Early Supplier Integration: Assessing Supplier Innovation Ideas

Abstract—For this paper, a benchmarking analysis was conducted to determine best practices for the evaluation and selection of supplier innovations as part of the purchasing process. All of the case companies analyze the quality of an innovation, but they do not evaluate the supplier proposing the innovation. To further develop these results, a World Cafe workshop was conducted. Two operationally usable checklists were developed to evaluate the characteristics and qualities of both the innovation and the supplier proposing the innovation. Both checklists can be combined into one evaluation-scoring model for supplier innovations. This process helps avoid wasting time attempting to implement “good” ideas from “bad” suppliers or discarding “bad” ideas from “good” suppliers that may still have potential for further development.

Key words: Innovation assessment, new product development, procurement, purchasing, supplier innovation

INTRODUCTION: THE NEED FOR A COMPREHENSIVE EVALUATION OF IDEAS AND THE COMPANIES PROPOSING THEM

Supplier involvement in new product development (NPD) is closely tied to NPD project performance (Dekkers, Chang and Kreutzfeldt, 2013). Early supplier integration increases buying company innovation and innovation project success (Koufteros, Cheng and Lai, 2007; Un, Cuervo-Cazurra and Asakawa, 2010). In many industries, the majority of new patents are registered by suppliers (Schiele, Calvi and Gibbert, 2012).

Supplier innovation may also imply a high level of dependence of a buying company on its innovative supplier. This situation represents a potential risk for a buying company. There is also the risk of supplier incompetence in project execution, sometimes rising to the level of project obstruction (Hartley, Zirger and Kamath, 1997; Primo and Amundson, 2002; Zsidisin and Smith, 2005). The worst-case scenario for a buying company would be supplier resource dependence for its innovation capacity and a denial of access to these resources (Schiele and Vos, 2015).

For organizations, it is important to choose both the “right” innovations, those that ultimately become commercially successful, and the “right” suppliers, those that offer proper project execution.

When there are inter-organizational innovations, there is a need to go beyond merely assessing the proposed idea or innovation quality. There is also a need to determine how buyers can assess the quality of the supplier proposing innovation ideas. Specifically, one core issue is ensuring that a supplier will perform well on a NPD project for successful innovation project completion.

Innovation assessment models, both in theory and in practice, tend to focus on analyzing the potential of an innovative idea (Cooper and Kleinschmidt, 1987; Hartschen, Scherer and Brügger, 2009; Heesen, 2009; etc.). This may have been sufficient in times of closed...
innovation, when most ideas originated in the firm’s own research and development (R&D) laboratories. Then, it would not have made sense to verify whether the firm itself would have sufficient financial capacity to survive the implementation of an idea, and it was also not necessary to check whether the innovation would garner enough attention within the company or whether the R&D laboratory would start to work for other customers. For open innovation and joint innovation, innovation assessment tools and practices that are twenty years old or more and focus only on the market and technical potential of the innovation may be outdated. This lack of currency is especially true when it comes to innovative ideas originating outside the company. These tools and practices do not reflect the importance of supplier involvement as a new NPD reality. Hence, a simple and manageable tool to assess a supplier’s likelihood of success in realizing a proposed idea can prove invaluable to innovation, technology and project managers.

This paper presents an attempt to develop such a model. After a brief introduction to some background theory, two practical efforts are introduced: the first is a benchmarking study to identify potential management tools existing within the industry. Then, using the World Café development process (see box “Design World Café as a method” below), a developed supplier assessment tool is presented and discussed. The major managerial issues and lessons associated with the model and its application are also presented.

As a first implication, two operationally usable checklists are developed to evaluate an external innovation on the one hand and the innovative supplier on the other hand. The second insight is the integration of the two checklists into one scoring model; evaluating a supplier innovation from two dimensions— from an innovation criteria side and a supplier side. Additionally, the results reveal two innovation-supplier constellations, which, to date, have been blind spots. How should “bad” innovations from “good” suppliers or “good” innovations from “bad” suppliers be treated?

