<th>Contribution from Paper to RQ answer within this paper</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Paper I Case study 1</td>
</tr>
<tr>
<td>Rq1</td>
<td>X</td>
</tr>
<tr>
<td>Rq2</td>
<td>X</td>
</tr>
<tr>
<td>Rq3</td>
<td>X</td>
</tr>
<tr>
<td>Rq4</td>
<td>X</td>
</tr>
</tbody>
</table>

Table 3: Table demonstrates Case study 1 and the numbers of respondents and data collection occasions.

<table>
<thead>
<tr>
<th>Study 1 Case study 1</th>
<th>No of resp.</th>
<th>Total no of open ended verbal questions</th>
<th>Total no of audit statements</th>
<th>Total no of open ended written questions</th>
<th>Total no of workshops</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper I</td>
<td>21</td>
<td>840</td>
<td>840</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Paper II</td>
<td>18</td>
<td>-</td>
<td>-</td>
<td>1170</td>
<td>12</td>
</tr>
</tbody>
</table>

Table 4: Table demonstrates case studies 2-5 and the numbers of respondents and data collection occasions.

<table>
<thead>
<tr>
<th>Study 2 Case study 2-5</th>
<th>No of resp.</th>
<th>Total no of open ended verbal questions</th>
<th>Total hours of observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper III</td>
<td>4</td>
<td>224</td>
<td>~8</td>
</tr>
</tbody>
</table>

Qualitative methods have been used except for case study 1 for which both quantitative and qualitative methods as documentation, interviews, direct observation, participant-observation were used in accordance with Yin (2009). The data have been analyzed using thematic analysis according to Boyatzis (1998). One way to express thematic analysis is to liken it to translation from one language to another, in this case from qualitative information to more understandable quantitative information. To be able to use thematic analysis, Boyatzis sees the need for a number of underlying competences to recognize patterns, openness, flexibility and knowledge in the specific research area. This kind of competence could be developed to increase the theoretical sensitivity of a researcher, the capacity to recognize what is important, give it meaning and conceptualize the observations. The thematic analysis is performed in four steps; (1) Sensing themes, identifying codable moments (2) Making it reliable, encoding codable moments recognized. (3) Developing codes (4) Interpreting the information according to theories (Boyatzis, 1998).
5 Findings
As mentioned in the introduction, this is the forth paper from a research study conducted at two Swedish SMEs where conclusions from the two cases studies, presented in three different papers, have contributed to answer the RQ within this paper.

Table 5: Table demonstrates conclusions used as data to answer RQ

<table>
<thead>
<tr>
<th>Paper</th>
<th>Author</th>
<th>Conclusions</th>
<th>Contribution to RQ</th>
</tr>
</thead>
</table>
| I     | Karlsson & Johnsson (2010) | - Respondents didn’t understand questions or areas for which the questions were asked.  
- An interview complementary to an audit is a useful tool to obtain a better understanding of the results from the audit.  
- The spontaneous answering scale that was identified from the interviews made it possible to compare individual answers with others and thereby reveal knowledge gaps within the statement areas.  
- The audit indicate if respondents are working in a way that supports innovation rather than to what extent that behaviour is implemented throughout the organization, which suggests that the respondents concerned know what is done but are not participants in that work. E.g. A respondent is able to score an audit statement without being able to describe how the statement is performed (or even what), suggests that the respondent knows what is done but is not part of that work. | Rq1, Rq2 |
| II    | Johnsson & Karlsson (2011) | - Innovation-related knowledge gaps divided in organizational and individual gaps.  
- Individual gaps are characterized by differences between individuals, regardless of what positions these individuals hold, the organizational innovation structure and innovation management.  
- A kind of incubation time of approximately 6 month, from resistance to understanding, appeared in all three teams  
- Many innovation-gaps can be identified and that they seem to have a potential negative impact on innovation performance by fragmenting the innovative capabilities of an organization.  
- Managers with a total innovation perspective could use gap-analysis as an integrated, on-going part of continuous innovation management rather than attempt to identify predefined gaps.  
- A company-specific and continuous gap-analysis could be an effective way | Rq2 |
for total innovation-oriented managers to maintain a holistic focus on balanced innovation. Focus on factors with a critical impact on innovation performance is suggested.

