

# Configuring intellectual property management strategies in co-creation: A contextual perspective

Anja Tekic & Kelvin W. Willoughby

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## Abstract

Tension between dynamic innovation activities and conventional static methods of intellectual property ('IP') protection pushes companies to cultivate new IP management strategies that are responsive to the dual challenges of control and openness of IP in co-creation projects. Great openness may obstruct appropriation of benefits from co-creation outcomes, while great control may demotivate individual external contributors and impede their contributions to corporate innovation projects. Finding an appropriate approach to harmonizing control and openness of IP is complicated by the peculiarities of the context of co-creation, yet the issue of the context dependence of IP management in co-creation has thus far received only minor attention in the innovation management literature. Hence, arguing that management of IP needs to be customized to match the specificities of particular co-creation projects, we conducted exploratory research intended to investigate what IP management strategies companies actually adopt in distinctive co-creation contexts, as well as how those IP management strategies differ across the co-creation contexts. Drawing upon the results of an analysis of 111 co-creation projects from the automotive industry, we provide an overview of 17 unique configurations of IP management strategies employed by companies, revealing notable contrasts between different co-creation contexts. By emphasizing the importance of adopting a contextual perspective on IP management in co-creation, this paper addresses current limitations of academic research at the interface of IP and co-creation and provides guidelines to project managers about which IP management strategies may be most prudent for specific co-creation contexts.

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# **Configuring intellectual property management strategies in co-creation: A contextual perspective**

Anja Tekic & Kelvin W. Willoughby

## **Introduction**

Intellectual property ('IP') has become enormously important in the knowledge-based, innovation-driven economy of the 21st century. As corporate value worldwide is increasingly derived from intangible assets, a great share of which is accounted for by IP, companies accordingly tend to rely upon IP rights to protect and extract value from their innovations (Candelin-Palmqvist, Sandberg, & Mylly, 2012). However, the recent trend towards open innovation, in which innovative companies draw upon the activities of multiple external actors to augment or support corporate product innovation projects, has made the management of IP in such projects more complex and challenging (Bogers, 2011; Bonabeau, 2009; H. Chesbrough, 2003; Huizingh, 2011; Lakhani & Panetta, 2007).

In this paper we focus on a specific manifestation of open innovation, namely co-creation, which we define as collaborative innovation initiated by a company, involving individual external contributors or co-creators—not just customers, but also students, researchers and specialized experts, etc.—who may provide valuable input to the company's innovation projects (Tekic & Willoughby, 2018). Co-creation requires the contribution of information, knowledge and IP from both the company's side and the co-creators' side, and it involves the generation of new intellectual assets and associated IP rights, for example, patents, copyright, design rights or trade secrets, or even trademarks. Thus, co-creation is almost inevitably followed by challenges related

to IP protection and ownership (Antorini & Muñiz Jr., 2013; Boudreau & Lakhani, 2013; Greer & Lei, 2012; Hienerth, Keinz, & Lettl, 2011).

The need for harmonizing control and openness of the IP in collaborative innovation, exacerbated by the tension between dynamic innovation activities and conventional static methods of IP protection, pushes companies to cultivate new approaches to IP management that facilitate rather than obstruct involvement of multiple external actors into corporate innovation (Alexy, Criscuolo, & Salter, 2009; Laursen & Salter, 2014; Lee, 2009; O'Hern & Rindfleisch, 2010). This challenge is recognized in both the co-creation and general open innovation literatures (Bogers, 2011; de Beer, McCarthy, Soliman, & Treen, 2017; Henkel, Baldwin, & Shih, 2013; Miozzo, Desyllas, Lee, & Miles, 2016). Too open and permissive an approach to IP management in collaborative innovation leads to difficulties in IP management, such as troublesome IP protection and difficulties in appropriating benefits from innovation. Conversely, too controlling and restrictive an approach to IP management has the potential of obstructing or even killing collaborative innovation, by demotivating external actors from contributing their ideas and solutions due to their perception of being treated unfairly with regards to IP. Finding an appropriate IP strategy is additionally exacerbated by the peculiarities of the context of collaborative innovation. Given that a 'one-size-fits-all' approach to IP management in collaborative innovation is not viable, companies need to adapt their IP management strategies to the specificities of particular projects (Alexy et al., 2009; Belenzon & Schankerman, 2015; de Beer et al., 2017; Giannopoulou, Yström, & Ollila, 2011; Lakhani & Panetta, 2007).

During the last decade a notable body of published research has appeared on the variety of IP management strategies that companies adopt to cope with the tension between control and openness in inter-firm and university-industry collaboration, with

special attention having been given to strategies based on employment of different appropriation mechanisms (Aloini, Lazzarotti, Manzini, & Pellegrini, 2017; Gama, 2018; Stefan & Bengtsson, 2016; Zobel, Lokshin, & Hagedoorn, 2017), IP modularity and selective revealing (Henkel et al., 2013; Henkel, Schöberl, & Alexy, 2014), and co-ownership of IP resulting from collaborative innovation (Belderbos, Cassiman, Faems, Leten, & Van Looy, 2013; Drechsler & Natter, 2012). At the same time, issues of IP management in collaborative innovation with individual external contributors have been attracting the attention of innovation management scholars, calling for further research at the interface of co-creation and IP management (Bartl, Füller, Mühlbacher, & Ernst, 2012; de Beer et al., 2017; Hoyer, Chandy, Dorotic, Krafft, & Singh, 2010; Mazzola, Acur, Piazza, & Perrone, 2018).

Previous research has identified IP protection issues related to companies' and co-creators' input to co-creation projects, such as the risks of involuntary transfer of companies' knowledge across corporate boundaries (Bonabeau, 2009; Füller & Matzler, 2007; Greer & Lei, 2012), unfair exploitation or appropriation of co-creators' input by initiating companies (Abhari, Davidson, & Xiao, 2018; Bartl et al., 2012; Füller & Matzler, 2007) or by other co-creators through replication, theft and imitation, or free-riding (Bauer, Franke, & Tuertscher, 2016; Bockstedt, Druehl, & Mishra, 2016; Natalicchio, Messeni Petruzzelli, & Garavelli, 2014). Nevertheless, information in the literature about alternative strategies that companies adopt to manage IP related to co-creation outcomes is still sparse. Research on crowdsourcing, seen as a way of involving individual external contributors in corporate innovation, emphasizes the importance of employing more restrictive IP management approaches that would enable companies to appropriate the benefits of innovation by obtaining ownership of the winner's solution or by acquiring a license to exploit that solution (de Beer et al., 2017;

Mazzola et al., 2018; Mortara, Ford, & Jaeger, 2013). On the other hand, research on community-based innovation has raised the issue of restrictive IP management approaches tending to deter collaborative innovation and collective creativity, and has thereby highlighted the virtues of free revealing, or employing Open Source or Creative Commons licenses, in such an environment (Albors, Ramos, & Hervas, 2008; Benkler, 2017; Harwood & Garry, 2014). Scattered evidence about the different IP management strategies that companies may adopt for different forms of involvement of individual external contributors in corporate innovation, as well as evidence about the potential significance of the co-creation context for making decisions about IP management strategy, may be found in the literature emanating from that research. Nevertheless, comprehensive studies that take various contexts into account when discussing IP management in co-creation are very limited (Alexy et al., 2009; Boudreau & Lakhani, 2013; Felin & Zenger, 2014), leaving the issue of contextual dependence of IP management still largely unexplored in the co-creation literature. Researchers in the field to date have limited their attention to a specific co-creation context of interest, excluding other co-creation contexts from the scope of the research.