**Dependence on Supplier Innovation**

Innovations are defined as “new solutions” in products, technology, processes and marketing, representing one way by which organizations gain competitive advantages. There are several NPD and innovation management approaches to develop and handle company innovations. Typically, sequential multistep processes are used to select and implement innovations. For instance, a conventional NPD process may occur through idea generation, idea screening, innovation development, testing, and new product launch (Williams and McGuire, 2010).

Companies rely heavily on innovations from and developed with their suppliers (Dekkers et al., 2013). Supplier cooperation is crucial (Schiele, 2010); it provides within the NPD process a variety of benefits, e.g., a shorter time to market, higher product quality, lower project costs, and higher speed of production (Primo and Amundson, 2002). Buying companies also compete for suppliers with superior innovation power or with exclusive access to radical innovations. A large majority of radical innovations come from a minority of firms (O’Connor, Ravichandran and Robeson, 2008; Sorescu, Chandy and Prabhu, 2003), which leads to competition for the best suppliers and growing supplier dependence. If companies want to gain access to the most promising innovations, they must compete against other buying companies to receive preferred customer status from innovative suppliers (Schiele, 2012). Preferred customer status influences supplier behavioral intentions to the extent that suppliers reward selected customers with more favorable treatment (Hüttinger, Schiele and Veldman, 2012).

Greater supplier dependence, caused by early supplier integration into the NPD process, carries great risks for buying companies. Some suppliers, for instance, may not collaborate in the expected manner. Some organizations seem to have only a limited understanding of how to include suppliers in NPD (Lakemond, Berggren and Weele, 2006). Studies show the possibility that early supplier integration will not necessarily lead to performance improvement (Eisenhardt and Tabrizi, 1995; Hartley et al., 1997; Swink, 1999) or will even result in a negative business impact for the buying company (Littler, Leverick and Wilson, 1993). The exploration of this phenomenon reveals that not only do “bad” innovations fail but also a certain number of “good” innovations fail due to poor supplier innovation execution performance on a particular development project.

**A Benchmarking Study: Predominance of Gut Feeling and Neglect of Supplier Evaluation**

In our research, to evaluate the existing best practices in the evaluation of supplier innovations, two research methodologies were combined: a benchmarking analysis and a World Café workshop. Benchmarking is defined as the search for best practices in a certain field or in relation to a specific topic, the implementation of which will assist in the goal of achieving superior performance (Camp, 1989).
The aim of our benchmarking study was to identify the best practices for clustering, evaluating, and selecting supplier innovations. However, we did not find any existing best practices; therefore, we needed to conduct a workshop to develop the requested tool.

Sixteen companies participated in the benchmarking (out of 73 companies invited). The participants were experts from various leading companies located in Germany. The goal was to devise a participant setup that was as diverse as possible. Therefore, companies with different sizes and from different business sectors were selected. Eight extremely large companies were selected because they are well-known global players, and eight smaller ones were selected because of their extraordinary innovation power. The company representatives were either purchasing managers, innovation managers, or NPD process managers.

All benchmarking participants were interviewed, using a detailed questionnaire, on how they conduct innovation evaluation and selection within their companies. The benchmarking results are summarized in Figure 1.

The benchmarking firms expressed that no easy-to-apply tool was available. Remarkably, the results also showed that none of the case companies assessed the supplier from which the innovation originated. These results also confirmed the findings from a literature review.

Failing to specifically assess the supplier that proposes an innovation may, to some extent, explain reports of supplier obstructionism and the high failure rate of supplier-induced innovations. It may often be the case that it would not have made sense to try to develop an innovation with a particular supplier because that supplier did not have sufficient resources to contribute or did not apply them; in such circumstances, failure is almost certain.

Hence, it is important to determine which suppliers could cause problems and which are likely to be more reliable.

