

A Taxonomy of Web-Based Inbound Open Innovation Initiatives

Frederik von Briel

City University of Hong Kong, Kowloon, Hong Kong, fvonbriel2@student.cityu.edu.hk

Christoph Schneider

City University of Hong Kong, Kowloon, Hong Kong, christoph.schneider@cityu.edu.hk

Follow this and additional works at: <http://aisel.aisnet.org/amcis2012>

Recommended Citation

von Briel, Frederik and Schneider, Christoph, "A Taxonomy of Web-Based Inbound Open Innovation Initiatives" (2012). *AMCIS 2012 Proceedings*. 21.

<http://aisel.aisnet.org/amcis2012/proceedings/VirtualCommunities/21>

This material is brought to you by the Americas Conference on Information Systems (AMCIS) at AIS Electronic Library (AISEL). It has been accepted for inclusion in AMCIS 2012 Proceedings by an authorized administrator of AIS Electronic Library (AISEL). For more information, please contact elibrary@aisnet.org.

A Taxonomy of Web-Based Inbound Open Innovation Initiatives

Frederik von Briel

City University of Hong Kong
fvonbriel2@student.cityu.edu.hk

Christoph Schneider

City University of Hong Kong
christoph.schneider@cityu.edu.hk

ABSTRACT

The term “open innovation” describes the opening of innovation processes of organizations to include external knowledge as well as external paths to market. Various concepts are grouped under the umbrella term “open innovation,” and topics such as crowdsourcing are increasingly receiving attention from researchers as well as practitioners. Unfortunately, the broad coverage and the fact that research on open innovation is a relative young research area also led to a very fragmented usage of the term. In this paper, we seek to contribute to the clarification of the term open innovation, and develop a taxonomy of web-based inbound open innovation initiatives from an organizational perspective. Based on a literature review and the examination of 49 examples we develop a taxonomy consisting of the dimensions process phase, outcome focus, group of participants, knowledge visibility, and facilitation.

KEYWORDS

Open innovation, classification, taxonomy

INTRODUCTION

In today’s highly competitive environment, organizations have to deal with various challenges, including shorter product life cycles, higher demands for customization, and increasing development costs due to rising complexity of technology. In order to handle such challenges, organizations are increasingly trying to leverage collaborations with external partners. Coined by Chesbrough (2003), the term “open innovation” (OI) describes this opening of innovation processes of organizations to include external knowledge as well as external paths to market in their innovation processes, with a focus on the exploitation of technology and knowledge. The basic idea of opening up the innovation process is not new; for example, in 1714, the British government started a problem solving contest that could be classified as OI (Sobel, 2005). Globalization and the evolution of information and communication technologies now enable integrating partners from all over the world into the innovation process by facilitating collaboration with individuals as well as other enterprises. As a result, various business and public sector organizations are implementing OI initiatives.

Although OI seems to receive increasing attention from researchers (Dahlander and Gann, 2010), the term is used in a very fragmented manner (Gassmann, Enkel, and Chesbrough, 2010), partly due to the broad definition of OI. For instance, user innovation, crowdsourcing, or mass customization are concepts that, depending on the context, can be classified as OI. While these concepts show certain overlap, they often substantially differ in their focus, application, and perspective, leading to varying interpretations of the term OI itself (Groen and Linton, 2010).

Another reason for the different understandings of the term is that research on OI is a relatively young area, which lacks a consistent body of knowledge, or a common domain language. Taxonomies¹ can provide a common domain language and can therefore facilitate the growth and sustenance of research areas (e.g. Chakrabarti, 2011). To clarify the term open innovation from an organizational perspective, we develop a taxonomy of web-based² inbound OI initiatives; specifically, we examine 49 initiatives from the perspective of the conducting organizations, with a focus on the participant-facing characteristics. Thus, this taxonomy helps categorize, differentiate, and potentially integrate research in the area of inbound

¹ As taxonomies and typologies provide similar attributes, these terms are frequently used interchangeably (Bailey, 1994).

² The initial point of contact is the internet.

OI³. From an organizational perspective, this taxonomy provides an orientation for identifying and specifying required participant-facing characteristics of OI initiatives.