Thus, arguing that companies need to customize their IP management strategies to match the specific type of co-creation they practice, in this study we adopt a contextual perspective on IP management in co-creation. Being mindful of the need for companies to artfully combine control and openness of IP in co-creation projects, we conducted exploratory research intended to answer the following questions: (1) *what IP management strategies do companies actually adopt in distinctive co-creation contexts;* and (2) *how do those IP management strategies differ across the co-creation contexts?* Seeing co-creation as a company-centric approach to collaborative innovation, by ‘IP management’ we are concerned with the means that initiating companies employ to

protect the co-creation outcomes and with the manner in which they arrange ownership and user rights of those outcomes.

With the dual aims of both addressing current limitations in published academic research at the interface of co-creation and IP management, and providing guidelines to innovation practitioners about how to manage IP in different co-creation contexts, in this paper we offer an overview of IP management strategies adopted by companies in different co-creation contexts.

The next section of the paper contains an outline of the background theory and conceptual considerations of our research, and addresses both the IP management strategies that companies adopt in co-creation and the different co-creation contexts that may influence the choice of an adequate IP management strategy. The research methodology adopted in this study is then described, together with details about data collection and data analysis. The results section comprises a comparative overview of alternative IP management strategies adopted by companies in different co-creation contexts. The final section consists of discussion and concluding remarks about theoretical and managerial implications of the current research, as well as its limitations, and contains suggestions for further research.

### **Theoretical background and conceptual considerations**

Increasingly, managers of companies challenged by environmental uncertainty and the complexities of innovation are mindful that to accelerate innovation they need to tap into both internal and external sources of knowledge (Huff, Moeslein, & Reichwald, 2013). Advocates of this type of innovation strategy, typically referred to as ‘open innovation,’ extol the virtues of companies transforming their closed boundaries into semi-permeable membranes, enabling innovation to move easily between the external and internal environments of the firm (Chesbrough, 2003). Adopting such an approach

can make it more difficult and troublesome for companies to appropriate benefits from innovation (Belderbos et al., 2013; Dahlander & Gann, 2010; Fowles & Clark, 2005). Thus, mastery of IP management—understood as a sophisticated discipline for designing and implementing IP strategies along the entire innovation process—is an imperative for companies who wish to achieve and sustain a competitive advantage (Ernst, 2017).

The innovation management literature lacks a generally accepted clear definition of IP, partly due to the interdisciplinary character of the topic (Candelin-Palmqvist et al., 2012), but the central place of IP in our research requires positing a formal definition. Drawing upon widely accepted conventions about the underlying subject matter of IP as promulgated by the World Intellectual Property Organization (WIPO, 2003) and commentary from scholarly sources (Cornish, Llewelyn, & Alpin, 2013; Goldstein & Landova, 2015; Willoughby, 2013), intellectual property is therefore formally defined here as that class of intangible assets on which legal rights have been conferred by a sovereign state whereby the recipients of those rights possess the authority to exclude others from using, making, selling, distributing, importing, copying or otherwise exploiting those assets without permission.

Some intangible assets (e.g., technical ideas that are not novel, or ‘secrets’ that neither pertain to commerce nor are actually secret) may not accrue legal IP rights, as such, and hence are not included here as part of what we have labelled as ‘intellectual property.’ However, the range of intangible materials and intellectual results of co-creation projects that are eligible for IP protection (e.g., novel and non-obvious technical ideas, new product designs, original text, original graphics, or classified business information, and even some types of business or product ideas) is substantial. Thus, in this paper we do not use the term ‘intellectual property’ as a synonym for

‘intangible assets’ in general, but for a narrower sub-category of intangible assets. We also recognize that some intangible subject matter involved in co-creation projects that does not strictly speaking qualify as ‘intellectual property’ may nevertheless be protected by implicit or informal norms-based practices under which its creators obtain *de facto* rather than *de jure* exclusive rights over their creations (Bauer et al., 2016; Fauchart & von Hippel, 2008).

### ***IP management in co-creation***

It has been observed that, in contrast with conventional corporate alliances and joint ventures, in which corporate agreements are typically well defined and formalized, relationships between companies and individual external contributors are generally ruled by loose or informal contractual obligations, with the result that in co-creation projects companies do not enjoy the same power of monitoring and enforcement of obligations to which they are accustomed with formal industrial partners (Rayna & Striukova, 2015). Thus, explicit contractual terms and conditions need to be determined for each co-creation project, to ensure proper, fair and transparent treatment of IP, especially with regards to ownership of co-creation outcomes, licensing arrangements between the company and co-creators, and compensation of co-creators (Antorini & Muñoz Jr., 2013; Boudreau & Lakhani, 2013; Brem, Bilgram, & Gutstein, 2018; de Beer et al., 2017; Standing & Standing, 2018).

Transfer of the ownership of co-creation outcomes to the initiating company is seen as critically important ingredient of the company’s quest to appropriate value from innovation and govern the revenue streams that will come from it (de Beer et al., 2017; Feller, Finnegan, Hayes, & O’Reilly, 2012). Obtaining private corporate ownership gives companies control over the IP, freedom to use it and to fully exploit it as they wish, and the opportunity to accumulate know-how at low cost (Chatterji & Fabrizio,



2014; Hienerth et al., 2011; Mazzola et al., 2018). Nevertheless, assignment of all the IP to the company may also be seen to be demotivating for co-creators, and thereby as retarding and impeding collaborative innovation (Albors et al., 2008; Benkler, 2017; Bogers & West, 2012).

Conversely, licensing arrangements in co-creation do not involve transfer of ownership from co-creators to initiating companies, but rather determine specific terms under which companies may exploit co-creation outcomes. Companies may acquire exclusive licenses to co-created solutions, under which co-creators may neither grant any other licenses to third parties nor use the solutions themselves, or non-exclusive licenses, leaving co-creators the right to grant licenses to third parties or to use solutions themselves (de Beer et al., 2017; Mazzola et al., 2018; Pitkänen & Lehto, 2012). Companies may also employ Open Source or Creative Commons licenses in co-creation as institutional mechanisms by which onerous or extreme control over IP is eschewed, but under which IP rights are still asserted. Such licensing arrangements are not used as a blocking device to exclude others, but as a mechanism to include them, with some amount of regulation and control (Benkler, 2016; de Laat, 2005; Parmentier & Mangematin, 2014). In this way, companies create extensive opportunities to promote broad-based creativity and inventive activity in the wider community, thereby increasing the efficiency and effectiveness of companies' R&D, enabling the growth of innovative ecosystems, and securing dominant market positions for companies, or boosting corporate profits (Belenzon & Schankerman, 2015; Benkler, 2017; Nagle, 2018). Nevertheless, even though such 'inclusive' and permissive licensing arrangements may be a driving incentive for contribution and more committed involvement in co-creation, they leave a company without full IP ownership or control,

thereby potentially restricting its ability to appropriate value from the co-created IP (Dahlander & Gann, 2010; Henkel et al., 2013).

