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ABSTRACT
Within the open innovation debate, significant attention has been paid to the fact that customers can be a useful source for bringing new ideas and concepts into a company. In this context, online platforms have become a widely used instrument to facilitate interaction between companies and customers. While prior literature discusses various aspects of open innovation platforms, a market-oriented analysis covering all types of platforms for idea creation and concept development seems to be still missing. By evaluating a total of 44 different innovation platforms, we identify the degree of interrelation between five major platform attributes and develop two key differentiating dimensions: The platform operator (company vs. third party) and the platform purpose (find solutions vs. understand customers). The resulting classification matrix highlights a newly emerging category of online open innovation platforms, opening the field for deeper investigation in future research.

Keywords
Open innovation, customer involvement, innovation platforms, platform market classification, correlation analysis, cluster analysis.

1. INTRODUCTION
Market liberalization and global trade have led to increasing competition over the past decades. This development forces companies worldwide to look for new ways to foster their innovation abilities in order to differentiate themselves from their competitors. Here, customer involvement and the consideration of customer needs can already be regarded as an integral part within the field of new product development (NPD) [7; 26; 33].

Besides communicating their needs, customers can also work out new ideas, modify products to their specific demand, and build and test prototypes [12; 37; 38; 39]. And, they often freely reveal what they have done. In order to make use of such innovative behaviors and activities, an increasing number of companies have started to directly involve their customers in the innovation processes. Chesbrough [9] postulated the term 'open innovation', which refers to companies opening up their traditionally internal innovation and new product development processes by involving suppliers, customers, and other external parties. Prahalad and Ramaswamy [30] even see a general trend that companies need to involve their customers more deeply in value creation, because the traditional concept of a company-centric market is shifting towards a market of consumer co-creation.

Early forms of open innovation have a long-standing history: In 1714 the British Parliament offered a prize of 20,000 pounds to anyone who could invent a way to determine longitude at sea. Astonishingly, not Isaac Newton came up with the winning idea, but an unknown carpenter and clockmaker, who constructed a high-accuracy marine chronometer [19; 21]. Today it has become much easier to outsource idea creation and problem solving to the crowd. A key enabler for this 'open' trend is technology: The internet and new web 2.0 concepts and technologies "are allowing companies and their customers to interact with unprecedented levels of richness" [5, p. 22]. Online collaboration "stimulates new ideas and new approaches that can lead to breakthrough solutions for complex problems. Blogs, wikis […], online communities, and social networks can bring product developers together in real time" [40, p. 26]. The "wide availability of web 2.0 applications has led to the increasing emergence of professional amateurs: From ornithologists to photographers, people who previously had the passion but no tools are now empowered with technology that enables them to perform at the same level as professionals" [4, p. 52].

Over the past years, we have seen a great diversity of online open innovation platforms emerging. The reason for this diversity is twofold: First, the technological change and rapid development of new sophisticated online technologies for creative collaboration results in a constant change of the landscape of innovation platforms [22]. Second, open innovation spans a wide field leading to an ever increasing diversity in possible platforms. For instance, integrated players may range from customers, suppliers, and research institutes to even competitors, who can participate in very different stages of the innovation process [10].

The great diversity of online innovation platforms complicates the identification of key characteristics and differentiators of these

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platforms. In this context, prior literature suggests an immense variety of attributes for classifying innovation platforms, unfortunately with little reciprocal referencing and no overall study context [3]. Thus, up to now, it is not clear how attributes of innovation platforms are inter-related and which of them contribute to a classification of the market. This leads us to the key research questions of our study:

1. How are attributes of open innovation platforms inter-related with one another?
2. What are key attributes (or differentiators) for an appropriate market classification of innovation platforms?

The paper at hand is structured as follows: We first place our study in the context of prior research and derive a set of platform attributes from prior literature. Then we identify relevant online open innovation platforms and evaluate these platforms along the identified attributes. Next, we conduct regression and cluster analyses to identify key differentiators and develop a typology for open innovation platforms. Finally, we present implications for practice and research.

2. RESEARCH BACKGROUND

2.1 Open Innovation

The word 'innovation' is often associated with the industrial production sector and related to technical inventions. Nevertheless, innovation also takes place in the context of processes and organizations, as already noted by Schumpeter (1912) almost 100 years ago. Generally speaking, innovation means the creation of something 'new' – for example new ideas, new technologies, new products, and new processes.

Traditionally, innovation is the core responsibility of a company's internal R&D (research & development) division. But innovation does not have to take place exclusively inside central R&D [1; 2]. Henry Chesbrough created the term 'open innovation' because he noted that "the distribution of knowledge has shifted away from the tall towers of central R&D Facilities", and "companies can find vital knowledge in customers, suppliers, universities, national labs, consortia, consultants, and even start-up firms" [9, p. 40].

