Cross-industry innovation: Why should a marine biologist cooperate with a chemical company in an innovation project?

This chapter exhibits distinct motivational factors with respect to participating in cross-industry innovation and particularly in cross-industry innovation workshops. It explains why external experts of more or less distant fields or industries contribute in innovation projects which go beyond their own industry boundaries.

Introduction

In order to foster cross-industry innovation, it is crucial to integrate experts of distant industries and diverse backgrounds who contribute in the generation of novel, radical ideas and innovations (Enkel and Gassmann, 2010). The experts’ reasons to participate are likely to differ from those of customers, suppliers and online contributors who often contribute in open innovation activities. Although literature already reveals motivational factors for the latter group of contributors (Franke and Shah, 2003; Jeppessen and Frederiksen, 2006), the motivational factors for participating in cross-industry innovation activities have not been covered, yet. Why do or why don’t experts from analogous industries participate in cross-industry innovation efforts?

Theoretical concept

Ajzen’s (1991) theory of planned behavior is applied in order to analyze the motivation and subsequent behavior of cross-industry experts. As this theoretical and empirically tested framework has not yet been applied to innovation management in the fuzzy front-end, it shall help to understand why external experts are motivated to participate in ideas workshops across industry boundaries. As a result, their attitudes, subjective norms and perceived behavioral control regarding cross-industry innovation are targeted to predict their behavioral intention and final commitment or denial.

The three predictors are adapted towards cross-industry innovation in a way that characteristics like cognitive distance (Nootenboom et al., 2007), strategic intent (Gassmann and Zeschky, 2008) and analogical thinking (Kalogerakis et al., 2010) are considered. The attitudes regarding cross-industry innovation are either positive or negative and relate to an expert’s experiences with previous projects across industry or field boundaries. The subjective norms refer to what third parties (e.g. the top management or the direct supervisor) think about an expert’s participation in cross-industry innovation projects. The perceived behavioral control regards an expert’s self-efficacy with respect to his or her capabilities to abstract and create analogies. Additionally, an expert’s perceived probability of coming up with solutions for a problem in a distant field or industry is considered.

In a next step, these three predictors are regressed on the experts’ behavioral intention regarding cross-industry innovation as well as on the experts’ final commitment or denial concerning the cross-industry innovation workshops, arranged by the chemical company (see Figure 1).

Method and analysis

By arranging a series of cross-industry innovation workshops with a leading chemical company, expert-related data of diverse fields such as biotechnology, chemistry, oceanography, nutrition technology, bionics and renewable primary products could be collected. Then, these data could be used to approach the existing research gap. Before participating in the workshops, the experts were interviewed on the telephone with respect to their attitudes, subjective norms and their perceived behavioral control regarding cross-industry innovation. Both scientific and business experts who finally joined and who did not join in
the cross-industry workshops were embraced in the sample.

In total, 52 potential experts were identified and called. Since only 35 experts volunteered for an interview, we achieved a response rate of 67.3%. In order to also perform statistical analyses with the interview data, an integrated qualitative-quantitative research design was applied (Srnka and Koeszegi, 2007). Three researchers autonomously coded the experts’ hermeneutic answers into numbers before consolidating the coded results. The three predictors, namely attitudes, subjective norms and perceived behavioral control regarding cross-industry innovation, were created from the arithmetic means of the suitable items’ sums. Within the specific predictors all items were weighted equally. We selected this approach to diminish the amount of free parameters in the structural model (Bagozzi and Yi, 1988).

Structural equation modeling was used for the statistical analyses demonstrating an excellent fit according to established fit measures ($\chi^2$/df = 1.054; CFI = 0.998; RMSEA = 0.040; SRMR = 0.0233). Furthermore, both convergent and discriminant validity could be proven. Additionally, the experts’ hermeneutic answers were analyzed in detail (Mayring, 2002) to derive specific motivational factors and to exploit all advantages of this mixed methods approach.

**Results and implications**

Based on the external experts’ attitudes, subjective norms and perceived behavioral control regarding such a cross-industry innovation approach, the intention and the behavior can be predicted with a high degree of accuracy (see Figure 1). In particular, the variable perceived behavioral control verifies a significant influence ($\beta=0.350; \rho<0.05$) on the experts’ behavioral intention of participating in the cross-industry innovation workshop.

One major motivation of participating in cross-industry innovation activities might result from the

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**Figure 1: Structural equation modeling results**

<table>
<thead>
<tr>
<th>Attitude towards cross-industry innovation</th>
<th>Subjective norm regarding cross-industry innovation</th>
<th>Intention of participating in cross-industry innovation</th>
<th>Participation in cross-industry innovation</th>
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<tr>
<td>[Diagram showing the relationships and coefficients]</td>
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**Overall model fit:** $\chi^2$/df = 1.054; CFI = 0.998; RMSEA = 0.040; SRMR = 0.0233.

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$; n.s. = not significant
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experts’ individual qualification assessment and the self-efficacy considering their own capabilities and competences across fields. Despite Ajzen’s (1991) theory, the perceived behavioral control does not show a significant effect on the final behavior. In this context, we learnt from the expert interviews that the firm’s strict non-disclosure agreement led to some denials, although the experts felt highly self-confident with respect to their cross-industry thinking.

The predictor perceived behavioral control seems to even have a stronger impact than the attitudinal factors regarding cross-industry innovation ($\beta=0.280; \rho<0.1$). Due to the fact that scientific experts and particularly university professors work independently and do not have supervisors, the subjective norms regarding cross-industry innovation hardly play a role. This led to a non-significant result with respect to this relationship. By having focused on business experts only, this relationship might have shown a different result. Furthermore, our findings demonstrate that the experts’ first behavioral intention towards cross-industry innovation has a significant influence on the final commitment in such workshops ($\beta=0.902; \rho<0.01$).

We contribute to theory and practice, as this empirical research verifies Ajzen’s (1991) framework in a new context. In addition, it delivers new insights in the field of cross-industry innovation. Furthermore, our results support firms in effectively finding qualified and motivated external experts for such innovation activities. This might result in a higher quality of generated workshop ideas.

At a glance – Summary

| Positive experiences with projects across fields or industries have a significant influence on the participation in a cross-industry format. |
| An expert’s self-efficacy in his or her capabilities to abstract a problem and to create analogies has a strong influence on the behavioral intention regarding cross-industry innovation. |
| External experts might also be motivated through potential networking and learning effects in distant fields which can be useful for future projects. |
| Subjective norms towards cross-industry innovation might become an important motivational factor with respect to business experts, but not for scientific experts (e.g. university professors). |

Your contact person for cross-industry workshops

Karoline Bader, MA
Doctoral candidate
Tel. +49 7541 6009-1285
Email: karoline.bader@zu.de

Further readings