8-2010

Innovation Contests – Where are we?

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Recommended Citation

Bullinger, Angelika Cosima and Moeslein, Kathrin, "Innovation Contests – Where are we?" (2010). *AMCIS 2010 Proceedings.* 28.
http://aisel.aisnet.org/amcis2010/28

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ABSTRACT

Innovation contests in their basic structure have a long-standing tradition and can be attributed to continuously gain in importance as a corporate practice. A deep understanding of this online instrument, however, is still lacking. Contrary to other methods used to realize open innovation, research in the field of online innovation contests displays a growing, but only rudimentarily intertwined body of publications. This paper provides the essential systematization of the field, integrating both, academic knowledge and business deployment. Juxtaposing 33 relevant journal and conference publications with empirical basis and an analysis of 57 real-world innovation contests, we highlight interesting disruptions and distill six pathways for future research. These cover the optimal degree of elaboration, the interplay of competition and community, the importance of community applications, the trajectory towards open evaluation, and the identification of additional design elements.

Keywords

open innovation, web 2.0, innovation contest

INTRODUCTION

Innovation contests in their basic structure have a long-standing tradition and have influenced industries or even societies. For example, in 1869, Emperor Louis Napoleon III of France offered a prize to anyone who could make a "satisfactory substitute for butter, suitable for use by the armed forces and the lower classes." Still, neither Michel-Eugene Chevreul nor Hippolyte Mege-Mouris (historians are uneven about the inventor) were paid when they came up with margarine, since Napoleon died before. In the 19th century, innovation contests leave the realm of political organizers as they are increasingly adopted by industrialists as a powerful means of problem solving. Famous examples of this period include the "Rainhill trials" (1829) which were used by the directors of the Liverpool and Manchester Railway Company to decide whether hauling trains should be powered by stationary engines or locomotives. During the next century, realization of innovation contests slowly entered average business: An early example can be identified in 1997, when the "Fredkin Prize for Computer Chess" granted USD 100'000 for building the first computer to beat world chess champion Garry Kasparov.

The deployment of innovation contests took off, however, with the development of information and communication technology, in particular the internet, which allows for online competitions. Nowadays, highspeed internet access allows individuals as well as firms, public organizations, and non-profit organizations, to act as *organizers* of innovation contests (Piller & Walcher, 2006). Accordingly, innovation contests have continuously gained in number and multitude for about twenty years. Some of them, e.g. the platform Innocentive (founded in 2001), where companies publish open challenges for scientists, or the t-shirt company Threadless (founded in 2000), entirely based on the submission and evaluation of designs by users, have gained quite a reputation among research and practice. However, there are many more innovation contests currently running. At the moment of writing, 77'800 hits at google.com when searching for the term "innovation contest".

Whereas innovation contests can thus be attributed to continuously gain in importance as an innovation practice among companies, a deep understanding of this instrument is still lacking. Contrary to other methods used to realize open innovation, research in the field displays a growing, but only rudimentarily intertwined body of publications on the topic. This paper provides the essential systematization of the field and goes beyond academic knowledge by juxtapositioning business deployment. We present at first the methodological approach chosen to unite academic knowledge and practical deployment of innovation contests (cf. Method). Subsequently, the results of the systematic review of literature and practice are presented (cf. Findings from the reviews) and discussed (cf. Discussion: Juxtaposing research and practice). Following this presentation of interesting disruptions between academia and practice and the identification of six pathways for future research, a conclusion section closes the paper.

METHOD

We define an innovation contest[1] as a web-based competition of innovators who use their skills, experiences and creativity to *provide a solution* for a particular contest *challenge* formulated by an organizer (cf. Piller & Walcher 2006 or Ebner et al. 2010). To better assess the current state of innovation contests in research and practice, we chose a two-fold methodological approach subsequently explained.

Systematic literature review

We performed first a systematic literature review following the guidelines of Creswell (2002). The literature was reviewed by two researchers in innovation management and an *outside judge* specialized in information systems.