The focus of our study lies on the integration of the customer in the (open) innovation process. Customers are a very special group among all external players possibly involved in the innovation process. Depending on the product or service offered, customers may exceed all other 'innovators' by far in terms of sheer numbers, which makes managing their innovative skills and behaviors highly complex. But for a long time, their knowledge was not captured. Only since the internet has become a mass information channel, customers were offered a convenient way to express their opinions and share their ideas [27]. Companies on the other side realized this potential and started to create virtual customer communities for knowledge exchange and participation.

With respect to the 'innovation process', customer participation can occur at different stages. As shown in Figure 1, customers can generate ideas and develop concepts for new products or product enhancements; they can be involved as co-creators in design and engineering; and they can support companies by testing finished products and identifying critical issues prior to launch [15].

This study is focusing on the initial stage of the innovation process, the phase of idea creation and concept development. This phase is often referred to as the 'fuzzy front-end' in new product development [21], the stage where the "spark of the innovation must somehow form and coalesce in the minds of innovators to the extent that they can recognize its financial and strategic potential […]" [16, p. 2].

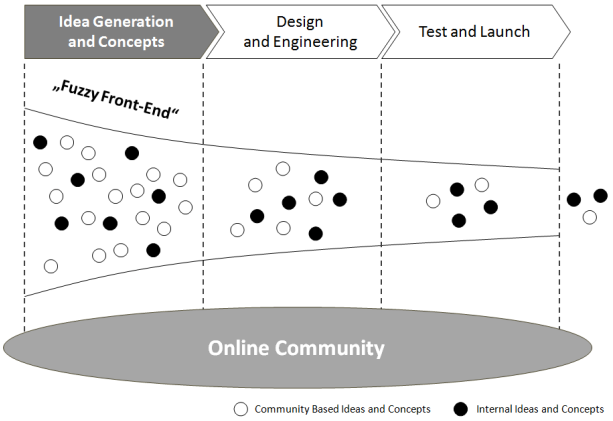

Figure 1. Utilization of Online Communities in New Product Development (based on Füller et al., 2006)

Involving customers in the fuzzy front-end of the innovation process can be valuable in various aspects: Customers can help to identify new demand, they can be a source for identification of new opportunities, and they can bring in their own technical knowledge for solving specific scientific questions as input for a product concept.

When a company chooses to involve their customers in this early stage of the innovation process, efficient communication is necessary. Online communities are nowadays an established channel where virtual interest groups of individual users share enthusiasm for an issue or an activity. And, online communities are often meeting places for innovative users [15]. Because these online communities can have very different forms, we will have a deeper look at innovation-related online communities and underlying technical platforms in order to identify the differentiating attributes or design elements [6; 17].

2.2 Open Innovation Platforms

Together with advancing internet technologies, new concepts for communication and user interaction have established over time: Forums, blogs, wikis, social networks, and product review and rating websites are examples of different online formats where customers can seek and share information and knowledge. This also applies to innovation platforms, which exhibit a wide variety of purposes and methods [24].

Scientific research has started to examine and explore the phenomenon of virtual customer integration in innovation. To identify differences between existing open innovation platforms, we have conducted a structured literature research and review. Our goal was to find attributes and design elements which have been used to describe and distinguish different innovation platforms. We applied relevant keywords ('open innovation', 'innovation platforms', 'innovation communities', 'customer involvement', etc.) both to the Business Source Complete database, as well as to Google Scholar. We concentrated on those search results which compare different innovation platforms, or

even develop a typology for classification, because such sources usually list a set of attributes for differentiation. Furthermore, we analyzed references from within the sources, if the citation was again related to innovation platforms.

In the identified articles and books, we can find a diverse number of attributes with an even more diverse number of possible values or characteristics. We structured our findings along the simple but comprehensive framework shown by Malone et al. [24]. They define set of building blocks which can be used to describe online platforms dedicated to collective intelligence. The framework is composed of four key questions:

- *What* is being done?
- *Who* is doing it?
- *Why* are they doing it?
- *How* is it being done?

The 'what' question deals with aspects related to the goal of an innovation platform. A key attribute is the stage of the innovation process the online platform is dedicated to. It ranges from idea creation and need identification, to concept and solution development, to design and engineering until finally validation, test, and commercialization [8; 14; 19; 32; 35]. Another aspect is the degree of user elaboration. User input can vary from simple posting ideas and recommendations to developing sophisticated prototypes and feasible solutions [6; 17; 28; 31; 35]. Similarly, the specificity of the task or solution space can be different among platforms: It can be unspecified with a large solution space, or on the contrary show very specified problems with given technical restrictions [6; 17; 28; 31]. Finally, innovation does not necessarily need to be the core objective of a web platform – some platforms foster innovativeness of their users rather as a byproduct [22].

We then identify a number of aspects related to the second question ('who'), dealing with the actors and the staffing in the innovation process. A first important distinction is the operator of the platform: Usually it is either a company or a third party acting as intermediary between the company and the customers [6; 17; 25]. Customers as contributors can be distinguished by their role in the process [8; 27], and also by the expertise and knowledge which they bring in [6; 8; 14; 17; 31]. Moreover, the number of participants is mentioned as differentiating aspect [14; 22].