**DESIGN WORLD CAFÉ: DEVELOPING A TOOL TO ASSESS BOTH THE INNOVATION AND THE SUPPLIER**

Neither the literature nor the benchmark companies offered easy-to-use tools to assess the quality of a proposed idea and the likelihood that the supplier originating the idea would have the capacity to realize it. Thus, another round of research was completed to design such a tool. A variant of the World Café method, a two-round Design World Café, was used for tool development.

Altogether, 15 participants from 12 companies took part; seven of them had already participated on behalf of their companies in the benchmarking, and eight were newly recruited to complete and balance the sample. This combination was chosen to include participants who were involved in the creation of the base data and participants who could provide new information.
The participants were selected according to their expertise in the areas of innovation management, NPD, and purchasing. The World Café had four tables, but for exemplary purposes, we report the results of only two of them. These two tables focused on (a) how to assess the quality of an innovation and (b) how to assess the likelihood that the supplier proposing this innovation would be likely to perform well in its further development and implementation.

Box: Design World Café as a method

The World Café was created by Brown and Isaacs (Brown and Isaacs, 2005) and can be regarded as a specialized form of the conventional focus-group approach (Brennan and Ritch, 2010). It is a user-friendly method with the following characteristics. The participants divide themselves into small groups that come together at different tables. At each desk, one particular aspect of the research problem is discussed with the help of a moderator, who hosts the debate (Hüttinger, Schiele and Schröer, 2014). After a predefined period of time (usually 20–45 minutes during all rounds), the participants are requested to change tables. They can freely choose the table for the next round but may not return to any table at which they have already participated. Consequently, each discussion round brings together a new group in a new constellation. At the beginning of each round, the moderator summarizes the previous discussion points. This process is repeated until each participant has contributed to every discussion topic (Hüttinger et al., 2014). At the end, each moderator summarizes the results of their table and presents them to the plenum. In our design, the final step is an evaluation round in which the participants walk around and review the lists of results on each table. They rate the aspects on each table with the help of “stickers.” In doing so, a ranking of the aspects emerges on each table. The more stickers that one aspect receives, the more important it is in the eyes of the participants.

In this study, the standard World Café method was expanded by combining two small World Cafés. In World Café 1, each moderator at each table showed part of the consolidated results of the benchmarking referring to the topic of his table. The participants at tables 1 and 2 received the results of the clustering and evaluation methods used from the benchmarking (Figure. 1). In the following four short World Café rounds, the participants discussed the benchmarking findings and had the chance to add new aspects and arguments. At the end of World Café 1, the evaluation round occurred. Each of the 15 participants received 20 stickers (5 for each table) to rate the aspects that were the most important from their perspective. After analyzing the sticker rating, the moderators took the most highly rated aspects to work on in World Café 2. The task in World Café 2 was to focus on the top five rated aspects from World Café 1, to further expand them by forming subcriteria and to create operational models that could be used to evaluate supplier innovations. The structure of the entire World Café workshop is shown in Figure. 2.

RESULTS: CHECKLISTS TO ASSESS INNOVATION AND SUPPLIER QUALITY

The participants at table 1 worked on the five main aspects of innovation evaluation, which were identified in World Café 1: “market potential,” “influence on the existing business model,” “market/customer acceptance,” “cost-benefit analysis,” and “proof of concept.” To make a potential evaluation following these

### World Café 1

<table>
<thead>
<tr>
<th>Round</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30 min</td>
</tr>
<tr>
<td>2</td>
<td>15 min</td>
</tr>
<tr>
<td>3</td>
<td>10 min</td>
</tr>
<tr>
<td>4</td>
<td>10 min</td>
</tr>
</tbody>
</table>

**Rating:** After round 4 all flipcharts are shown and presented to the participants. The participants perform the evaluation with the help of stickers (30 min). 20 stickers per expert (5 stickers per topic).