III  Johnsson (2011)

- All respondents gave descriptive answers to all answers, e.g. define innovation and describe how innovation was executed at the company.
- Communication was active and frequently within all departments. Untapped innovation capacity was identified in both job- and private-related situations such as conversations, phone-calls, e-mails and breaks for coffee or lunch, suitable for sharing experience, contacting suppliers/customers/users, networking, searching for opportunities/solutions, constituting a part of a multifunctional innovation network, without negative effects to the overall working-situation.
- Three ways of communication: information in-put (where the participants were informed by another person), information out-put (where the participant took the initiative to inform another person) and “spontaneously” (where conversations begin spontaneously at e.g. coffee breaks).
- Communication via e-mails, conversations and phone-calls were identified in 32% of the 267 documented work-activities, being appropriate as work-activities when searching for e.g. innovative opportunities, suppliers, etcetera according to innovation processes.

Rq1, Rq3, Rq4

Conclusion

Innovation-related knowledge, knowledge gaps, information flow and awareness are important aspects in the forthcoming innovation work of a newly-formed innovation team and its emergence. Innovation knowledge and information flow, in which communication is the key factor (Backström et al, 2011; Cohen and Levinthal, 1990; Hallgren, 2009; Johannessen and Olsen, 2011; Kihlbom, 2005; Lundin and Söderholm, 1995; Wehlan, et al 2011; Zuidema and Kleiner, 1994) enables the continuance of the innovation work but having innovation knowledge and the ability to communicate is not sufficient. The team must also be able to handle innovation-related knowledge gaps (knowledge gap) between members of the innovation team and other employees and to utilize divergences in e.g. competences (Backström and Olson, 2010; Kelly, 2005; Smart et al, 2007; Zuidema and Kleiner, 1994). Innovation-related information flow is also related to awareness and readiness in order to capture opportunities (Billet, 2001; Ellström et al, 2007; Schweder and Sullivan, 1993; Trott, 2012) when they appear as affordances (Norman, 1999). In order to arrange an organization within which an innovation team can exist and perform innovation work, all (organization, innovation team and members) must support the innovation team, where it, in order to improve its skills must practice.
An innovation team is appropriate in an organization using or intending to use a post-industrial work system because such organizations are more mature in their thinking with respect to employees and autonomy (Backström and Olson, 2010; Trott, 2012). Management must also provide the members of an innovation team with time and relevant resources to perform innovation-related work for several reasons; the innovation team needs time to learn to trust each other, to learn from each others knowledge, to mature as a team, to learn and practice innovation management and to study the innovation team’s progress from their work. Management also needs time to become accustomed to the feeling of uncertainty associated with innovation work. Top management must encourage, trust, support and show guidelines for an innovation team, set boundaries but not limitations, and to allow time to the organization to all these innovation work. Management must also exercise patience and view the innovation team as an investment which will require time to give visible results. The management should communicate all information that might be of importance to an innovation team as there may be gaps in highly relevant information. One can keep in mind that the larger the project, the greater the risk of incorrect communication (Johannessen and Olsen, 2011).