Analyzing the third question 'why' customers participate, we examine conformity that the user motivation can be fostered by monetary incentives and also by non-monetary factors, such as social recognition, entertainment and curiosity, as well as product usage and personal needs [6; 14; 17; 32]. However, the question of motivation for the platform operator has so far not been discussed in detail.

The final question ('how') is related to the underlying structures and processes of the customer integration. Here we again find a broad variety of different aspects: Some articles differentiate online and offline communities [6; 17]. Participation can be open to any user, or it can be limited to a group of users who are pre-selected through invitations [29]. Some platforms restrain task duration to a predefined period of short or longer duration [6; 14; 17]. Another matter is governance: Some platforms allow their users to decide on the best solution (flat), others let users only vote but the company has the ultimate decision power (hierarchical) [6; 17; 29]. Finally, some articles also list add-on community functionality as differentiator, e.g. sharing of material, such as links and white papers, communication functions, or expert directories [6; 8; 14; 17; 19; 25].

Table 1 summarizes the various attributes found in the literature review, and our allocation to the related subordinate question from Malone's framework:

Table 1. Attributes of Innovation Platforms

	Attributes	References
What	NPD Process	[8; 14; 19; 32; 35]
	User Input, Degree of User Elaboration	[6; 17; 28; 31; 35]
	Task Specificity, Solution Space	[6; 17; 28; 31]
	Innovation Focus	[22]
Who	Platform Operator	[6; 17; 25]
	Customer Role	[8; 27]
	User Type, required Knowledge	[6; 8; 14; 17; 31]
	Number of Participants	[14; 22]
Why	Motivation, Incentives	[6; 14; 17; 32]
How	Media (online, offline)	[6; 17]
	Participation (open, closed)	[29]
	Task Duration	[6; 14; 17]
	Governance (Decision Power)	[6; 17; 29]
	Community Functionality	[6; 8; 14; 17; 19; 25]

Due to the specific focus of our study, not all attributes listed in Table 1 are relevant for our present analysis. For example attribute 'NPD Process' (the differentiation by the NPD process stage, see figure 1) is not relevant for our analysis, because we focus on customer integration in the early innovation process phase (the fuzzy front-end), and therefore all platforms under consideration would have the same attribute value. Another example is attribute 'Innovation Focus': Kozinets et al. [22] differentiate between platforms with the direct innovation intention and other platforms where innovative ideas are produced as a by-product (e.g. shopping platforms). Our focus is only on platforms with a direct relation to innovation, and we therefore can exclude this attribute from our further analysis. Also, we do not consider attribute 'Media' because we do not analyze offline customer interaction; neither do we consider attribute Participation because innovation models with closed participation mechanisms are out of our scope of analysis. We also excluded attribute 'Customer Role', because in the NPD ideation phase, the customer always fulfils the role of a 'resource' [27].

Another aspect is that some attributes are certainly valid differentiators of open innovation platforms, but at a rather granular level. With regard to our research questions as defined in section 1, the attributes 'Number of Participants', 'Task Duration' and 'Community Functionality' are not relevant for our study, because they deal with rather detailed questions related to specific process characteristics and platform functionalities. We also excluded the 'Governance' attribute, because in a company-customer context the company always takes the final decision on which ideas or solutions to implement. Open innovation platforms with flat governance would represent Open Source projects as indicated by Pisano and Verganti [29].

Table 2 shows the identified attributes of online innovation platforms relevant for our further analysis. The specified values are also derived from the discussed literature sources. We defined suitable names for these values because the different literature sources were not fully aligned and used different nomenclature to some extent.

Table 2. Attributes and Values for Further Analysis

Attributes	Values	
Platform operator	Company	Third party
User input (or degree of user elaboration)	Ideas & needs	Concepts & solutions
Task specificity (or solution space)	Specific	Not specific
User type (or required knowledge)	Devotee	Expert
Motivation (or incentives)	Monetary	Non-monetary

3. METHODOLOGY

3.1 Data Collection

The objective of this study is to understand the interrelation of open innovation platform attributes, and to identify key differentiators of open innovation platforms for an appropriate market classification. For this purpose, we have performed a structured internet research of freely accessible innovation platforms, to be used for our further evaluation and analysis. This research has been conducted in two parts:

The first part is based on the articles in our literature review (compare section 2.2). We searched the articles for examples of online open innovation platforms and found 195 relevant references. For each platform, we searched in Google if we could find the platform, i.e. if it is still online, and then visited the website. In some cases there was no obvious relation to the topic of innovation, maybe because the website has been changed since it was discussed in the referring article. We found 153 websites which are still online and are related to innovation. Out of these, we excluded all websites where customers cannot directly participate (at current state). This usually happens for two main reasons: The websites were part of a one-time innovation contest which is already completed. Or, the websites are run by innovation software solution companies who follow a B2B business model. Then we excluded the platforms which do not facilitate the 'idea generation and concepts phase' (the fuzzy front-end), but rather design, development, testing or commercialization. We end up with 20 relevant innovation platforms referenced in reviewed literature.