Finally, companies structure compensation in different ways, combining monetary and non-monetary rewards, to recompense co-creators for their efforts and/or for the IP (Bonabeau, 2009; Boudreau & Lakhani, 2013; Füller, 2010; Mortara et al., 2013). Especially when transferring their IP to the initiating company, co-creators tend to have greater expectation of a reward and companies may need to be sensitive to the motivations of co-creators (Antorini & Muñoz Jr., 2013; de Beer et al., 2017). Also, companies possess a preference for monetary rewards, i.e., for paying for the external knowledge, as opposed to just taking it or using it gratuitously. This is because by employing monetary rewards companies are essentially ‘buying’ rights to co-creation outcomes (Felin & Zenger, 2014; Terwiesch & Xu, 2008). In other words, corporate managers may worry that freely revealed external knowledge is not easily controlled, that applying it may require great coordination effort, and that exploiting other people’s ideas without financial consideration may, under some circumstances, raise potential legal, ethical and public-relations issues associated with exploiting the unpaid work of co-creators (Schaarschmidt & Kilian, 2014; Standing & Standing, 2018).

### ***Importance of the co-creation context for IP management***

‘Context’ as a research framework has received significant attention in the management literature, emphasizing primarily the importance of, for example, geography, industry, and culture (Dess, Ireland, & Hitt, 1990; Feldman & Florida, 1994; Hofstede, 1994; Nakata & Sivakumar, 1996). Nevertheless, as the contextual perspective in innovation management research has become more prominent, the meaning of ‘context’ *vis-à-vis* innovation has broadened (Tekic & Willoughby, 2017) and now embraces a variety of conditions or factors typically associated with the intra-organizational milieu, such as

firm size, firm type, product life cycle stage, product development stage, innovation type, or the degree of the product innovativeness (Huizingh, 2011; Ortt & Duin, 2008; Tidd, 2001).

The innovation management literature presents a number of different innovation-relevant contextual frames that might be pertinent, in principle, to making decisions about which IP management strategy should be adopted in co-creation. Examples include the industrial setting and business model (Lakhani & Panetta, 2007), the type and degree of innovation (Zobel et al., 2017), the technological environment and knowledge distribution (Alexy et al., 2009), or the development stage and knowledge domains (Mazzola et al., 2018). Nevertheless, informed by some evidence from the literature that, on one hand, companies engaged in crowdsourcing projects tend to acquire all the rights to co-creation outcomes (Boudreau & Lakhani, 2013; de Beer et al., 2017; Felin & Zenger, 2014; Mazzola et al., 2018; Mortara et al., 2013), and that, on the other hand, companies engaged in collective community-based co-creation projects tend to employ Open Source or Creative Commons licenses, or even to freely reveal co-creation outcomes (Albors et al., 2008; Benkler, 2017; Boudreau & Lakhani, 2013; Felin & Zenger, 2014; Harwood & Garry, 2014), we argue that particular characteristics and conditions of co-creation projects, engendered by the number of individual external contributors involved in the co-creation of a single solution, create distinctive contexts for IP management.

In this sense, we differentiate between two types of co-creation, namely ‘company-to-one’ (*one co-creator—one solution*) and ‘company-to-many’ (*many co-creators—one solution*) co-creation (Tekic & Willoughby, 2018). Characterized by the differences in the volume of existing relationships in a co-creation project, the potential for recombination of contributions, and the potential for IP control, co-creation types

may influence the decision about which IP management strategy should be adopted in a specific context.

Within company-to-one co-creation, co-creation of a single solution takes place between the initiating company and only one co-creator (Tekic & Willoughby, 2018). Such co-creation happens in crowdsourcing innovation contests, where the solving of a company's defined product innovation problem is outsourced to a loosely defined, generally large, group of people who may possess relevant knowledge (Ghezzi, Gabelloni, Martini, & Natalicchio, 2018; Jeppesen & Lakhani, 2010). Even though a company may collect numerous potential solutions to its problem, all the solutions represent separate contributions (Boudreau & Lakhani, 2013), and the actual co-creation takes place with a single co-creator, the contest winner, who may be involved in further stages of product innovation. Company-to-one co-creation also takes place in collaboration of a company with an individual expert purposefully selected for a specific project. Thus, in accordance with its above-mentioned characteristics, company-to-one co-creation represents a context where the number of existing relationships in the co-creation of one solution is small, where the potential for spontaneous recombination of contributions is low, and where IP can be straightforwardly controlled.

Conversely, within company-to-many co-creation, co-creation of a single solution takes place between a company and a group of co-creators who are supported to co-create among themselves and join their efforts to solve a specific problem (Tekic & Willoughby, 2018). Such co-creation based on joint product innovation and collective intelligence happens in, for example, online communities, lead user workshops, hackathons or living labs. In such an environment co-creators typically freely reveal or share their intangible assets which are inevitably combined, making it difficult to

determine individual contributions and thus making the protection of IP very challenging (Boudreau & Lakhani, 2013; Jeppesen & Frederiksen, 2006). In accordance with its above-mentioned characteristics, company-to-many co-creation represents a context where the number of existing relationships in co-creation of one solution is great, where the potential for spontaneous recombination of contributions is high, and where IP cannot be easily controlled.

Thus, by looking at co-creation from the perspective of the number of individual external contributors involved in the co-creation of a single solution, we distinguish two different contexts of potential relevance for IP management in co-creation.

## **Methodology**

Given the paucity of theory and empirical evidence in the literature dealing specifically with alternative IP management strategies in collaborative innovation between companies and individual external contributors, we conducted exploratory qualitative research on IP management in co-creation by collecting, generating and analysing information on IP management from multiple co-creation projects.

In view of the fact that a single company may actually adopt a variety of IP management strategies across different co-creation projects, we adopted the individual co-creation *project* itself, rather than the firm that initiated the project, as the basic unit of analysis for our research. Adopting a data-rich qualitative research approach enabled us to both understand how IP was managed in each individual case and to capture the diversity of IP management strategies across cases.