The innovation team should be multifunctional as divergence in e.g. skills and knowledge is positive for the dynamic of the team (Backström and Olson, 2010; Kelly, 2005; Smart et al, 2007). Divergence also prevents groupthinking that might be the cause of incorrect decisions too early in a project (Backström and Olson, 2010; Olsson et al, 2010; Isaksen and Ekvall, 2010). Divergences in a network are also positive as they make it easier to find relevant competence when needed (Olsson et al, 2010). Convergence is driven by the interest of the members in uniting as a team, in learning from each other and in exchanging knowledge and information according to Lubaktin et al (2001). As a team matures over time in accordance with the process of convergence and divergence, the members will reach a phase of interdependence in which they really benefit from each other’s knowledge, but there’s also a challenge to contain the divergences in the team to avoid groupthinking. A similar phenomena called reciprocal learning might appear, i.e. the members sharing knowledge without intending to take advantage of the others knowledge. Reciprocal learning is usually associated with two or more organizations beginning a joint venture (Lubaktin et al, 2001), but I see the individuals in a newly-formed innovation team as being in a similar situation. The process begins when the members learn to trust each other and then learn to learn from each other. If the members reach this latter phase they can create completely new knowledge.

The members of an innovation team should participate willingly for the team to function satisfactorily (Nerkar et al, 1996; Hallgren, 2009; Hoegl et al, 2003; Xu et al, 2006). In forming a team, preferable a maximum of six persons (Dew and Hearn, 2009), key persons in their departments should be selected, starting from a convener or innovation coach who can share leadership with the team as it mature. It is also important to choose members with the right personality. They should be committed, positive to new influences and new knowledge, and enjoy working together in a team. One person who does not fulfill these criteria can have a negative effect on the work of the entire team (LePine et al, 2011) This research shows that the participating innovation teams’ innovation knowledge needs improvement before conscious innovation work can be conducted where training and learning is an important factor for successful results. The ability to achieve innovation readiness (Ellström, 2007) in order to detect affordances needs some practice, where affordances appear in the information flow when people are aware of what is happening and have the ability to interpret the situation from an innovation point of view (Norman, 1999). The information flow continues, partly within the organization, partly outside the organization, partly during working hours and partly during non-working hours. This means that affordances might appear anywhere as e.g. at a workplace, in the supermarket while shopping, in contact with a supplier or at a meeting with the innovation team. I believe management by its innovation strategy can influence the mind of the members’ in an innovation team to consciously and unconsciously search for affordances.
Figure 3: Innovation Team Model. The figure demonstrates how an innovation team is related to its members and innovation aspects in different situations.

A description of the Innovation Team Model (ITM) above would be: The innovation team is at the center but would not exist without employees wishing to participate and the team’s survival depends on the progress of the convergence-divergence process as the team matures. The members of the innovation team develop rules applicable within the team, each finding a suitable working method. As the members’ knowledge of innovation knowledge increases, they can begin gathering and spreading information in their daily work, at their workplaces or in other environments. In time, they can acquire sufficient innovation knowledge to be able to develop readiness capabilities and observe affordance in different situations. The readiness may include the ability to detect affordance for which another member of the innovation team has stimulated or asked for, or as cognition stimuli when a member adopts the idea of another to develop a new idea.
6. Contribution
This research contributes on the prior research of innovation teams. A deeper understanding of newly formed innovation teams before innovation work is begun is provided and a model (ITM) describing the conditions regarding innovation aspects is suggested. The case studies conducted provide a holistic picture where one can see that a newly formed innovation team is in a very complicated situation, and relates not only to the individual members, but also to the team, its context and network within and outside the organization. One conclusion made from this research, not being expressed clear enough in prior research, is that one cannot expect a newly formed team to manage innovation before it has emerged into an innovation team and developed innovation related knowledge, learned to utilize from innovation related knowledge gaps and information flow, and being able to be aware of innovation related opportunities.

Future research is suggested on creating and studying the emergence the newly formed innovation teams. In doing so, guidelines to start up the innovation team could be developed and the ITM used to describe its current and forthcoming situation, which could be adjusted according to new knowledge.

7. Practical implications
Suggestions, suitable for both established companies or consultants, to practical implication of this research is when planning and starting up new innovation teams, helping it to understand the complexity of team dynamics and the connection between top management and innovation team members. Positive output might be a first step towards (an even more) sustainable innovation system and innovative organization.

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