The second part is a Google web search. We applied an iterative search, because relevant websites do not always appear in the Google search results list, but can also be found via post-query browsing [41]. This iterative approach of refining keywords has also been suggested by Creswell [11, p. 34] who acknowledges that "keywords may emerge in identifying a topic". New keywords identified during query browsing were then used in the following Google search iteration. With this approach the list of used search keywords and terms has been continuously amplified in order to obtain the best possible search results. Search results were filtered with the same restrictions as discussed above (direct customer participation possible, focus on the idea generation and concepts phase). Here, we find additional 24 relevant innovation platforms, which add up to a total of 44 innovation platforms for further evaluation.

Details on the selected and evaluated innovation platforms can be found in the appendix.

3.2 Data Evaluation

We have evaluated all 44 online open innovation platforms in our sample with the evaluation framework as shown in Table 2. The evaluation was based on a thorough analysis of the website and all information provided with regards to the attributes under consideration, but without registration and trial-testing.

We found that a few innovation platforms are ambiguous in their approach, e.g. they offer the exchange of ideas but also ask users to provide solutions to specific problems. In these cases, we marked both values as valid.

We also noted that for some innovation platforms a fairly detailed analysis of their business model and their value proposition was required in order to assign these platforms to the different attribute values of our analysis framework. In other words, the assignment of the attribute values was easy in many cases, but more difficult in some other cases. To ensure that our attributes and the defined values are sufficiently reliable and meaningful, we performed the evaluation of all platforms by two authors independently (investigator triangulation). In most cases our evaluations were congruent, but we also had some deviations. We calculated the percentage agreement and also Cohen's kappa as an agreement measure for each attribute. The test results showed a value of Cohen's kappa of at least 0.78 and a minimum observed agreement of 89%, which is a very good result according to Landis & Koch [23]. For those cases where we had a different understanding on the categorization, we discussed all deviations and re-evaluated these cases jointly.

3.3 Data Analysis

All subsequent data analyses are based on the final evaluation of the platforms. To understand how the attributes of innovation platforms inter-relate with each other, we performed a Contingency Analysis and applied the Chi² test of independence.[1] For each pair of attributes we created cross-tabulations with the frequency distributions, resulting in 10 different cross-tabulations. Because some platforms had been evaluated with both values as valid within a single attribute, the cross-tabulations were extended with a third value called 'both'. This led to cross-tabulations consisting of 3x3 matrices, except for the dichotomous attribute 'operator' (2x3 matrices). For each cross-tabulation we then calculated Chi² value and the level of significance for rejecting the null hypothesis of independence of the attributes.

In a second step, we investigated the interrelation of the individual value pairs more deeply. We calculated the Pearson's product-moment correlation coefficient for all values of the five attributes as shown in Table 2, resulting in a 10x10 correlation matrix. The correlation coefficient reflects the degree of linear relationship between the attribute values. It can range between -1

[1] The Chi² test of independence is used as part of our Contingency Analysis. Here, the Chi² test of independence does not require a standard-normal distributed data set. Chi² values are calculated based on comparing expected and examined frequencies. The attributes in our data set are nominal (see Appendix).

and 1, where 1 would indicate perfect positive relation, and -1 perfect negative relation. Thus, we calculated 45 correlation coefficients for comparison of the 10 values.

Having investigated the interrelation of the attributes, we tried to obtain a meaningful classification of innovation platforms based on our representative data sample. We conducted an SPSS cluster analysis on the entire evaluation dataset using the Jaccard measure, and obtained the dendrogram showing the clusters built at each distance. We compared the dendrogram with our platform evaluation and could derive reasonable classes, which fit well with the identified interrelations between the analyzed platform attributes.

4. RESULTS

Overall, the evaluation shows that the attribute values resulted in a rather balanced distribution within our sample of innovation platforms (see Figure 2).

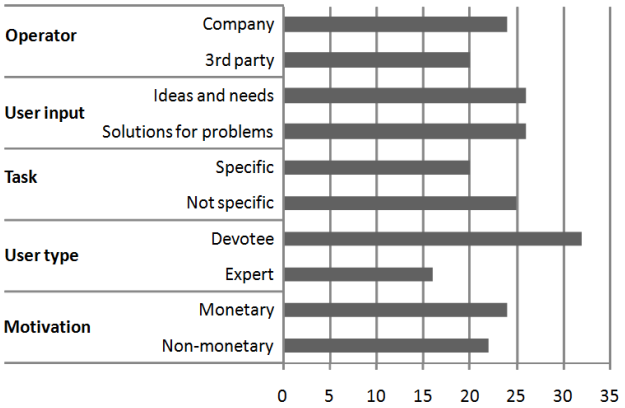

Figure 2. Value Distribution of 44 Platforms

On the one hand, this finding confirms the supposition that the five chosen attributes are relevant and suitable for classifying online open innovation platforms. On the other hand, it indicates significant differences between the evaluated platforms along the examined attributes, as the respective values are rather oppositional.