The step 'keyword search' (1) encompassed search terms derived from the combination "*a + b*", where *a* equals *idea, ideas, concept, innovation* or *design* and *b* equals *contest, competition, jam, tournament* or *prize*. Search began with the terms *idea, ideas* and *competition, contest*, as suggested prior expert interviews. The list was continuously amplified when a new term appeared for the *third time* in publications, typically in the reference section (step (3) of the literature review). This evolving approach was chosen to grasp the multiplicity of terms currently used to describe the topicality. The search process led to the identification of $n1_{bsc}=2'411$ articles within the *Business Source Complete* database which were published in the last 50 years (April 1959 to July 2009). We used Business Source Complete as database as its focus on *management* publications fits our perspective on innovation contests as tools for managing open innovation. Drilling down results to articles in academic publications and selected magazines, in which innovation contests (or one of the many synonymous terms) were in the *focus*, e.g. title or abstract enclosed the term led to $n1_{IC}=38$ articles. The same procedure was applied to search with *Google Scholar* (2). We added Google Scholar as the relatively novel topicality is covered also in outlets which are accessed via Google Scholar but not included in Business Source Complete. In particular, we wanted to include work in progress on the topic, if available. We included the subject areas *Business, Administration, Finance*, and *Economics*; *Engineering, Computer Science, and Mathematics;* as well as *Social Sciences, Arts,* and *Humanities* since the topic is covered by these strands of research mostly. The initial sample from the search terms "*a + b*" (as indicated above) resulted in $n2_{gs}=15'661$ hits. Again, by two steps of limitation, $n2_{IC}=82$ relevant contributions were selected. Bringing together the 38 articles from Business Source Complete and the 82 publications identified by Google Scholar, we set a third delimiter and included only papers with an empirical basis (i.e. at least one case study). This choice was made to fulfill our research goal to amalgamate academia and practice in the field and led to a final sample of $n3_{data}=33$ articles. Articles integrated in the sample are marked by an asterisk in the reference section of this paper.

Systematic field review

Our systematic field review on innovation contest was performed in two overlapping phases: First, *identification and selection* of innovation contests to be included in the sample. Innovation contests were chosen according to the information needed (Glaser & Strauss, 1967). Thus, the final sample is not meant to be a representative one. We focused on those contests which are characterized by a set of pre-defined criteria. Second, *analysis* of the sample in the light of the design elements we distilled from literature was performed.

In phase one 'identification and selection', we identified innovation contests via *Google*; search terms were derived from the combination "*a + b*" as in the review of literature. Using awareness level as first criterion, we selected innovation contests which scored highest in page rank (state of December 2008); ($n4_{google}=73$). To relate our review of practice to extant knowledge, we chose a subset of contests based on the following limiters: *online* innovation contest; provision of *rewards*; medium to very long term *contest period* within the last 4 years; representation of *different industries*; majority of organizers active in the *business-to-consumer* field; and *openness* to a broad public[2]. These characteristics apply to most of the publications identified in the review of literature. Limitation led to a set of $n4_{start}=45$ innovation contests. In the course of the *analysis phase* (phase 2), we have been continuously adding contests until saturation was reached in June 2009 ($n4_{end}=57$) and additional innovation contests have provided only marginal information (Glaser and Strauss, 1967). Details on the analyzed innovation contests are in appendix.

During phase two, we analyzed whether and how the innovation contests in our sample integrate the design elements derived during the systematic literature review. Analysis was done by *3 independent raters* who were asked to state: "Is [name of

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[1] We use "*innovation* contest" (IC) instead of "*idea* contest" to illustrate that a contest is able and suited to cover the entire innovation process from idea creation and concept generation to selection and implementation (Tidd et al. 1997).

[2] Consequently, we excluded innovation contests as presented by Innocentive (www.innocentive.com) where, for most of the challenges, participants need expert knowledge to submit an idea.

innovation contest] considering [specific design element]?", with response possibility limited to *binary* responses. If two of the raters agreed that an innovation contest integrates a particular design element, this design element was marked as being *given*; otherwise it was marked *not given*.

FINDINGS FROM THE REVIEWS

Overall, the literature review shows that extant publications are dominated by *single case studies*. Even if multiple case studies are used, they are typically used side by side (e.g. Ogawa & Piller 2006). This methodological trend leads to in-depth knowledge silos on individual cases with only limited possibilities for generalization. When analyzing the 33 articles, however, we found that a common and unifying trend across the majority of publications is the *recommendation of design elements* for innovation contests.

We collected the different design elements mentioned within our sample and distilled a set of ten which were most often referred to. With the design elements, the papers typically list attributes which we hence unified for each design element in order to reach a holistic framework. In the following, we condense the results of our literature review by presenting the ten design elements and their attributes as distilled from the literature. To ease readability, we use only pertinent articles out of the sample.