In the next section, we provide a brief overview of related literature. We then describe the methodology used for developing our taxonomy, before introducing and explaining the resulting taxonomy and discussing the application of our taxonomy in research and practice. We conclude the paper with directions for future research.

RELATED LITERATURE

Since the term “open innovation” was introduced by Chesbrough (2003), research in this area has been conducted from various perspectives. As studies on OI often focus on specific industries or are limited to particular aspects of the innovation model (Gassmann et al., 2010; Vrande, Jong, Vanhaverbeke, and Rochemont, 2009), they do not offer a comprehensive view of OI, and to the best of our knowledge, only few articles seek to address the fragmented usage of the term.

Notably, West and Bogers (2011), Huizingh (2011), and Schweisfurth, Raasch, and Herstatt (2011) provided categorizations and/or literature reviews focusing on different aspects of OI. Further, practitioner-oriented publications by Phillips (2010) and Manceau, Moatti, Fabbri, Kaltenbach, and Bagger-Hansen (2011) attempted to distinguish between different OI initiatives.

Reference	Focus	Categories	Related dimensions	Related characteristics
West and Bogers (2011)	Categorization of inbound OI	Obtaining innovation	Process phase	Idea generation/Conversion
		Integrating innovation		-
		Commercializing innovation		Diffusion
Huizingh (2011)	Content, context dependency and process of OI	Open innovation process	Group of participants	Unrestricted
		Closed innovation process		Restricted
		Open innovation outcome	Knowledge visibility	Visible
		Closed innovation outcome		Hidden
Schweisfurth et al. (2011)	Models of free revealing in OI	Ideation	Process phase	Idea generation
		Development		Conversion
		Production and marketing		Diffusion
		Directed	Outcome focus	Topic-/Target-oriented
Undirected	Totally open			
Phillips (2010)	Idea generation phase of the OI process	Directed instruction	Outcome focus	Topic-/Target-oriented
		Undirected instruction (suggestive)		Totally open
		Invitational (selected participants)	Group of participants	Restricted
		Participative (everyone)		Unrestricted
Manceau et al. (2011)	Impact of OI	Topic-oriented	Outcome focus	Topic-/Target-oriented
		Partner-oriented	Group of participants	Restricted
		Fully open approach	Outcome focus	Totally open
			Group of participants	Unrestricted

Table 1. Summary of related literature

³ User innovation as a particular kind of innovation is also sometimes classified as open innovation; yet, while open innovation focuses on the exploitation of knowledge and technology (Chesbrough, 2003), user innovation focuses on free revealing of innovations through users, treating information as a public good (von Hippel, 2005). In this taxonomy, we include initiatives where users freely reveal information, but explicitly exclude toolkit-based user innovation initiatives (e.g. Piller and Walcher, 2006).

These studies inform our current work by providing a starting point for examining the process phases (e.g., West and Bogers 2011), the openness (e.g., Huizingh 2011), the outcome focus (e.g., Schweisfurth, Raasch, and Herstatt 2011), and the intended audience (e.g. Manceau et al., 2011; Phillips, 2010) of the initiatives. Table 1 provides a summary of the related literature and its relevance to our taxonomy of inbound OI initiatives.

METHODOLOGY

Taxonomies, often used in the natural sciences, are used to enhance the understanding of objects by describing, categorizing, and classifying different objects of interest. In addition to helping understand objects of interest, taxonomies also provide a common domain language. By delivering maximal information with the least cognitive effort and mapping the real world structure as closely as possible, taxonomies can enable the precise and efficient specification of objects of interest (Rosch, 1998). As taxonomies differ based on the perspective (e.g., a dog's structure of the world would differ from a human's structure of a world, since it would include amongst others attributes of smell that humans are not able to perceive), both the intended users and purpose of the categorization determine the level of abstraction and the structure of categories (Rosch, 1998).