4.1 Interrelation of Platform Attributes

In a first step, we start to elaborate the question whether the attributes are independent from each other or not. A high independency would indicate that we have to deal with quite a large number of different platform classes, whereas a high dependency suggests having a low number of classes.

With a Chi² test of independence for each pair of attributes we test against the H_0 hypothesis that both attributes of each pair are independent. For each cross-tabulation (pair of attributes) the P-values are below 1%, such that we can reject the H_0 hypothesis of independence at the 1% level of significance: None of the attributes is independent from any other attribute (see Table 3).

However, it is noticeable that we find three cases where the P-value is zero or very close to zero: This applies to the attributes user input, task specificity, and motivation; the dependency between these attributes is obviously very high. Another finding is that the attribute 'Operator' is the least dependent one, showing the largest P-values. Still, even these P-values are within the 1% confidence level, providing sufficient evidence for dependency with the other attributes.

Table 3. Level of Significance (percentage values)

P for Chi² Test (in %)	OP	UI	TS	UT	MO
Operator (OP)					
User input (UI)	0.16				
Task specificity (TS)	0.14	0.00			
User type (UT)	0.61	0.05	0.02		
Motivation (MO)	0.51	0.00	0.00	0.66	

In a second step, we perform correlation analysis between the individual values of the attributes in order to get a better understanding of how the attributes are inter-related. Subsequently, we describe the results from the correlation analysis for each attribute. Because of the symmetry of the correlation matrix we compare correlations only for one of the attribute pairs, i.e. motivation as the fifth attribute in our list is being discussed in the context of all the other attributes. All results from the correlation analysis are shown in Table 4.

Operator: Overall, the correlation of operator values with other attribute's values is low compared to the rest, with absolute r-values between r = 0.37 and r = 0.54. If a platform is operated directly by a company, it rather asks for ideas on improvement

Table 4. Correlation analysis between individual values

Correlation coefficient r		**Operator**		**User input**		**Task**		**User type**		**Motivation**	
		CO	3P	ID	SO	SP	NS	DE	EX	MO	NM
Operator	Company (CO)	1.00									
	3rd party (3P)	-1.00	1.00								
User input	Ideas and needs (ID)	0.54	-0.54	1.00							
	Solutions for problems (SO)	-0.39	0.39	-0.69	1.00						
Task	Specific (SP)	-0.54	0.54	-0.91	0.67	1.00					
	Not specific (NS)	0.49	-0.49	0.95	-0.63	-0.95	1.00				
User type	Devotee (DE)	0.47	-0.47	0.63	-0.51	-0.67	0.60	1.00			
	Expert (EX)	-0.45	0.45	-0.62	0.53	0.64	-0.58	-0.81	1.00		
Motivation	Monetary (MO)	-0.47	0.47	-0.76	0.91	0.74	-0.70	-0.56	0.50	1.00	
	Non-monetary (NM)	0.37	-0.37	0.74	-0.83	-0.64	0.69	0.51	-0.47	-0.91	1.00

and customer needs. Tasks are not very specific, rarely expert knowledge is required, and no monetary (or material) reward is paid for customer contribution. On the contrary, if a platform is operated by an independent third party organization, they rather specify the problems and ask users to develop solutions. Tasks are much more specific and often require expert knowledge, and the best solutions are often rewarded with a (monetary) prize.

User input: User input values show a much higher correlation with the remaining attributes. There is strong evidence (r = 0.95) that platforms asking customers to communicate their ideas and needs are not specific in their task definition. Also, platforms looking for solution to specific problems usually award monetary prizes for the best contribution (r = 0.91). Customers contributing to idea platforms are rather devotees with little technical expertise required (r = 0.63), whereas users trying to solve complicated problems often need some form of expert knowledge in the respective field (r = 0.53).

Task specificity: As shown above, there is a very high correlation between the type of user input required (idea vs. solution), and the specificity of the task. Accordingly there is also a high correlation between specific tasks and required expert knowledge (r = 0.64), as well as monetary incentive schemes (r = 0.74). Less specific tasks require less technical knowledge and are usually not rewarded with a monetary incentive.

User type: In line with the other results, platforms where expert users deal with very specific problems are more likely to offer monetary rewards or other valuable prize (r = 0.51) than platforms where (still devoted) customers share ideas and engage in discussions.

As shown in Table 4, we also calculated correlations between values of the same attribute (intra-attribute correlation). If an attribute is dichotomous, the correlation coefficient is -1.00. This only applies to the operator attribute, because for all other attributes we have evaluated at least some platforms with both values. Nonetheless, the intra-attribute correlation does not provide further insight regarding the nature of the interrelations between the attributes, and hence is not further interpreted.