### World Café 2

<table>
<thead>
<tr>
<th>Round</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>40 min</td>
</tr>
<tr>
<td>2</td>
<td>20 min</td>
</tr>
<tr>
<td>3</td>
<td>10 min</td>
</tr>
<tr>
<td>4</td>
<td>10 min</td>
</tr>
</tbody>
</table>

**Summary**

Each moderator summarizes the results of his table (5 min each = 20 min)

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Figure 2. Setup of the World Café workshop.
criteria more user-friendly, over the four working rounds of World Café 2, the participants created a checklist and formulated and clarified examples for weak or strong scores for each subcriterion (all results are summarized in Figure 3). The criterion “market potential,” for example, evaluates the “market situation” (which forecasts whether the innovation only secures the current market share or whether it creates a new monopoly) and the level of “differentiation” from the competition.

At table 2, the participants also worked in World Café 2 on the five aspects that achieved the highest scores in World Café 1. The five highest rated criteria for supplier evaluation for World Café 1 were the following: “employees of the supplier,” “creative potential,” “endurance,” “exclusivity,” and “other customers of the supplier.” In the four working rounds of World Café 2, the participants merged two criteria, “exclusivity” and “other customers of the supplier,” into one new aspect, “preferential treatment.” In addition, they formed subcriteria and examples for weak and strong scorings, which was precisely the same procedure performed at table 1. All results for table 2 are shown in Figure 4.

Figure 4 reveals the following: one way to identify “bad” suppliers is to analyze the quality of their personnel. For instance, the turnover rate is evaluated. If a supplier has a high and constant rate of employee turnover, few scoring points are awarded; on the other hand, if the rate is lower than 2%, a high score is awarded. Then, the visibility of the supplier’s personnel is assessed in a similar way, and so on. The result is a summarized score for the supplier.

As a result, using these two checklists, a double scoring model for the evaluation of supplier innovations is achieved that evaluates the innovative idea and the supplier providing it (Figure 5).

The weights for each criterion were derived from the expert ratings according to World Café 1. Further research may quantify the approach and generate more generalizable scores. For the moment, we suggest that each user may use this initial experience or define the weighting criteria according to their individual situation.

The model allows the comparison of innovations and the selection of innovations with the highest chance of being implemented. As opposed to conventional models, the criteria set for innovation scoring are more sophisticated than the traditional “gut feeling” and—importantly—are the first to fully integrate the second dimension, namely, the quality of the supplier.

**DISCUSSION AND CONCLUSION: THE INNOVATION—SUPPLIER EVALUATION MATRIX**

This paper presents insights from a benchmarking study and from a Design World Café workshop. The results revealed the lack of an easily applicable tool to assess not only the quality of a proposed innovation but also the quality of the supplier that
proposed the idea. Since no suggestions for the latter could be identified, we designed such a tool by a joint effort in a workshop.

The benefit of the new approach developed here, differentiating between the quality of the idea and the quality of the supplier proposing it, is that previously overlooked causes of failure can be identified. For example, a promising idea should nevertheless be developed because the involved supplier is too “bad” (situation 3 in the matrix below). Alternatively, we can identify those ideas that might need improvement but are worth exploring because even though the current quality of the idea might be precarious, the supplier is very “good”; thus, there may still be a chance to achieve innovative results (situation 2).

As visualized in the matrix (Figure 6), there are four potential result combinations: a “bad” innovation from a “bad” supplier (1); a “bad” innovation from a “good” supplier (2); a “good” innovation from a “bad” supplier (3); and a “good” innovation from a “good” supplier (4).