Taxonomies have also shown to be useful in disciplines like management science (Miller and Roth, 1994) or information systems (Sabherwal and King, 1995); especially in relative young and immature research areas, which are often highly fragmented, taxonomies that contribute to the clarification and provide the ability to distinguish between different aspects of these areas can support the development of a consistent body of knowledge. For example, Geiger, Seedorf, Schulze, Nickerson, and Schader (2011) developed a taxonomy of crowdsourcing (a relatively young and fragmented area) following the methodology of Nickerson, Varshney, Muntermann, and Isaac (2009); as OI is a similarly young and fragmented area (Gassmann et al., 2010), we also follow the approach of Nickerson et al. (2009) for the development of our taxonomy.

Nickerson et al. (2009) propose a method for developing taxonomies consisting of different dimensions, each with at least two *mutually exclusive and collectively exhaustive* characteristics. Specifically, the authors suggest iterating between examining empirical data and refining the taxonomy to arrive at a conceptual taxonomy that is open for future increments. The aim of this methodology is to generate applicable taxonomies, which are in terms of breadth and depth characterized by both conciseness and adequate complexity.

The starting point for developing the taxonomy is the definition of its so-called meta-characteristics, the most comprehensive characteristics based on the purpose of the taxonomy. In our case, the purpose is to provide researchers and organizations with a tool to classify web-based inbound OI initiatives. The meta-characteristics derived out of this purpose are the participant-facing aspects that can be controlled by the organizations. Using these meta-characteristics as a lens, we reviewed OI-related literature to identify and compare an initial set of general categories; this allowed us to distill distinct characteristics and to carve out comprehensive dimensions, leading to an initial taxonomy. We then compared the dimensions and characteristics of the taxonomy to the literature, and, where needed, made modifications based on the literature and our understanding. Table 1 shows the categories identified through the literature review and their related dimensions and characteristics of the final taxonomy. The next step is to select objects to be classified, in our case a randomly selected sample of 49 publicly accessible web-based inbound OI initiatives conducted by 41 companies (see the Appendix)⁴. We analyzed and compared the objects in terms of their specific characteristics, so as to identify comprehensive and descriptive dimensions with mutually exclusive characteristics within each dimension. Following this step, we reviewed and re-conceptualized the taxonomy (where needed) to identify potential modifications or extensions in order to improve the taxonomy and validate it based on the objects. After this adjustment, we applied the taxonomy by classifying the 49 OI initiatives, evaluated its fit, and went back to conceptualization. We repeated this process until no more modifications could be identified. We also compared subsamples of the classified initiatives from both researchers to ensure the reliability of the characteristics.

TAXONOMY

By applying this methodology, we developed a five-dimensional taxonomy of web-based inbound OI initiatives from an organizational perspective, focusing on the participant-facing characteristics (see Figure 1). At first, an organization has to decide about the *process phase* of the innovation process that it wants to open up. Next, the *outcome focus* has to be determined based on the desired results and the *group of participants* has to be defined. Finally, an organization has to consider the *knowledge visibility* and the kind of *facilitation* of the initiative.

⁴ We differentiate between initiative and organization since one organization can have several initiatives with different characteristics.

In the following we describe three particular cases from our sample, which will serve as illustrative cases in the description of the five dimensions:

1. Home textile manufacturer Franco Manufacturing started an idea crowdsourcing initiative on the *Edison Nation* online platform to brainstorm for new product innovations. The company defined the frame for desired ideas, e.g. by specifying the target costs, and invited everybody to submit ideas through an online form. Inventors of selected ideas were rewarded with 20 years percentage of sales or buyout.
2. Telecommunications giant Ericsson focuses with its *Ericsson Labs* initiative primarily on developers. On its online platform, Ericsson provides application programming interfaces (APIs), related documentation, a community for discussion of the APIs, and the possibility to share resulting applications for testing and to obtain feedback. Everyone can access the platform and APIs to develop own applications, and also test the resulting applications.
3. Computer manufacturer Dell offers people on its *Idea Storm* platform the opportunity to get in touch with the company and to submit innovation related information. A particular initiative on this platform is *Storm Session*, where the company asks open questions about different topics to an open audience. The submitted information is publicly displayed and participants can evaluate and comment on it.