Concerning *media*, innovation contests can be run online, offline or mixed mode (Boudreau et al., 2008; Brabham, 2009). They are run by an *organizer*, herewith encompassing companies, public organizations, individuals as well as non-profit organizations, e.g. museums (Ebner et al., 2010; Klein & Lechner, 2009; Smith et al., 2003). Usually, the organizer dedicates the contest to a specific *topic*; details of which vary extensively. The topic indicates *specificity* of the *task/ topic* (ranging between *low* if the task is very open and *high* if the task is highly specific) and the desired *degree of elaboration*. The contest might call for simple textual descriptions of rough *ideas, sketches,* more elaborated *concepts*, or even *prototypes* and fully functional *solutions (*Ebner et al., 2010; Klein & Lechner, 2009; Smith et al., 2003). Also evolving potential innovations that get refined during a number of contests are an option. By definition of the topic, the organizer also indicates the interesting *target group* of participants. Literature identifies a distinction between an *unspecified target group,* i.e. participation is open to everybody and a *specified target group*, when participation is e.g. limited to a country or qualified by age or interest (Brabham 2009; Bullinger et al., 2009; Carvalho, 2009). In addition, the organizer indicates whether participation is required by an *individual,* in *teams* or *both* (Boudreau et al., 2008; Carvalho 2009; Smith et al., 2003). Each innovation contest runs for a limited period of time; during this *contest period* participation is allowed. *Contest periods* range from *very short term* (some hours to a maximum of 14 days), *short term* (15 days to 6 weeks) to *long term* (6 weeks to four month) or even *very long term* (more than four months/ ongoing) (Boudreau, et al. 2008; Bullinger et al., 2009; Ebner et al., 2010). To foster participation, the organizer establishes a *reward system* to *motivate* the participation of the target group – adapted to its needs (Boudreau et al., 2008; Bullinger et al., 2009; Ogawa & Piller, 2006). Motivation can be induced via extrinsic motivators (awards and prizes), intrinsic motivators (enjoyment) or mixed mode. As for extrinsic motivators, literature reports them to cover both monetary awards (prize money) and non-monetary awards (e.g. valuable goods) (Brabham, 2009; Bullinger et al., 2009; Piller & Walcher, 2006). Intrinsic motivation is stressed in combination with social motivation, covering positive community feedback, reputation among relevant peers, and self-realization (Fueller, 2006). Fostering intrinsic and social motivation and simultaneously supporting interaction of participants are *community functionalities* (Brabham, 2009; Piller & Walcher, 2006)*.* They enhance information exchange, topic related discussion, and – if allowed – collaborative design of products. Applications belonging to the field of social software are well suited to foster community building, e.g. a fanpage of the contest on *facebook.com*, messaging services and personal profiles. Once submissions are made, their evaluation can be made along to three basic pathways which can be freely combined: *self-assessment* by the participant, *peer review* by the (other) participants of the innovation contest and evaluation by a *jury of experts* (Carvalho, 2009; Ebner et al., 2010; Klein & Lechner, 2009).

Table 1 below illustrates the state of knowledge on design elements of innovation contests. It subsumes the 10 design elements with synonyms, a definition (left column), and common attributes (right column).

Design element *(synonyms):* definition	Attributes					
1 Media (-): environment of IC	Online		Mixed		Offline	
2 Organizer (-): entity initiating IC	Company	Public organization	Non-profit		Individual	
3 Task/ Topic specificity *(problem specification)*: solution space of IC	Low (Open Task)		Defined		High (Specific task)	
4 Degree of elaboration *(elaborateness, eligibility, degree of idea elaboration):* required level of detail for submission to IC	Idea	Sketch	Concept	Proto-type	Solution	Evolving
5 Target group *(target audience, target participants, composition of group)*: description of participants of IC	Specified			Unspecified		
6 Participation as *(eligibility)*: number of persons forming one entity of participant	Individual		Team		Both	
7 Contest period *(timeline)*: runtime of IC	Very short term	Short term		Long term		Very long term
8 Reward/ motivation (-): incentives used to encourage participation	Monetary		Non-monetary		Mixed	
9 Community functionality *(community application, communication possibility, tools)*: functionalities for interaction within participants	Given			Not given		
10 Evaluation *(ranking)*: method to determine ranking of submissions to IC	Jury evaluation	Peer review		Self assessment		Mixed

Table 1 Design elements for innovation contests (IC) as derived from systematic literature review

DISCUSSION: JUXTAPOSING RESEARCH AND PRACTICE

Putting side by side the review of literature and the 57 cases, we identify a set of disruptions of which we derive pathways for future exploration of the fascinating field of innovation contests. Generally, we observe that academic literature allows to distill ten design elements with their attributes. While literature has so far not focused on distribution of attributes across multiple cases or likely combinations, the 57 cases indicate preferences in the design and implementation of online innovation contests. In addition, practice is contradictory to some of the design elements mentioned in the literature; these differences will subsequently be highlighted for each design element. From most relevant differences, we derive propositions for future research in the field.