The matrix can be helpful in deciding on a “go/no-go” decision on supplier innovations. Quite obvious conclusions are that category (1) should be declined, and the innovations from category (4) should be launched. However, the category (2) and (3) innovations are less clear. A common mistake is that the innovations in category (3) are implemented. Although they are rated “good,” these innovations fail because of the poor project performance of the “bad” supplier. Perhaps better alternatives would be

<table>
<thead>
<tr>
<th>World Café 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion of the benchmarking findings, addition of new aspects and definition of Top Criteria (through “slicker” rating)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Subcriteria</th>
<th>Example of weak score</th>
<th>Example of strong score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employees of the supplier</td>
<td>Fluctuation</td>
<td>Constant employee turnover</td>
<td>Less than 2% fluctuation</td>
</tr>
<tr>
<td>Transparency</td>
<td>No visibility of the personnel of the supplier</td>
<td>Entire team with CVs is known and is the “A-team” of the supplier</td>
<td></td>
</tr>
<tr>
<td>Cross-functionality</td>
<td>Only sales personnel visible</td>
<td>On the supplier team multiple functions collaborate well with each other</td>
<td></td>
</tr>
<tr>
<td>Quality of ideas</td>
<td>Single idea, narrow view, as understanding of embeddedness</td>
<td>Several business model changing ideas embedded in a global view, understanding the market</td>
<td></td>
</tr>
<tr>
<td>Professionalism within the innovation management</td>
<td>Spontaneous idea management only</td>
<td>Well documented professional innovation management (processes, KPIs, gates)</td>
<td></td>
</tr>
<tr>
<td>Implementation</td>
<td>Few innovations actually implemented, late cessation of unsuccessful projects</td>
<td>High ratio of ideas presented and implemented, quick abort mechanisms</td>
<td></td>
</tr>
<tr>
<td>Endurance</td>
<td>Financial</td>
<td>Unstable financial condition</td>
<td>Good solvency; equity ratio available</td>
</tr>
<tr>
<td>Stability</td>
<td>Risk sharing</td>
<td>Wants to transfer full risk to customer</td>
<td>Willing to share risks (e.g., carries development costs amortized through future sales)</td>
</tr>
<tr>
<td>References</td>
<td>No references</td>
<td>Many good references in the industry and part of the network</td>
<td></td>
</tr>
<tr>
<td>Preferential treatment</td>
<td>Exclusivity</td>
<td>Idea offered to all other customers in the same way</td>
<td>Exclusivity access to idea for defined time, offered first to us</td>
</tr>
<tr>
<td>Ideas proposed</td>
<td>Ideas offered elsewhere first</td>
<td>Supplier offers many good ideas to us first</td>
<td></td>
</tr>
<tr>
<td>Other relations</td>
<td>No business with us</td>
<td>Many other business relationships with us, that the supplier may not want to put at risk</td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>World Café 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>The participants were asked to further detail the main aspects and to conduct an operational model or a tool to use in operative innovation management.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Innovation Evaluation</th>
<th>Criterion</th>
<th>Subcriterion</th>
<th>Weight</th>
<th>Innovation A (score: weight)</th>
<th>Innovation B (score: weight)</th>
<th>Supplier Evaluation</th>
<th>Criterium</th>
<th>Weight</th>
<th>Innovation A (score: weight)</th>
<th>Innovation B (score: weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market potential (cost / benefit)</td>
<td>Market situation</td>
<td>0.18</td>
<td>Score A * 0.18, B * 0.18</td>
<td>Score A * 0.18, B * 0.18</td>
<td>Employees of the supplier</td>
<td>0.24</td>
<td>Score A * 0.24, B * 0.24</td>
<td>Score A * 0.24, B * 0.24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Influence on business model (external)</td>
<td>Enduring the current business</td>
<td>0.42</td>
<td>Score A * 0.42, B * 0.42</td>
<td>Score A * 0.42, B * 0.42</td>
<td>Creative potential</td>
<td>0.19</td>
<td>Score A * 0.19, B * 0.19</td>
<td>Score A * 0.19, B * 0.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market acceptance</td>
<td>Customer service</td>
<td>0.09</td>
<td>Score A * 0.09, B * 0.09</td>
<td>Score A * 0.09, B * 0.09</td>
<td>Endurance</td>
<td>0.17</td>
<td>Score A * 0.17, B * 0.17</td>
<td>Score A * 0.17, B * 0.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost / benefit analysis</td>
<td>Cost / benefit ratio</td>
<td>0.09</td>
<td>Score A * 0.09, B * 0.09</td>
<td>Score A * 0.09, B * 0.09</td>
<td>Endurance</td>
<td>0.09</td>
<td>Score A * 0.09, B * 0.09</td>
<td>Score A * 0.09, B * 0.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proof of concept</td>
<td>General availability</td>
<td>0.08</td>
<td>Score A * 0.08, B * 0.08</td>
<td>Score A * 0.08, B * 0.08</td>
<td>Supplier Score</td>
<td>Sum A</td>
<td>Sum B</td>
<td>Sum A + B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovation Score</td>
<td>Sun IA</td>
<td>Sun IB</td>
<td>Overall Score = Innovation Score + Supplier Score</td>
<td>Sun IA + Sun IB</td>
<td>Sun A + Sun B</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Figure 4. Criteria for the evaluation of the innovating supplier (results from table 2 of the World Café).