## ***Data collection***

Motivated by the great number and variety of identifiable co-creation projects initiated by automotive companies, we decided to focus this study specifically on how IP is

managed in co-creation within the automotive industry. Insights from industry reports (Hitachi Consulting, 2017; PwC, 2013) show that automotive companies are the leaders in collaborative innovation with external actors across corporate boundaries. Starting with involving customers in product innovation for the purpose of taking advantage of mass customization techniques enabling the configuration and personalization of cars, automotive companies have explored distinctive co-creation practices by involving any interested individuals with the required set of expertise and experience into their innovation projects. The automotive industry has also garnered great attention in the academic literature on open and collaborative innovation, given that a car has become a ‘platform’ for different technologies, pushing automotive companies to look for know-how outside their organizational boundaries (Ili, Albers, & Miller, 2010; Mueller-Seitz & Reger, 2010; Schuster & Brem, 2015; Wilhelm & Dolfsma, 2018).

Our broad Internet-based search for co-creation projects initiated by automotive companies—identifiable from within their corporate websites, corporate single-project and multi-project platforms, as well as within intermediary open innovation platforms—provided us with a pool of 168 pertinent cases. To enable collection of qualitative data about how IP was managed in individual co-creation projects, we searched for the projects’ terms and conditions. The written terms and conditions may be seen as the ‘legal cornerstone’ of co-creation projects as they describe and determine upfront how IP is handled (de Beer et al., 2017). Within our initial sample of 168 co-creation projects we were able to obtain terms and conditions for only 111 projects. The terms and conditions of the remaining projects were neither attached to the project website nor publicly available on any other website related to the project or to the initiating company. Further Internet search for the missing terms and conditions, beyond these sources, did not yield any results. Thus, we were able to conduct analysis of IP

management in co-creation based on the data contained within the terms and conditions of projects for about 67% of the initial sample.

Our final sample of 111 cases of distinct co-creation projects, comprised 79 company-to-one and 32 company-to-many co-creation projects. The co-creation projects were initiated by 17 different automotive companies, with headquarters in Germany, USA, UK, South Korea, Japan, Italy, the Czech Republic and France, ranging from around 100 to 640,000 employees and from around 10 years up to 140 years of operation. The identity of the initiating company was kept confidential in the cases of 20 projects in our final sample.

Our focus on the automotive industry allowed us to generate a sample of co-creation projects that involved a variety of co-creation approaches (crowdsourcing contests, co-creation workshops, hackathons, community-based innovation, etc.), situated in both online and offline co-creation settings. Within the set of 79 company-to-one co-creation projects (see Appendix 1) there were 49 projects organized on online intermediary platforms (33 *eYeka*, 14 *jovoto*, and 2 *HYVE Crowd* projects), 26 projects organized on online corporate multi-project platforms (23 *Local Motors Launch Forth* and 3 *BMW Co-Creation Lab* projects), and 4 projects organized on online corporate single-project platforms (2 *Daimler AG*, 1 *Ford Motor Company* and 1 *Volkswagen AG* projects). Within the set of 32 company-to-many co-creation projects (see Appendix 2) there were 9 projects organized in the offline setting (3 *Audi AG*, 2 *Jaguar Land Rover Automotive PLC*, 2 *Daimler AG*, 1 *BMW AG* and 1 *Toyota Motor Corporation* projects), 22 projects organized on an online corporate multi-project platform (*Local Motors Launch Forth*) and 1 project organized on an online intermediary platform (*HYVE Crowd*).

## ***Data analysis***

To extract maximum value from the available qualitative data in our data set we adopted an iterative process of data reduction, data display, and conclusion-drawing, following the established data-analysis approach of Miles and Huberman (1984). This procedure enabled us to identify what IP management strategies companies actually adopt in distinctive co-creation contexts, as well as how those IP management strategies differ between co-creation contexts.

First, to examine the IP management strategies used by companies in each co-creation project in our final sample of 111 cases, we analysed the projects' terms and conditions by the means of *qualitative content analysis* (Hsieh & Shannon, 2005; Mayring, 2004). We used a hybrid approach to content analysis (Fereday & Muir-Cochrane, 2006), incorporating both deductive (based on existing theoretical concepts) and inductive (based on collected data) approaches to category system development (as in Hutter, Hautz, Füller, Mueller, & Matzler, 2011; Lettl, Herstatt, & Gemuenden, 2006). Such a hybrid approach supported guided but not restrained content analysis, congruent with the exploratory nature of this research. We first determined three broad *a priori* categories that were emphasized in the literature in discussions of IP management practices that companies adopt in co-creation (Antorini & Muñoz Jr., 2013; Boudreau & Lakhani, 2013; de Beer et al., 2017; Felin & Zenger, 2014; Mazzola et al., 2018), namely: transfer of ownership from co-creators to the initiating company; licensing arrangements between co-creators and the company by which the company obtains the rights to use co-creation outcomes; and, the compensation structure, i.e., rewards that co-creators receive for their effort and IP. We commenced the content analysis of terms and conditions based on these *a priori* categories, but allowed new categories that supported enhanced characterization of IP management in co-creation to



emerge directly from analysis of the collected data. This led to iterative refinement and revision of the category system during analysis. In addition to data that could be easily classified within the three *a priori* categories, our analysis of the terms and conditions of the co-creation projects generated information about three new categories of IP management practices, namely: the use of non-disclosure agreements (NDAs); employment of potential additional agreements between the company and co-creators not otherwise specified within the terms and conditions as such; and, inclusion of a waiver option by which companies agree to return the rights they obtained through transfer of ownership or different licensing arrangements back to co-creators within a specific period of time if they decided not to use co-creation outcomes. All the terms and conditions of all the projects were then reanalysed according to the final six categories, which we label here as ‘IP dimensions,’ namely: (1) *transfer of ownership*; (2) *licensing arrangements*; (3) *compensation structure*; (4) *NDAs*; (5) *additional agreements*; and (6) *waiver option*.

Supported by reduction-oriented quantitative tabulations, we then compared the individual cases and aggregated the results of the content analysis to create case clusters. Clustering the cases based on different configurations of IP dimensions enabled us to identify various IP management strategies adopted in 111 co-creation projects. We identified 11 different configurations in the context of company-to-one co-creation and 9 different configurations in the context of company-to-many co-creation. For each configuration we selected representative case(s) to illustrate the adopted IP management strategy in co-creation. With the goal of exemplifying distinctive or unique examples of project terms and conditions, one representative case was selected within a single setting, i.e., online intermediary platforms (*eYeka*, *jovoto*, or *HYVE Crowd*), online corporate platforms (multi-project platforms, such as *Local Motors Launch Forth*

and *BMW Co-Creation Lab*, or single-project platforms), or different offline settings. Thus, due to the variety of cases within a single identified configuration of IP dimensions, some IP management strategies were illustrated by more than one representative case. There were 27 representative cases selected in total, 15 cases for IP management strategies in the context of company-to-one co-creation and 12 cases for IP management strategies in the context of company-to-many co-creation.

### **IP management in different co-creation contexts: Results**

Our analysis of how companies manage IP in co-creation projects according to six IP dimensions—namely, transfer of ownership, licensing arrangements, compensation structure, NDA, additional agreements and the waiver option—enabled us to identify salient links between co-creation contexts and IP management strategies. The results of this exploratory analysis are summarised below.