Process phase	Outcome focus	Group of participants	Knowledge Visibility	Facilitation
idea generation	totally open	restricted	visible	self facilitated
conversion	topic oriented	unrestricted	hidden	intermediary platform
diffusion	target oriented			external scout

Figure 1. Dimensions and characteristics of inbound OI initiatives

Process Phase

The first dimension distinguishes possible *process phases* in which the organization can open up its innovation process. The three characteristics identified by us closely mirror the Innovation Value Chain (Hansen and Birkinshaw, 2007), a practitioner-oriented framework that divides innovation processes (on the most abstract level) into idea generation, conversion and diffusion. Despite the fact that OI is limited to the idea generation phase in the original Innovation Value Chain concept, this framework and its segregation of the innovation process has shown to be most suitable for the classification of process phases of OI initiatives. Specifically, we found support for OI initiatives in the following process phases:

- Idea generation: The first phase of the innovation process, in which the organization is searching for new ideas.
- Conversion: The second phase of the innovation process, which includes the selection and development of ideas. In this phase, organizations have to fund the development of selected ideas to turn them into solutions. Since prototypes, specific descriptions for prototypes, licenses, or patents act as direct input for the development, initiatives that request for one of those artifacts are considered as being in the conversion phase.
- Diffusion: The last stage of the innovation process, which deals with the distribution of the solution.

In our examples, the initiative of Franco Manufacturing is classified as being in the *idea generation* phase, since the company is searching for new ideas using brainstorming. In contrast, the initiative of Ericsson, where developed application parts are available (APIs) and prototypes can be tested, is classified as being in the *conversion phase*.

Outcome Focus

The second dimension is the *outcome focus*, where the OI initiatives can be classified based on their desired results. The literature review revealed that research typically distinguishes between directed and undirected approaches. For example, Phillips (2010) uses the term “instructions provided” to categorize initiatives in the idea generation phase, distinguishing between directed (i.e., with instructions) and suggestive (i.e., with no instructions provided). Whereas the directed approach appears to be more relevant to the concrete problems and opportunities of an organization, the undirected approach typically results in a larger quantity of contributions (Phillips, 2010). Similarly, Schweisfurth et al. (2011) categorize development

approaches into directed or undirected, and also highlight the presumably increased alignment to organizational needs of a directed approach; further, Schweisfurth et al. (2011) note that an undirected approach might even lead to a wrong focus of participants, which could lead to suboptimal outcomes. While this two-tier categorization into directed and undirected approaches served as a starting point for the current taxonomy development, we regard three characteristics as more useful and accurate⁵:

- **Totally open:** The company is open for any kind of input.
- **Topic-oriented:** The organization specifies areas of interest, but does not request *specific* solutions.
- **Target-oriented:** The organization states specific problems and requirements for which solutions are demanded.

Franco Manufacturing's initiative clearly states specific solution areas, defines target values like customers or costs, and is therefore classified as *target-oriented*. The initiative of Ericsson on the other hand provides multiple APIs that can be used for various purposes and the company doesn't restrict their usage. The API for geo located messaging for example could be used for the development of games as well as for advertisement apps, therefore the initiative is classified as *totally open*. Finally, Dell's *Storm Session* initiative depicts characteristics of a *topic oriented* approach, since the company asks open questions about specific topics.

Group of Participants

The dimension *group of participants* refers to the openness of an initiative. Following Huizingh (2011), Manceau et al. (2011) and Phillips (2010) we identified two characteristics of openness of OI initiatives:

- **Restricted:** The organization limits participation to selected partners (often explicitly invited by the organization or its intermediaries).
- **Unrestricted:** The organization does not limit participation; rather, everybody who is interested can participate/submit content.

All three of the examples discussed are unrestricted; Dell's *Storm Session* initiative provides a good illustration of this characteristic: Although Dell sometimes indicates a *preferred* audience of participants, everybody who is willing to is invited to participate. As the company does not preselect participants in any manner, the initiative is classified as *unrestricted*.

Knowledge Visibility

The dimension *knowledge visibility* refers to the visibility of the innovative knowledge that is generated or delivered by participants during the initiative. Our literature review showed that the *knowledge visibility* is primarily considered from an intellectual property perspective; it can be distinguished between two characteristics:

- **Visible:** The innovative knowledge is easily and timely accessible by external parties; in such cases, the contributions are publicly accessible, or are accessible after completing a simple registration process (which does not include a selection process).
- **Hidden:** The innovative knowledge is only visible to the organization or selected partners.