As the focus of our research is on *online* innovation contests, we included 46 contests which are purely online and a set of eight which include *offline* parts, e.g. a presentation in front of a jury (e.g. *Sony Ericsson Content Award 2008, Brown Shoe Student Design Contest*). For reasons of comparison, we integrated three contests without online component (*First Lego League, Advertising & Circulation Idea Contest 2009* and *Innovation & Entrepreneurship contest 2009*).

In our sample, we found an overwhelming majority of 43 contests to be conducted by *firms*. Only 9 *public organizers* (e.g. London's Victoria and Albert Museum with its *Shoe Design Competition*) and 5 *non-profit* organizers like the Advantan Foundation which initiated an idea exchange platform for entrepreneurs (*Ideablob*) could be identified. The predominance of innovation contests initiated by *companies* expands on Walcher (2007) who describes a continuum of organizers.

Closely related to the *organizer* is the topic of the idea contest, defined by *specificity* of the *task/topic* and the required *degree of elaboration*. Interestingly, a medium amount of *specificity* prevails (41 contests); this can be easily illustrated for the area of fashion, where organizers often purport a specific theme, like the "original origins" of the *CEC Shoe Design Contest*. The *degree of elaboration*, on the other hand, is nearly equally distributed among the attributes *ideas, sketches, concepts, prototype, solution* and *evolving*. This result is interesting, as e.g. Walcher (2007) and Piller & Walcher (2006) suggest in their paper near equal distribution of the attributes. Therefore, we judge prevailing degrees – *low (idea)* or *high (solution)* – as insufficiently precise. Accordingly, we

> *propose to research (i)* the design element *elaboration* in more detail in order to specify the optimal degree of elaboration depending on the type of contest (e.g. task/ topic specificity).

Concerning the addressed *target group*, a design element closely related to *specificity* and *degree of elaboration,* our sample shows a strong trend towards *specified* (n=36), while criteria used for specification of participants range widely. For instance, innovation contests in the field of *ICT* explicitly target software developers or very technically interested people. A similarly strong tendency has been identified for *participation as individual or team*. While two thirds (n=31) of the examined innovation contests allow submissions only by *individuals*, nine focus explicitly on *teams* (e.g. *Sony Ericsson Content Award 2008*). In 17 contests, for instance the *A1 Innovation Days*, participation both as team and as individual has been accepted.

Results concerning the *contest period* show a predominance of *long* and *very long term* contests (18 respectively 22). Innovation contests comprising of a complex task in combination with a high *degree of elaboration*, as *BraunPrize 2009* and *Sony Ericsson Content Award 2008*, have a duration of more than four months in each stage; they are representatives of the attribute *very long term*[3]. This shows a change since Walcher (2007) put forward an average duration of six weeks and calls for alteration of attributes.

When it comes to *reward/ motivation*, we identified 20 innovation contests basing solely on monetary rewards, while the biggest group – 30 contests – combined both reward schemes. Monetary assets thereby include assets like notebooks (*MTV Engine Room*), cell phones, or voyages (*A1 Innovation Days*) as well as money prizes; these start with EUR 500 for a third place in *Tchibo Ideas* and can reach up to EUR 500'000 (*Scoop!*). *Non-monetary motivation* has been explicitly integrated for instance in the reward scheme of the *NoAE Innovation Competition* where winners take part in workshops with experts. Given the discussion on account *of intrinsic and extrinsic motivation* for participation in an online environment which stress the importance of intrinsic and social motivation (e.g. Fueller, 2006; Lakhani & von Hippel, 2003), it is surprising that our sample shows such a strong predominance of extrinsic reward schemes. Given this state, we

> *propose to research (ii)* the link between *intrinsic motivators* and *community applications* in more detail.