#### ***IP management in company-to-one co-creation***

In the company-to-one co-creation context, co-creation of a single solution takes place between the initiating company and only one co-creator. Each of the 79 analysed cases of company-to-one co-creation projects incorporate the use of online crowdsourcing contests, organized either on the companies' own single-project and multiple-project platforms, such as *Local Motors Launch Forth* or *BMW Co-Creation Lab*, or via a third-party platform, such as *jovoto*, *eYeka* or *HYVE Crowd*, that acts as an innovation intermediary between companies and co-creators.

Among the analysed company-to-one co-creation projects, we identify 11 IP management strategies based on distinctive configurations of the six IP dimensions (Table 1).

There are 15 company-to-one co-creation projects, organized on *Local Motors* and *jovoto* platforms, in which the IP management strategy is based on combining full transfer of ownership with monetary compensation, while excluding NDAs, additional agreements and the waiver option. This IP management strategy may be illustrated by selected excerpts from the terms and conditions of the representative projects. For example, in the case of *LM Autonomous* (a *Local Motors* project), the winners of the contest needed to ‘*assign and agree to assign to Local Motors all right, title, and interest (including any and all intellectual and industrial property rights of any sort throughout the world) in and to such Selected Design, and every part or piece thereof.*’ Co-creators were compensated by a monetary prize, in return for the transfer of ownership of co-creation outcomes to the initiating company. Conversely, in the case of *Skoda Experience*, by participating in the project ‘*all rights (were) automatically passed to the client (of jovoto),*’ while all participating co-creators were compensated by a monetary prize.

We identify an additional 35 company-to-one co-creation projects, organized on the *eYeka* and *jovoto* platforms, in which the IP management strategy is based on the combination of full transfer of ownership and monetary compensation, with the additional employment of a non-disclosure agreement (NDA). This IP management strategy may be also be illustrated by selected excerpts from the terms and conditions of the representative projects. For example, in the case of *Citroen Design* (an *eYeka* project) the winners of the contest needed to ‘*sign an assignment of rights agreement and assign the intellectual property rights on winning submissions to the company on behalf of which eYeka (had) organized the contest,*’ in exchange for the monetary prize. The winners also needed to agree to ‘*keep the submission and the fact that he/she (had) assigned the intellectual property rights on the submission to the company as*

*confidential and not disclose such elements to any third party.*’ Conversely, in the case of *VW Buzz 2* (a *jovoto* project), winners of the contest transferred ownership rights to the initiating company in exchange for a monetary prize, while additionally agreeing not to disclose any confidential information in relation to the company or co-creation project.

Within our set of company-to-one co-creation projects, we identify one more IP management strategy based on full transfer of ownership. In contrast with the previous two strategies, this strategy combines full transfer of ownership with non-monetary compensation, while ignoring the employment of NDAs, additional agreements and the waiver option. Such a strategy is adopted in only one project, namely *Conf PKW*, organized on the *HYVE Crowd* platform, keeping the identity of the initiating company confidential. Winners of the contest agreed to assign all IP rights to the company, while being compensated by a non-monetary prize (i.e., an iPad).

In the rest of the cases within our set of company-to-one co-creation projects, ownership rights remained with co-creators. To be able to use co-creators’ IP for commercial, research or development purposes, the companies that initiated these projects set up distinctive licensing arrangements.

There are 12 company-to-one co-creation projects, organized on the *jovoto* and *BMW Co-Creation Lab* platforms, in which the IP management strategy is based on the employment of an exclusive license, by which a company obtains the rights to use the outcomes of co-creation, combined with monetary compensation. The following two projects may act as examples to illustrate this IP management strategy. In the case of *Audi Light* (a *jovoto* project) the winners of the contest needed to ‘*agree to jovoto passing the exclusive rights to the client (Audi AG)... in case the client wishes to license it.*’ Conversely, in the case of *BMW Trunk* (a *BMW Co-Creation Lab* project) the

winners of the contest needed to ‘*assign the right of use without any limitation in terms of geography, time or content, ... to BMW without further conditions and without any additional consideration.*’ Such exclusive licensing arrangements leave the co-creators with no rights to use their solutions, even though they retain the ownership of them. In both cases co-creators were compensated by a monetary reward.

Additionally, we identify three IP management strategies in company-to-one co-creation based on the combination of exclusive licensing and monetary compensation, distinguished by the employment of NDAs, additional agreements and a waiver option. There are two projects, both organized on the *jovoto* platform, in which NDAs are employed, in addition to exclusive licensing and monetary compensation, as a part of an IP management strategy. For example, in the case of the *Audi Sound* project, winners of the contest agreed to keep the information about the projects confidential and to transfer exclusive rights of their IP to *Audi*, in exchange for a monetary prize. On the other hand, we identified one project, namely *Daimler Smart*, organized on the corporate single-project platform, in which the IP management strategy is based on combining an exclusive license and monetary compensation with an additional agreement with co-creators. In this case, the additional agreement related to the commercial use of the co-creation outcomes, i.e., if *Daimler AG* decided to commercially use a co-creator’s submission, the co-creator would receive ‘*a one-time reimbursement of 1500 EUR.*’ Finally, a strategy based on an exclusive license and monetary compensation combined with an additional agreement and the waiver option is identified in two *Volkswagen* projects, namely *VW App* and *VW Engineering*, organized on the *HYVE Crowd* and on a single-project platform. In these projects, even though *Volkswagen* obtained the exclusive rights to use the co-creation outcomes and compensated co-creators by a monetary prize, the company agreed to waive its exclusive rights and return them to co-

creators 24 months after the contest ended, if it decided not to use the outcomes. The company also agreed to sign an additional agreement with co-creators for commercial use of the outcomes.

The exclusive license option is rarely combined with non-monetary compensation. We identified only one such case, namely the *Ford Innenraum* project, organized on a single-project platform. In this project, the winners of the contest were awarded with vouchers for shopping in the *Ford Online-Shop*, while transferring exclusive rights of use to *Ford*. Similar to previous cases, the exclusive license employed was perpetual, royalty-free, world-wide and irrevocable.

Even though there are no cases in our analysed sample of company-to-one co-creation projects in which the non-exclusive license option is employed, we identify 9 projects, all of them organized on the *Local Motors* platform, in which the IP management strategy is based on employment of a *Creative Commons* license, specifically the Creative Commons Attribution-NonCommercial-ShareAlike (BY-NC-SA) license. There are 2 projects in which the employment of this license is combined with monetary compensation, such as in the case of *LM Botbox*, and 7 projects in which it is combined with non-monetary compensation, such as in the case of *LM Sketchwall Racer*.

Finally, we identify one single case in our sample of company-to-one co-creation projects in which companies eschew obtaining ownership rights or licenses to use co-creation outcomes. This is the case with *Mercedes Digital*, organized on a single-project platform. In this project, *Mercedes-Benz* offered a monetary prize to winners of the contest, retaining the right to further contact them and close an additional agreement in case the company decided to exploit the outcomes.