Both variants feature different peculiarities that have to be considered by the organization. While it might be beneficial for the organization to make the innovative knowledge *visible*, so as to facilitate collaboration or to benefit from external feedback, it also imposes risks such as the exploitation of the knowledge by competitors.

Dell's *Storm Session* initiative from our examples depicts the *visible* characteristic: submitted information is publicly accessible by everybody on the platform, and the company is making use of evaluation and feedback from other participants. Franco Manufacturing, in contrast, collects submitted ideas in a closed context, where no one except the company (and potentially the platform operator) has access to the submitted ideas; therefore the initiative depicts the *hidden* characteristic.

⁵ It could be argued that topic-oriented and target-oriented depict sub-categories of directed approaches. However, taking the principles of Rosch (1998) as a basis, all three characteristics together act as an increasing specification of the desired outcome and therefore represent a better real world structure in terms of *outcome focus*. Further, given that each characteristic offers sufficient peculiarities to be distinguished from each other, we decided not to aggregate the characteristics at a higher level.

Facilitation

The last dimension is the *facilitation* of the OI initiatives, which solely emerged from the exemplary cases and is not based on literature. We identified three general characteristics of *facilitation*:

- **Self-facilitated:** Initiatives in which the organization either conducts the scouting or provides the platform to collaborate with partners by itself, without the utilization of any intermediaries. This kind of facilitation occurred most frequently in our sample.
- **Intermediary platform:** Initiatives where external platforms act as interface between the organization and the participants of the initiative. Intermediary platforms typically (but not necessarily) focus on particular areas or tasks. The specialization and the resulting concentration of tasks allow intermediary platforms to attract specific audiences as partners for the innovation initiatives.
- **External scout:** Initiatives where external parties conduct the scouting for external knowledge. Given that the task of external scouts is to find and to directly approach potential partners, we were unable to find publicly available examples for the usage of such external scouts. However, the existence of organizations that have specialized on scouting on behalf of other companies (e.g., Idea Connection, IXC UK, or yet2.com) justifies the inclusion of this characteristic.

From the examples introduced earlier, both the initiatives of Dell and Ericsson operate own platforms and are therefore classified as *self-facilitated*. In contrast, Franco Manufacturing uses *Edison Nation* as *intermediary platform* to get in touch with participants.

Target Audience and Incentive

From our review of the literature as well as the examination of our sample, two other important criteria emerged that have to be considered by organizations: *target audience* and *incentive*. The *target audience* (such as other organizations, customers, independent participants, or specific interest groups) determines to a large extent the inputs an initiative receives. As for *incentives*, Schweisfurth et al. (2011) identified three main categories: Financial, technological, and socio-political incentives. Financial incentives, such as rewards for the best ideas or bonuses for participation in successful initiatives, can be used for external as well as internal participants. Technological incentives originate through new products, features, or improvements that add value for the participants and are therefore especially attractive to customers. The last kind of incentives is socio-political incentives, e.g., a higher reputation in a community (similar to open-source software contributors).

As the target audience to a large extent determines the appropriate incentives, companies often use a combination of *incentives* to motivate participants from multiple *target audiences*. Since one of the requirements for a taxonomy is that the characteristics within a dimension are mutually exclusive (Bailey, 1994), these criteria cannot be included in our taxonomy. Nevertheless, as *incentive* and *target audience* are important criteria to be considered when planning OI initiatives, we highlight these to provide an encompassing view of the holistic process.

Our examples in general feature several characteristics for each of these two criteria. For example, the primary *target audience* of *Ericsson Labs* are developers that use the APIs to *develop* applications; however, other participants are sought to *test* applications; relatedly, the *incentives* to participate in the *Storm Session* initiative of Dell probably differ depending on the participant and could be expected *technological* benefits, *socio-political* reasons like approval from the community, or both.