Community functionality can be found in 31 cases. Commenting functions and forums are frequently occurring applications, but limited to innovation contests that comprise any kind of peer review; an outstanding example is *Osram's LED emotionalize your light* contest which provides a set of social networking applications comparable to *facebook.com.* Given the majority of *individual* participants while community functionality is increasingly realized, we

> *propose to research (iii)* how the elements of competition among participating individuals and their community-building is orchestrated.

In addition, given the surge of social software applications, community applications seem particularly interesting to explore in the context of innovation contests. We

> *propose to research (iv)* the impact of *community applications* on participants' behavior in innovation contests.

Which submission wins is by a vast majority of contests decided by a *jury of experts* (35 innovation contests). We judge this to be a standard procedure for contests in the area of apparel – only the *CEC Shoe Design* contest and *Iqons x Nike ID* explicitly *also* ask for peer review. The prominent exception from the rule is *Threadless* which outsources the entire evaluation of submitted t-shirt designs to potential customers (Ogawa & Piller, 2006). The trend towards jury voting is surprising, as first, literature is ambiguous whether cross-functional juries, with a broad scope of experience are at all suitable for evaluation (pro: McDermott & O'Connor 2002; contra: Galbraith, DeNoble & Ehrlich, 2008); and second, as the integration of larger (external) groups in the evaluation of innovations seems to generate better results (Piller & Walcher 2006; Soukhoroukova, 2007). We derive a pressing need to better understand evaluation and

> *propose to research (v)* in-depth the different forms of *evaluation*, e.g. by comparison of the results of peer review during and after the contest period.

All in all, our review of the online innovation contests has shown a set of design elements not included in the extant literature, e.g. the goal an organizer has when initiating a contest. We consequently

> *propose to research (vi)* which additional design elements should be added to the list in order to better identify and purposely design an online innovation contest.

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[3]   Continuous innovation contests like *Threadless* are classified according to their smallest module.

CONCLUSIONS

Based on a systematic review of literature and juxtapositioning of research and practice, this paper has distilled ten design elements for online innovation contests and illustrated their real-life deployment. Discrepancies between research and practice have led to the proposition of six pathways for further research on innovation contests.

The strengths of our study, however, must be tempered with recognition of its limitations. Given the qualitative nature of the review of current practice, the integrated systematization of design elements of innovation contests should be seen as a structured analysis of reality, and not as reality itself. First, we do not claim to have identified the comprehensive set of design elements and according attributes in sufficient detail. We see a need to further and in more detail explore a number of *design elements*. Second, whereas our findings present the design elements as stand-alone elements, further research could increase the knowledge on their *relations and interdependencies*.

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APPENDIX: ANALYZED INNOVATION CONTESTS (IN ALPHABETIC ORDER)

- A1 Innovation Days
- Advertising & Circulation Idea Contest 2009
- ASICS Design Competition 200
- Bata Shoe Design Competition
- Braun Prize 2009
- Brown Shoe Student Design Contest
- CEC Shoe Design Contest
- Change.org
- Comic Book Challenge
- Dein Wille geschehe
- First Lego League 2008
- Go! Animate
- Google Android Developer Challenge
- Google Lunar X Prize
- Google's Project 10 to the 100
- Ideablob
- Ideenwettbewerb der Region Cham
- Imagine Cup 2009
- Information Systems Contest
- Innovation & Entrepreneurship Contest 2009
- Intelchallenge
- IntelliJ IDEA(L) Plugin Contest 2006
- Iqons x Nike ID
- IT Services for Tomorrow's Data Center
- Juicy Ideas Competition
- LED emotionalize your light contest
- Light on Gesu
- Live Edge Contest
- Malaysia Footwear Design Competition
- MTV Engine Room
- Netflixprice
- Next Generation 2009
- NoAE Innovation Competition
- NoAE Innovationswettbewerb
- PLW Design Competition
- Progressive Automotive X Prize
- Project 10^100
- Samsung "How deep is your love?"
- Scoop!
- Sennheiser SoundLogo
- Shoe Design Competition
- Shoe Star
- Shoeperstar
- Sony Ericsson Content Award 2008
- StartUp Impulse
- Swatch MTV Playground
- Tchibo Ideas
- The Saltire Prize
- The Sims 2 H&M Fashion Runway
- Threadless
- Usable
- Virgin Earth Challenge
- Vodafone Wireless Innovation Project
- WePC.com
- What's your crazy green idea?
- WindSCAPE