Table 1 presents a summary of IP management strategies in company-to-one co-creation projects (for the complete sample of company-to-one co-creation projects see Appendix 1).

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TABLE 1

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***IP management in company-to-many co-creation***

In the context of company-to-many co-creation, co-creation of a single solution takes place between the initiating company and a group of co-creators who are supported to co-create among themselves and to join their efforts to solve a specific problem. Within our sample of 32 analysed cases of company-to-many co-creation, there are 9 projects that took place in the offline setting, in the form of innovation forums, hackathons or ideathons, and 23 projects that took place in the online setting, in the form of an innovation community on corporate platforms, such as *Local Motors Launch Forth*, or on intermediary platforms, such as *HYVE Crowd*.

Among the analysed company-to-many co-creation projects, we identify 9 IP management strategies based on different configurations of the six IP dimensions (Table 2).

There are 3 company-to-many co-creation projects, one organized on the online *HYVE Crowd* platform and two organized in the offline setting, in which the IP management strategy is based on combining full transfer of ownership with monetary compensation, while excluding NDAs, additional agreements and the waiver option. This IP management strategy may be illustrated by selected excerpts from the terms and conditions of the representative projects. For example, in the case of *Conf Digital* (a *HYVE Crowd* project), ‘*by entering the competition, participants irrevocably and unconditionally (needed to) assign, to the extent legally possible, to HYVE any and all intellectual property rights.*’ The original rights of the non-winning participants were

later re-assigned back to those non-winning participants, since the initiating company chose not to make use of them in its innovation process. In the case of *Jaguar Developer* (an offline project), winners of the contest agreed to ‘*transfer to Jaguar Land Rover the ownership title in respect of the source code, machine code, any other parts of computer programs (co-creation outcomes),*’ while in the case of *Toyota Connected* (an offline project), all participants in the ideathon agreed that ‘*projects and ideas submitted would be owned by Toyota.*’ In all these cases, co-creators were compensated by a monetary prize, in return for transfer of ownership of co-creation outcomes to the initiating company.

In the remaining cases within our set of company-to-many co-creation projects, ownership rights remained with co-creators. In these cases, initiating companies primarily used non-exclusive and Open Source or Creative Commons licenses to obtain rights to use the co-creation outcomes.

The employment of non-exclusive licensing arrangements is identified in 5 company-to-many projects. There is only one project, namely *Audi ADC*, organized in the offline setting, in which the IP management strategy is based on the employment of a non-exclusive license, combined solely with monetary compensation. In this case, ‘*in respect of any trade marks and other distinctive signs, patents and other intellectual property rights created in future within the framework of the competition*’ participants agreed to ‘*grant a complimentary, global, simple sublicensable and irrevocable right of use to the other participants as well as to Audi AG and to companies affiliated with it.*’ Winners of the competition were awarded by a monetary prize. A similar approach was adopted in 3 projects, organized by *Local Motors*, in which the IP management strategy was based on the combination of non-exclusive licenses and monetary compensation, but complemented by the employment of additional agreements. For example, in the



case of *LM Modular*, co-creators agreed to grant ‘to *Local Motors* a royalty-free, sub-licensable, transferable, perpetual, irrevocable, non-exclusive, worldwide license’ to co-creation outcomes. Nevertheless, if interested in commercializing co-creation outcomes, the company reserved the right to enter into additional agreements with co-creators, whereby they would assign their ownership rights to the company, in exchange for additional monetary or non-monetary compensation, in the form of a royalty or an award. Finally, there is a single case in which the IP management strategy is based on a non-exclusive licensing arrangement, complemented by a non-monetary compensation. This is the case of *Audi Smart Factory*, a project organized in the offline setting in the form of a hackathon, in which co-creators agreed to grant *Audi AG* ‘a global, unlimited, sub-licensable and irrevocable utilisation right to any copyrights created in the context of the *Smart Factory Hackathon*, as well as possibly trademarks and other marks, patents or other intellectual property rights for all known and unknown types of use.’ Three best teams participating in this hackathon received rewards including the participation in an Audi driving experience and a visit to a tech conference on Big Data and Data Analytics.

We identified 20 company-to-many co-creation projects, organized by *Local Motors* and *Audi*, in which companies adopted IP management strategies based on Open Source / Creative Commons licenses, complemented by monetary compensation. For example, in the case of the *LM Strati* project, *Local Motors* obtains rights to use the co-creation outcomes by employing the Creative Commons Attribution-NonCommercial-ShareAlike (BY-NC-SA) license that ensures disclosure while crediting authorship. Additionally, the company offers a percentage of revenue as a monetary compensation for co-creators, according to their level of contribution to the product. On the other hand, in the case of *Audi Hackovation*, a project organized in the offline setting in the

form of a hackathon, *Audi* employs a permissive Open Source license, namely the MIT License, stating that ‘*everything developed during the hackathon will remain open source projects and contribution will continue by Audi Business Innovation.*’

There is a single company-to-many co-creation project, namely *BMW AI*, organized by *BMW* and *Siemens* in the offline setting in the form of a hackathon, in which the IP management strategy employed is based on an Open Source license combined with NDAs and additional agreements, while compensating winning co-creators primarily by monetary rewards. While agreeing not to disclose any confidential information in relation to the company or co-creation project, participants of the hackathon were ‘*encouraged to publish their results under an open source license in order to promote innovation by sharing their work with a greater community.*’ Nevertheless, if their solutions were chosen for implementation, participants were required to grant *Siemens* and *BMW* a license to use the co-creation outcomes under terms and conditions negotiated in an additional agreement.

Finally, within our set of company-to-many co-creation projects there are 3 projects, all of them organized in the offline setting, in which companies decided to eschew obtaining ownership rights or different licenses to use co-creation outcomes. The detailed configurations of their IP management strategies differ. For example, in the case of *Mercedes Hack*, a hackathon organized by *Mercedes-Benz R&D*, the IP management strategy involved only monetary compensation, combined with an additional agreement with co-creators in the event of interest arising for the realization of co-created solutions. In the case of *Inmotion Hackthon*, a hackathon organized by *Jaguar Land Rover*, the IP management strategy involved monetary compensation and additional agreements, complemented by NDAs, agreeing not to disclose any confidential information nor use it for any purpose other than the *Inmotion Hackathon*.

Participants retained all the rights in their solutions, but agreed to potential additional agreements in case of the company's interest in further development of co-creation outcomes. Finally, in the case of *Daimler Hack.LA*, a hackathon organized by *Daimler AG*—and in contrast with the other projects—the company employed an option for an additional agreement ‘*to enter into an additional license or agreement*’ with participants, complemented by non-monetary compensation, including hardware kits and a visit to a tech conference.

Table 2 presents a summary of IP management strategies in company-to-many co-creation projects (for the complete sample of company-to-many co-creation projects see Appendix 2).