DISCUSSION

This taxonomy offers a way to classify web-based inbound OI initiatives from the perspective of the conducting organization, focusing on the participant-facing characteristics; its application can be seen in the Appendix.

As more and more organizations are planning to open up their innovation processes through web-based initiatives, a framework that aids in precisely determining and specifying their needs becomes increasingly important. Our taxonomy provides such a framework: based on its five dimensions it can be used as a tool to identify the overall participant-facing characteristics of planned OI initiatives, and helps clarify organizational needs before entering into detailed planning.

For researchers, the taxonomy provides a framework to identify and classify the increasing number and variety of new web-based inbound OI initiatives and related studies, helping to build a cumulative body of research. As taxonomies feature mutually exclusive characteristics, they enable the precise classification of objects of interest. To the best of our knowledge, very few OI taxonomies exist at the moment, with no taxonomy known to us that focuses on web-based initiatives.

We are aware that our taxonomy has some limitations; one of them is the limited number of examined initiatives. Another limitation is that not every characteristic is equally represented in the sample; for example, initiatives with the *external scout*

characteristic are not represented at all. The reason for this might be the limited number of initiatives in our sample; another explanation might be that some types of initiatives are conducted less frequently than others, or that information about initiatives might not always be publicly available (as is the case for the *restricted group of participants*, where organizations have little reason to publicize initiatives other than for marketing reasons). Yet, these examples show that our taxonomy covers even rare characteristics and strives to provide a holistic framework of web-based inbound OI initiatives; nevertheless, a validation of the taxonomy based on further initiatives could lead to modifications of characteristics or dimensions.

CONCLUSION AND FUTURE WORK

Open innovation has received much attention from both research and practice; yet, the term OI is used in a fragmented manner. This paper aims to contribute to the clarification of the term OI and to facilitate the development of a common body of knowledge in OI research.

Focusing on web-based inbound OI initiatives and participant facing characteristics, we developed a taxonomy based on a review of current OI literature and the examination of 49 current (at the time of the research) organizational OI initiatives. We identified five dimensions along which the initiatives can be classified: Process phase, outcome focus, group of participants, knowledge visibility, and facilitation.

The taxonomy provides researchers with an initial framework to specify distinct research foci on organizational inbound OI initiatives. Furthermore, it can serve as a tool for managers planning to launch OI initiatives by helping to identify and specify characteristics based on the requirements and objectives of the organization.

Since the amount of literature on OI as well as the number of organizations that conduct OI are increasing, this taxonomy offers the potential to be extended and adjusted in future. The methodology applied by us explicitly enables researchers to further refine the taxonomy. In addition to refining the taxonomy, researchers could study incentives and motivational factors, or the question of how to identify, find, and select target audiences. Furthermore, the application of OI in later phases of the innovation process, especially the diffusion phase, offers potential for future research.

REFERENCES

1. Bailey, K. D. (1994) *Typologies and taxonomies: an introduction to classification techniques*, SAGE, Thousand Oaks.
2. Chakrabarti, A. (2011) Towards a taxonomy of design research areas, in H. Birkhofer (ed.) *The Future of Design Methodology*, Springer, London 249–260.
3. Chesbrough, H. W. (2003) *Open innovation: The new imperative for creating and profiting from technology*, Harvard Business Press, Boston, MA.
4. Dahlander, L., and Gann, D. M. (2010) How open is innovation?, *Research Policy*, 39, 6, 699–709.
5. Gassmann, O., Enkel, E., and Chesbrough, H. W. (2010) The future of open innovation, *R&D Management*, 40, 3, 213–221.
6. Geiger, D., Seedorf, S., Schulze, T., Nickerson, R. C., and Schader, M. (2011) Managing the crowd: Towards a taxonomy of crowdsourcing processes, in *Proceedings of the Seventeenth Americas Conference on Information Systems*, August 4–7, Detroit, Michigan.
7. Groen, A. J., and Linton, J. D. (2010) Is open innovation a field of study or a communication barrier to theory development?, *Technovation*, 30, 11–12, 554.
8. Hansen, M. T., and Birkinshaw, J. (2007) The innovation value chain, *Harvard Business Review*, 85, 6, 121–130.
9. von Hippel, E. (2005) *Democratizing innovation*, MIT Press, Cambridge, MA.
10. Huizingh, E. K. R. E. (2011) Open innovation: State of the art and future perspectives, *Technovation*, 31, 1, 2–9.
11. Manceau, D., Moatti, V., Fabbri, J., Kaltenbach, P.-F., and Bagger-Hansen, L. (2011) Open innovation: What's behind the buzzword, *ESCP Europe and Accenture*.
12. Miller, J. G., and Roth, A. V. (1994) A taxonomy of manufacturing strategies, *Management Science*, 40, 3, 285–304.
13. Nickerson, R. C., Varshney, U., Muntermann, J., and Isaac, H. (2009) Taxonomy development in information systems: Developing a taxonomy of mobile applications, in *Proceedings of the Seventeenth European Conference on Information Systems*, June 8–10, Verona, Italy.