To summarize the results of the correlation analysis, we find a rather high correlation (highly positive or negative) for all attribute values. This confirms the result from our Chi² test that all attributes are somehow dependent. The correlation coefficients show which values of certain attributes usually occur together with which other values of other attributes ('platforms with value A in attribute X usually have value B in attribute Y'). The stronger the dependency between the values of two attributes, the less suitable are these attributes as single key differentiator for online open innovation platforms.

4.2 Platform Classification

A cluster analysis allows us to systematically identify meaningful types or classes of online open innovation platforms. Having a better understanding of relevant platform clusters within our sample, we are able to identify and analyze the characteristics of these clusters, and relate them with our findings from correlation/dependency analyses (see section 4.1).

After running the cluster analysis in SPSS, we obtain a rooted tree (dendrogram) for all platforms in our sample. Here, the 'closest' and most similar platforms are clustered first, and then the next closest ones, and so on with incrementing distance level. From all 44 platforms, we obtain 14 clusters at the closest distance level 1, which means that we have applied 14 different evaluation schemes, and 30 out of 44 platforms have been evaluated exactly the same as one of the other 14. Between distance level 8 and 11, we obtain a set of seven clusters, whereof three clusters only contain a single platform (obviously because these three platforms are pretty much different from the others).

In a next step, we reviewed the results from the cluster analysis, i.e. the identified clusters and the platform allocation, in detail. This review showed that:

- The three clusters with only a single platform show peculiar characteristics in (at least) some of the attributes and we could not find sufficient similarity to the other platforms in order to allocate them to a different cluster. For our further analysis in this study, we propose that their singular occurrence does not justify a self-contained platform class.
- In the case of one platform, we could obtain a more accurate assignment with a slightly different interpretation and renewed evaluation.
- Splitting one of the clusters into two would better reflect the examined differences of the contained platforms.

Thus, from the results of the cluster analysis, we finally obtained five different clusters of innovation platforms (see Table 5).

Table 5. Clusters and Examples from Cluster Analysis

No.	Characteristics	Examples
1	- Third party operator - Problem oriented, specific tasks, and monetary award for best proposal - Depending on complexity of the task: Devotee or expert	- InnoCentive - NineSigma - Bootb - Idea-Bounty - Crowdspirit
2	- Same as (1), but operated by company	- Cisco I-Prize - YTL myprize - Doritos crash the superbowl
3	- Operated by company - Monetary award, but no specific task (best idea or solution wins) - Obviously no deep expert knowledge required	- MotoFRWD - Tchibo Ideas - Microsoft Imaginecup
4	- Focus on ideas and needs - No specific tasks, no expert knowledge, no monetary award - Often implemented via third party *solution*, but officially operated by company (face to the customer)	- Dell Ideastorm - Starbucks Idea - Ideas.nagios.org - Preideas.com - Easyjet on Getsatisfaction
5	- Same as (4), but operated by third party without company involvement	- Getsatisfaction - Suggestionbox - Pleasefixtheiphone - Foursquare on Getsatisfaction

The allocation of the platforms to clusters provides interesting findings: First, the **platform operator** attribute seems to represent a key differentiator between the clusters: Comparing cluster 1

with cluster 2, and cluster 4 with cluster 5, we were able to observe the operator (either the company itself or an intermediary) as the only major difference between these two cluster groups.

Second, we were able to observe a major difference between clusters 1 and 2 compared to clusters 4 and 5, which substantiates our findings from dependency analyses, especially the correlation coefficient values: While one cluster group specifies specific problems (or challenges) to be solved, with monetary incentives awarded for the best solution, involving customers or users with rather special technical knowledge and expertise, the other group aims at identifying customer ideas and needs, without providing specified tasks and without monetary incentives, addressing a much wider community of users because usually no expert knowledge is required. The identified differences can be summarized as **platform purpose**: The first group aims at 'finding solutions' to defined problems and the second group's purpose is to 'understand customer' requirements, needs and ideas.

The platform purpose as defined can be seen as a key differentiator between the platforms. This finding is also supported by our cluster analysis. Here, the dendrogram shows a separation into two clusters at the largest distance level: One cluster contains all 'find solution' platforms; the other cluster comprises all 'understand customers' platforms.

It has to be noted that one group of online open innovation platforms (cluster 3) cannot be clearly assigned within the dimensions of our classification framework. Cluster 3 is different from the other four clusters in various ways: The respective platforms offer innovation challenges in a certain thematic context without specifying a dedicated problem to be solved; they encourage users to participate by offering prizes for best ideas or concepts; the benefit for the operator is not immediately clear, etc. Presumably, such innovation platforms are operated for the greater good, with the side effects of sustaining relationships with customers and creating a positive brand image for the operating company.