Figure 5. Scoring model for the supplier innovation evaluation.
to further develop the supplier, to buy the intellectual property of the idea, or to execute the idea with another supplier that is rated “good.”

An example for the latter type could be the development of a highly innovative automotive cockpit device. This idea originated with a small firm identified by their Silicon Valley innovation of a firm. However, that firm was too limited to bring the technology to serial maturity, let alone to produce 200,000 pieces. Hence, it was pooled together with an established first-tier automotive supplier and successfully marketed in the end.

It is worth noting that the analysis of the supplier’s prospects is important both with the growing number of start-ups offering innovations—then with the underlying question of whether they will survive—and with incumbents. With the latter, questions often arise regarding being a preferred customer, thus ensuring that the common project receives sufficient attention and resources, or being simply a standard customer (Hüttinger et al., 2012). A mismatch of dedication to a joint innovation project has often been found to be a root cause of supplier innovation implementation failure.

In conclusion, this paper provides managers insights in the following ways:

1) Although the majority of innovations are currently provided by suppliers, current innovation evaluation models largely neglect supplier-specific aspects. By developing and adding a supplier-evaluation dimension, this paper provides managers insights for innovation evaluation models.

2) Two operationally usable checklists for managers are presented. One evaluates the external innovation itself, and the other evaluates the supplier providing the innovation. These checklists can be combined into one scoring model that evaluates a supplier innovation from two sides—the innovation criteria side and the supplier side.

3) Using the scoring model, managers can form a matrix with four categories. Two previously questionable “go/no-go” categories (matrix fields (2) and (3)) require greater scrutiny by managers. The question is how to proceed with these two categories in the future? If a “bad” innovation from a “good” supplier is spotted (category (2)), it perhaps makes sense to either further develop the “bad” innovation with the “good” supplier (because only the “good” supplier has the capability to enhance it) or to discard the “bad” innovation and perhaps start another project collaboration with the “good” supplier to execute another innovation project. Viewing matrix category (3), a common mistake seems to be implementing “good” innovations from “bad” suppliers. Although the concepts are rated “good,” they fail because of the poor project performance of the “bad” supplier. Therefore, it would be useful to try to further push this “good” innovation together with a different supplier that has also a “good” rating.

In addition to the results discussed above, there are some managerial concerns:

The benchmarking was performed with only 16 case companies, which is a small sample size. Managers could go through the process we developed here for their organizations and suppliers to confirm our metrics and dimensions or develop unique ones.

The benchmarking and the World Café workshop were conducted with companies from one country only; thus, the results may not be generalizable to companies from other countries or continents. Once again, this affirms the need to determine whether these results are applicable to your organization and supply chain environment.

The tools developed here are very general; thus, it would be useful to apply other methodologies. For example, a quantitative analysis.
to check and verify these results (especially the subdimensions of the innovation scale) may be required. If you decide to utilize this tool for your company and situation, we would definitely like to receive feedback about any execution performance. We also recommend that organizations and managers be creative with the methodology and tools that we present in this paper.

REFERENCES