14. Phillips, J. (2010) Open innovation typology, *International Journal of Innovation Science*, 2, 4, 175–183.
15. Piller, F. T., and Walcher, D. (2006) Toolkits for idea competitions□: A novel method to integrate users in new product development, *R&D Management*, 36, 3, 307–318.
16. Rosch, E. (1998) Principles of categorization, in G. Mather, F. Verstraten, and S. Anstis (eds.), *The Motion Aftereffect: A Modern Perspective*, MIT Press, Cambridge, MA, 28-71.
17. Sabherwal, R., and King, W. R. (1995) An empirical taxonomy of the decision-making processes concerning strategic applications of information systems, *Journal of Management Information Systems*, 11, 4, 177–214.
18. Schweisfurth, T., Raasch, C., and Herstatt, C. (2011) Free revealing in open innovation: A comparison of different models and their benefits for companies, *International Journal of Product Development*, 13, 2, 95–118.
19. Sobel, D. (2005) *Longitude: The true story of a lone genius who solved the greatest scientific problem of his time*, Penguin, New York.
20. Vrande, V. van de, Jong, J. P. J. de, Vanhaverbeke, W., and Rochemont, M. de. (2009) Open innovation in smes: Trends, motives and management challenges, *Technovation*, 29, 6-7, 423–437.
21. West, J., and Bogers, M. (2011) Profiting from external innovation: A review of research on open innovation, *in progress*.

APPENDIX: OPEN INNOVATION INITIATIVES

Company	Initiative	Process phase	Outcome focus	Group of participants	Knowledge visibility	Facilitation
Commonwealth Bank	IdeaBank	Idea generation	Totally open	Unrestricted	Visible	Self
Starbucks	My Starbucks Idea	Idea generation	Totally open	Unrestricted	Visible	Self
Ford	Ford Social	Idea generation	Totally open	Unrestricted	Visible	Self
BMW	Virtual Innovation Agency	Idea generation	Totally open	Unrestricted	Visible	Self
Dell	Idea Storm	Idea generation	Totally open	Unrestricted	Visible	Self
SAP	Sapiens	Idea generation	Totally open	Unrestricted	Visible	Self
SaraLee	Making Innovations - Ideas	Idea generation	Totally open	Unrestricted	Visible	Self
Clorox	CloroxConnects for Consumers	Idea generation	Topic-oriented	Unrestricted	Visible	Self
CosmosDirekt	Ideen Forum	Idea generation	Topic-oriented	Unrestricted	Visible	Self
Dell	Idea Storm - Storm Sessions	Idea generation	Topic-oriented	Unrestricted	Visible	Self
BMW	Co-Creation Lab	Idea generation	Topic-oriented	Unrestricted	Visible	Self
AXA Winterthur	atizio - Insurance plans for self-employed individuals sought	Idea generation	Topic-oriented	Unrestricted	Visible	Intermediary platform
BRAVO	atizio - Neue App's für Teenager im Alter von 13-19 Jahren	Idea generation	Topic-oriented	Unrestricted	Visible	Intermediary platform
GDI	atizio - Supermarkt der Zukunft	Idea generation	Topic-oriented	Unrestricted	Visible	Intermediary platform
Shell	Game Changer	Idea generation	Topic-oriented	Unrestricted	Hidden	Self
Crown Holdings Inc	Edison Nation - Innovative Product Search	Idea generation	Target-oriented	Unrestricted	Hidden	Intermediary platform
Franco Manufacturing Inc	Edison Nation - Innovative Product Search	Idea generation	Target-oriented	Unrestricted	Hidden	Intermediary platform
Fisher-Price	Edison Nation - Innovative Product Search	Idea generation	Target-oriented	Unrestricted	Hidden	Intermediary platform
Ericsson	Ericsson Labs	Conversion	Totally open	Unrestricted	Visible	Self
Medtronic	Innovate with Medtronic	Conversion	Totally open	Unrestricted	Hidden	Self
Nokia	Nokia Beta Labs	Conversion	Topic-oriented	Unrestricted	Visible	Self
Xerox	Open Xerox	Conversion	Topic-oriented	Unrestricted	Visible	Self
Intuit	Intuit Labs	Conversion	Topic-oriented	Unrestricted	Visible	Self
Boots	Centre for Innovation	Conversion	Topic-oriented	Unrestricted	Hidden	Self
Campbell	Ideas for Innovation	Conversion	Topic-oriented	Unrestricted	Hidden	Self
Colgate	Innovation and Product Ideas	Conversion	Topic-oriented	Unrestricted	Hidden	Self