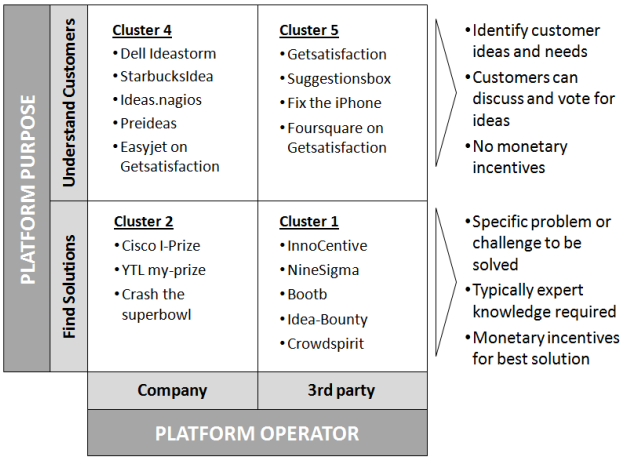

Figure 3. Classification for Innovation Platforms

Summarizing the cluster analysis, we found two key differentiators or dimensions for classification of innovation platforms: One dimension is the platform operator, which is either the benefiting company or a third party entity acting as intermediary. The other dimension is the platform purpose, which represents a combination of four platform attributes (motivation, task specificity, user input and type). Figure 3 spans the classification matrix resulting from these two dimensions and assigns clusters 1, 2, 4 and 5 to the respective quadrants.

This presented classification framework comprehends some interesting findings as basis for further discussion:

1. A new class of online open innovation platforms seems to emerge (cluster 5, top right quadrant). This cluster contains platforms which invite customers to share their ideas for dedicated companies, but they are neither operated by the companies themselves (e.g., like in Dell's Ideastorm), nor are the companies necessarily directly involved (e.g., like Easyjet who interact with their customers on Getsatisfaction).

2. Platforms asking for solutions to specified problems have historically been established by third party operators or intermediaries (e.g., InnoCentive). These platforms have been widely discussed in scientific research [6; 17; 19; 20; 24; 25; 28; 29; 35; 36]. However, we could identify that such challenges are also held directly by companies as in the case of Cisco, Doritos, and YTL. Whether there is a trend that an increasing number of companies organize such innovation challenges themselves would require further analysis (e.g. case studies with companies, or quantitative evaluation of the distribution over time).

3. Innovation platforms can be distinguished by their purpose into two very separate classes (the significance of this partition has been confirmed by the cluster analysis): One class looks for solutions to actual problems and asks externals such as customers to help find the best solution. This is clearly directed towards innovation. The other class asks customers for their opinion, needs, and improvement ideas. The purpose of these platforms could be much more related to customer loyalty and relationship management than actual innovation in its literal meaning.

5. SUMMARY AND DISCUSSION

The objective of this study has been to investigate into key differentiators of online open innovation platforms which are freely accessible on the internet and where customers (or users in a broader sense) can contribute to the generation of ideas and the development of concepts. The analysis results offer new insights with regard to the interrelations and the differentiation potential of major attributes of innovation platforms. A set of five attributes was identified as crucial for describing innovation platforms in our study context. Dependency and correlation analyses have shown that all five attributes are highly dependent on each other, with a slightly lower dependency for one attribute (platform operator). Moreover, a cluster analysis enabled the identification of five meaningful innovation platform clusters. Looking into the differentiating attributes of these clusters, we found two key attributes: platform operator and platform purpose. These attributes also constitute the dimensions of the suggested market classification framework (compare Figure 3).

5.1 Limitations

We acknowledge that this study does not explain the entire space of participation and collaboration related to open innovation. We

focus on freely accessible online open innovation platforms which support the initial innovation process phase of idea generation and concept development. The reason for this focus is simply that a wider view would add significantly more aspects and potential attributes to be considered, resulting in a surplus of complexity and controversy [3] which would be difficult to handle in a single article.

Furthermore, it may be questionable whether we identified all key attributes for evaluating and differentiating innovation platforms. In this context, the balanced distribution of our sample along the selected attributes can be interpreted as an indicator for the suitability and relevance of these attributes.

Another limitation relates to the evaluation of the innovation platforms. Results could be biased by the individual understanding and interpretation of the evaluation attributes and values, and also by the sequence the platforms have been reviewed. However, having used rather objective measures ('yes/no') as well as having applied investigator triangulation (agreement rate of 89 percent after the independent assessment phase), we believe that our evaluation process has been sufficiently accurate.

5.2 Implications for Research and Practice

Based on our findings and especially the suggested classification framework, we were able to identify numerous interesting aspects which require further research:

Platform purpose: There is a broad and intensive research stream related to innovation platforms focusing on solution finding (e.g. [6; 17; 19; 28; 36]). Such platforms are often called 'innovation contests' or 'innovation challenges', as there is a problem announced to be solved and the best result (typically chosen by a jury) wins a prize. We therefore propose that future research also concentrate on the other type of innovation platforms [13], where customers can share and discuss ideas and also vote for their favorite ideas. Critical questions related to these platforms would be:

- What is the 'success rate' of customer idea contributions? What share of customer ideas is really useful and worthy of further investigation? And what is the risk of annoying customers if their ideas are not followed up? How should platform operators interact and communicate with customers in order to 'manage the crowd'?
- Are companies really interested in the ideas of their customers? Or are they just pretending to listen, but their real intention is to entertain their customers in order to enhance customer loyalty? Is there a trend that open idea creation platforms are rather used in a customer relationship management context, as part of a so-called 'CRM 2.0'?