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TABLE 2

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### ***Summary of results***

Our analysis of 111 co-creation projects enabled us to identify 17 unique IP management strategies, based on a variety of configurations of the six IP dimensions, namely, transfer of ownership, licensing arrangements, compensation structure, NDA, additional agreement and the waiver option. Table 3 summarizes these 17 IP management strategies, indicating the number of cases of each configuration and the percentage of total cases in each respective co-creation context accounted for by each strategy configuration. The 17 unique IP management strategies are clustered in to 5 groups of strategies with common overarching features.

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TABLE 3

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We identified three IP management strategies based on full transfer of ownership of the co-creation outcomes to initiating companies that, as a group, were adopted in almost two thirds (about 65%) of the company-to-one co-creation projects. By embracing such an approach companies gain the right to unlimited and unrestricted

use of the outcomes and to their further potential implementation in corporate innovation processes. Nevertheless, it appears that companies rarely employ full transfer of ownership in the context of company-to-many co-creation. There was only one occurrence of such an IP management strategy identified within our set of company-to-many co-creation projects (about 9% of such projects).

With regards to licensing arrangements, companies employ a variety of exclusive, non-exclusive and Open Source / Creative Commons licenses. Exclusive licensing, the common element of 5 of the 17 unique IP management strategies, is associated solely with company-to-one co-creation projects (about 23% of such projects). There is no evidence of exclusive licensing being used in company-to-many co-creation projects. Conversely, in our sample, non-exclusive licensing is associated solely with company-to-many co-creation projects (about 16% of such projects), and is the common element of 3 unique IP management strategies adopted in that context. There are no observed instances of non-exclusive licensing in the company-to-one co-creation context. Finally, while the use of Open Source / Creative Commons licensing occurs in both contexts, it is especially prominent among company-to-many co-creation projects, accounting for almost two thirds (about 66%) of such projects. On the other hand, such licensing arrangements are observed in only a small minority (about 11%) of company-to-one co-creation projects. In both of the contexts we identified two unique IP management strategies based on Open Source / Creative Commons licensing.

Interestingly, very few companies adopt IP management strategies that involve neither transfer of ownership nor licensing arrangements. The results of our analysis show that just over 1% of company-to-one co-creation projects and just over 9% of company-to-many co-creation projects adopted such strategies. We identified three unique IP management strategies involving neither transfer of ownership nor licensing

arrangements, all of them employed in the context of company-to-many co-creation, while only one is employed in company-to-one co-creation context.

Most of the IP management strategies adopted in company-to-one co-creation projects (8 strategies out of a total 11 strategies identified in our sample from this context) were based either on full transfer of ownership or on exclusive licensing arrangements between companies and co-creators. Such IP management strategies were adopted in 69 company-to-one co-creation projects (i.e., over 87% of the total set of projects in this context), indicating that companies tend to prefer obtaining all IP rights or exclusive IP rights to the outcomes of company-to-one co-creation projects. On the other hand, most of the IP management strategies adopted in company-to-many co-creation projects (8 strategies out of a total of 9 strategies identified in our sample from this context) were based on non-exclusive licensing, Open Source or Creative Commons licensing or complete avoidance of any licensing arrangements between companies and co-creators. Such IP management strategies were adopted in 29 company-to-many co-creation projects (i.e., over 90% of the total set of projects in this context), indicating that companies tend to prefer less restrictive terms that allow co-creators to retain ownership over their IP as well as rights to use co-creation outcomes, when adopting the company-to-many format for projects.

Thus, the data reveal a clear contrast between the predominant IP management strategies adopted by firms according to whether the co-creation projects take place in the company-to-one or company-to-many context. Company-to-one co-creation tends to be associated with more restrictive IP management strategies, whereas company-to-many co-creation tends to be associated with more permissive IP management strategies. The overall differences in IP management strategies between the co-creation contexts detailed in Table 3 and discussed here are summarized in Table 4.

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TABLE 4

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Companies additionally reveal a clear proclivity for employing monetary compensation as a part of their IP management strategies. In all of the analysed co-creation projects, companies compensate co-creators for their effort in one way or another, either monetary or non-monetary. Monetary reward is identified as an important element of the compensation structure in both co-creation contexts. It is employed in about 89% of the company-to-one co-creation projects, through eight different IP management strategies, and in about 94% of the company-to-many co-creation projects, through seven different IP management strategies. In these cases, monetary reward is offered either as a one-time payment or as a percentage of revenue or sales of co-creation outcomes. Monetary compensation is sometimes additionally accompanied by non-monetary rewards, of a variety of types, such as vouchers, products, invitations to exclusive events, further involvement in product development processes, or even by giving recognition to co-creators in the final product. Our results show that companies very rarely employ solely non-monetary compensation in co-creation. It appears that non-monetary rewards tend to be used to complement other, more dominant, elements of the IP management strategies.

Finally, analysis of the data reveals that IP management strategies involving NDAs, additional agreements or waiver options are not prominent in either of the two co-creation contexts, being present in only a minority of co-creation projects overall. Non-disclosure agreements are employed as part of IP management strategies much more frequently (46%) in the context of company-to-one co-creation projects than they are (6%) in company-to-many co-creation projects. In each of the contexts, NDAs are integrated within two unique IP management strategies. Interestingly, however, the two strategies in which the NDAs are integrated differ between the two contexts. In other

words, the two contexts contrast not only in the frequency in which NDAs are employed but also in the way, or type of strategies, in which they are employed. Additional agreements—which are typically used to specify further arrangements (not otherwise already specified within the terms and conditions) between companies and co-creators when co-creation outcomes are realized and used commercially—are employed in about 5% of company-to-one co-creation cases, through three different IP management strategies, and in about 22% of company-to-many co-creation cases, through four different IP management strategies. Finally, our results show that the waiver option is the least employed IP dimension in IP management strategies in co-creation. It appears as a part of IP management strategies in only a tiny minority (less than 3%) of cases overall, and then only in company-to-one co-creation projects. Nevertheless, by limiting licensing arrangements in the situation where companies decide not to exploit co-creation outcomes, the waiver option represents an important element of the less onerous or more accommodating IP management strategies directed towards co-creators.

## **Discussion and conclusions**

Even though co-creation has attracted much attention in industry and in the academic world since the beginning of the 21st Century, research about IP issues in collaborative innovation between companies and individual external contributors has so far not addressed questions related to the context dependence of IP management in co-creation. To the best of our knowledge, our research is the first systematic work focused on alternative IP management strategies adopted by companies in different co-creation contexts, in other words, the first to adopt a contextual perspective in empirical analysis of IP in co-creation. We have been able to generate novel and original insights about differences in IP management between company-to-one and company-to-many co-

creation that may facilitate the creation of a new research agenda in innovation management studies, while also being useful for project managers in making decisions about their IP management strategies in co-creation.

### ***Theoretical contributions***

There are three major theoretical contributions of this exploratory research that may have an impact on the emerging debate on IP management in co-creation.