Company	Initiative	Process phase	Outcome focus	Group of participants	Knowledge visibility	Facilitation
LG	Collaborate & Innovate	Conversion	Topic-oriented	Unrestricted	Hidden	Self
DSM	DSM Licensing	Conversion	Topic-oriented	Unrestricted	Hidden	Self
HP	HP Labs Innovation Research Program	Conversion	Topic-oriented	Unrestricted	Hidden	Self
Panrico Donuts	innoget	Conversion	Topic-oriented	Unrestricted	Hidden	Intermediary platform
Arquebio Bioprocessing	innoget	Conversion	Topic-oriented	Unrestricted	Hidden	Intermediary platform
Orange Spain	innoget	Conversion	Topic-oriented	Unrestricted	Hidden	Intermediary platform
Intuit	Intuit Collaboratory - Entrepreneur Day	Conversion	Topic-oriented	Unrestricted	Hidden	Self
Johnson Controls	Open Innovation	Conversion	Topic-oriented	Unrestricted	Hidden	Self
Kraft	Innovate with Kraft Foods	Conversion	Topic-oriented	Unrestricted	Hidden	Self
Reckitt Benckiser	RD-Idealink	Conversion	Topic-oriented	Unrestricted	Hidden	Self
Unilever	Collaborating with us	Conversion	Topic-oriented	Unrestricted	Hidden	Self
Weyerhaeuser	Innovation	Conversion	Topic-oriented	Unrestricted	Hidden	Self
Glaxo Smith Kline	Innovation at GSK	Conversion	Topic-oriented	Unrestricted	Hidden	Self
P&G	Connect + Develop - P&G Needs	Conversion	Target-oriented	Unrestricted	Hidden	Self
Clorox	CloroxConnects for Inventors	Conversion	Target-oriented	Unrestricted	Hidden	Self
Kraft	The Collaboration Factory	Conversion	Target-oriented	Unrestricted	Hidden	Self
General Mills	G-Win	Conversion	Target-oriented	Unrestricted	Hidden	Self
Intuit	Intuit Collaboratory - Challenges	Conversion	Target-oriented	Unrestricted	Hidden	Self
Sara Lee	Making Connections - Needs	Conversion	Target-oriented	Unrestricted	Hidden	Self
Bell	TopCoder - Bells Admin Database Consolidation App UI Prototype	Conversion	Target-oriented	Unrestricted	Hidden	Intermediary platform
Unknown	TopCoder - FMS Achievement and Payment Validation Conceptualization	Conversion	Target-oriented	Unrestricted	Hidden	Intermediary platform
Unknown	Morpheus - Comp Calendar Architecture	Conversion	Target-oriented	Unrestricted	Hidden	Intermediary platform
Intuit	Intuit Collaboratory - Universities	Conversion	Topic-oriented	Restricted	Hidden	Self