We also found that platforms focused on understanding customer ideas and run by third party operators (top right quadrant in our framework) have been so far widely ignored by scientific research. Here, we propose to further analyze the long-term perspective and underlying business model of such platforms in absence of direct company involvement.

Platform operator: We found that innovation platforms for both purposes in our framework ('find solutions' and 'understand customers') can be operated either by companies or by intermediaries. Future research needs to examine the implicit differences and consequences for customers and companies related to this dimension. Our initial assumption would be that platforms run by intermediaries might attract a larger total number of users, enabling them to better leverage 'cross-selling' potential for individual sub-sections of their platform. By contrast, platforms operated directly by companies seem to be particularly suitable for creating a stronger corporate brand and image, for instance, by attracting a 'user/fan community'. However, as stated above, this initial assumption still requires further investigation.

Our research findings also suggest important implication for practice. Companies interested in setting up and/or using an innovation platform for their customers may use our classification framework as a 'big picture' of possible solutions in order to decide which platform suits best their needs. But an important question for practitioners still requires further in-depth analysis: 'Which type of innovation platform works for me'. Investigating this question will require first of all a definition of the different possible objectives of running an innovation platform, then deriving a definition of success metrics and KPIs considering the different customer relation and innovation environments, and finally the measurement of the success metrics and a discussion of implications for the companies.

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7. APPENDIX

Table 6. Online Open Innovation Platforms and Evaluation (alphabetical order)

Attributes:		Operator		User input		Task specificity		User type		Motivation	
No.	**Innovation Platform**	**CO**	**3P**	**ID**	**SO**	**SP**	**NS**	**DE**	**EX**	**MO**	**NM**
1	Adobe Ideas (via Brightidea)	●		●			●	●			●
2	Atizo		●	●	●		●	●		●	
3	Aufbruch Bayern (via Hyve)	●		●	●		●	●		●	
4	Battle of Concepts		●		●	●			●	●	
5	BeeQuu		●	●	●	●	●		●	●	●
6	Ben & Jerry Suggest a Flavor	●		●		●		●			●
7	BMW Virtuelle Innovations-Agentur	●		●			●	●	●		●
8	Bootb.com		●		●	●		●		●	
9	Brainfloor		●		●	●			●	●	
10	Changemakers		●		●	●		●	●	●	
11	Cisco i-Prize	●			●	●			●	●	
12	CrowdSpirit		●		●	●		●	●	●	
13	Dell Ideastorm	●		●			●	●			●
14	Doritos: Crash the Superbowl	●			●	●		●		●	
15	Easyjet (via GetSatisfaction)	●		●			●	●			●
16	Foursquare (via GetSatisfaction)		●	●			●	●			●
17	Getsatisfaction		●	●			●	●			●
18	Google Chrome (via Suggestionbox)	●		●			●	●			●
19	Healthcare Debate (via Ideascale)	●		●			●	●			●
20	Idea-Bounty		●		●	●		●		●	
21	Ideawicket		●		●	●			●	●	
22	InnoCentive		●		●	●			●	●	
23	Innoget		●		●	●			●	●	
24	Innovation Exchange		●		●	●			●	●	
25	Intel Leibniz Challenge	●			●	●		●		●	
26	Kraft "Innovate With Kraft"	●		●			●	●			●
27	Mendeley (via Uservoice)	●		●			●	●			●
28	Microsoft Imagine Cup	●		●	●		●	●		●	
29	Motorola	●		●	●		●	●		●	
30	myStarbucksIdea	●		●			●	●			●
31	Nagios (via Ideascale)	●		●			●	●			●
32	NineSigma		●		●	●			●	●	
33	NoAE Innovation Competition	●		●			●	●			●
34	One billion minds		●		●	●		●		●	●
35	Palm Pre (via Ideascale)	●		●			●	●			●
36	Planet Eureka		●		●	●			●	●	
37	Please fix the iPhone		●	●			●	●			●
38	SAP Sapiens (via Hyve)	●		●	●		●	●			●
39	Suggestionbox		●	●			●	●			●
40	Tchibo	●		●	●		●	●		●	
41	Vodafone ßvine	●		●	●		●	●	●		●
42	WePC.com	●		●			●	●			●
43	YourEncore		●		●	●			●	●	
44	YTL myprize	●			●	●			●	●	

CO = Company; 3P = 3rd Party; ID = Ideas & needs; SO = Solution for problems; SP = Specific; NS = Not specific; MO = Monetary; NM = Non-monetary
Double-selection possible within single attribute