By analysing different IP management strategies that companies adopt when collaborating with individual external contributors, this study contributes to the currently sparse co-creation literature dealing with specific IP arrangements between companies and co-creators. Embedded inside the terms and conditions of co-creation projects, such arrangements have not garnered the attention of scholars until recently (de Beer et al., 2017; Mazzola et al., 2018). Concentrating on crowdsourcing, these recent studies offer valuable insights about how IP related to co-creation outcomes is managed in the context that we label here as ‘company-to-one’ co-creation.

Nevertheless, the literature has so far not provided much evidence about specific terms and conditions between companies and co-creators beyond the company-to-one co-creation context. Management of IP related to co-creation outcomes in the context of company-to-many co-creation is still an underexplored topic, although some light has been shed on the subject by scattered evidence from the literature on Open Source, commons-based peer production and the networked economy (Belenzon & Schankerman, 2015; Benkler, 2016, 2017; Parmentier & Mangematin, 2014).

Contextual variety is rarely taken into account in the literature discussing IP management in co-creation (Alexy et al., 2009; Boudreau & Lakhani, 2013; Felin & Zenger, 2014), but our exploratory research has demonstrated the utility of adopting a contextual perspective by enabling us to produce a comprehensive overview of



alternative IP management strategies in co-creation. By comparing IP management in company-to-one and company-to-many co-creation our study has generated evidence that some IP management strategies are associated more closely with specific co-creation contexts than others. On one hand, it can be observed that the more restrictive IP management strategies—based either on full transfer of ownership or on exclusive licensing arrangements—are favoured by companies in the context of company-to-one co-creation, where the number of existing relationships in the co-creation of one solution is small, where the potential for spontaneous recombination of contributions is low, and where IP can be straightforwardly controlled. Such results concur with insights from the extant literature that, to be able to appropriate benefits from company-to-one co-creation, companies need to obtain ownership of co-creation outcomes or to acquire a license to exploit them, while compensating co-creators for their effort and IP by monetary prizes (Boudreau & Lakhani, 2013; de Beer et al., 2017; Felin & Zenger, 2014; Mazzola et al., 2018; Mortara et al., 2013). On the other hand, our study provides evidence that more permissive IP management strategies—based on non-exclusive licensing, Open Source or Creative Commons licensing or complete avoidance of any licensing arrangements—are preferred by companies in the context of company-to-many co-creation, where the number of existing relationships in co-creation of one solution is great, where the potential for spontaneous recombination of contributions is high, and where IP cannot be easily controlled. Such results concur with some insights from the extant literature that, to cultivate collective creativity and recombination of contributions in company-to-many co-creation, companies need to avoid more restrictive IP management strategies and instead employ Open Source or Creative Commons licenses, or even freely reveal co-creation outcomes (Albors et al., 2008; Benkler, 2017; Boudreau & Lakhani, 2013; Felin & Zenger, 2014; Harwood & Garry,

2014). As is the case for IP management strategies in company-to-one co-creation, monetary compensation represents an important element of IP management strategies in company-to-many co-creation.

Finally, by seeing IP management strategies as configurations of different IP dimensions—namely transfer of ownership, licensing arrangements, compensation structure, NDAs, additional agreement and a waiver option—this study points to the importance of employing a *configurational perspective* on IP management strategies in co-creation, to complement the *contextual perspective*. By combining IP dimensions in different ways, companies cultivate new IP management strategies that may reduce the tension between control and openness of the IP in co-creation, and facilitate involvement of individual external contributors in corporate innovation, as called for by scholars in the open and collaborative innovation literature (Laursen & Salter, 2014; Lee, 2009; O’Hern & Rindfleisch, 2010). Additionally, adoption of a configurational perspective in this study allowed us to identify distinctive elements among ostensibly similar generic IP management strategies. Even though the results do not show exclusive deployment of each identified IP dimension for a specific co-creation context, they do reveal general variations between contexts, and they broaden our understanding of variety of potential configurations upon which a company may build an IP management strategy.

### ***Limitations and future research directions***

This exploratory research faces a number of limitations. Based on a sample of co-creation projects from the automotive industry, our findings have limited generalizability. Future research may benefit from examining IP management strategies adopted in co-creation projects by companies from some other industry or industries. Nevertheless, our sample embraces a substantial variety of co-creation projects with

diverse objectives, namely technology development (such as in cases focused on connected vehicles, driverless vehicles, electric vehicles, new mobility services, etc.), product design (such as in cases focused on vehicles' interior and exterior design) and user experience (such as in cases focused on marketing campaigns). Thus, despite our focus on a single industry in this study, our findings may apply to IP management in co-creation across a range of industries, in which companies collaborate with co-creators in development of technology-based consumer products.

Additionally, by including only projects which have their terms and conditions publicly available on the Internet, the final sample is subject to potential bias in regards to case heterogeneity. On one hand, the sample is inclined towards online co-creation projects, as offline co-creation projects rarely have their terms and conditions published on the Internet. On the other hand, as single-project platforms are typically closed after a certain period of time following the end of the project, the sample is inclined towards projects organized on intermediary platforms and corporate multiple-project platforms, as they remain active over longer periods of time due to their ongoing operational activity. Thus, to overcome the restraints of the data collection procedure employed here, future research should verify the results of this study by employing multiple data sources that go beyond Internet-based search.

Furthermore, at this stage, our research provides a comprehensive overview of IP management strategies that are available for use by companies in different co-creation contexts, namely company-to-one and company-to-many co-creation. However, our findings do not allow identification of *best practices* in IP management in co-creation, and we therefore propose rectifying that shortcoming in future research by identifying IP management strategies in co-creation that lead to superior co-creation project performance across a variety of explicitly defined co-creation contexts.

Accordingly, we also propose conducting research to identify IP management strategies that are perceived as normatively superior for the initiating companies as well as those that are perceived as most attractive by the co-creators.

Finally, in this study we have analysed co-creation types (company-to-one and company-to-many) as the only potentially significant contexts for IP management in co-creation. We are aware of other potentially relevant contextual factors for this research, such as the industrial setting, the business model, the technological environment, the type of innovation, or the development stage (Alexy et al., 2009; Lakhani & Panetta, 2007; Mazzola et al., 2018; Zobel et al., 2017). Thus, we acknowledge the limitations of the approach adopted here. However, we have chosen a single contextual perspective partly because of the need to be prudent in the scope of our inquiry, but also because the literature points to varying project-specific conditions prevailing across different types of co-creation that may influence the effectiveness of an IP management strategy (e.g., Boudreau & Lakhani, 2013; Felin & Zenger, 2014). Company-to-one and company-to-many co-creation may be contrasted according to differences in at least three characteristics, namely, the volume of existing relationships among co-creators in a project, the level of recombination of co-creators' contributions, and the potential for control of IP by the initiating company. Such project-specific conditions, engendered by the number of individual external contributors involved in the co-creation of a single solution, arguably create distinctive contexts for IP management in co-creation. Nevertheless, we expect that future research may benefit from adoption of a more complex contextual perspective. For example, analysis of company-to-one and company-to-many co-creation in both the online and offline settings may help us to elaborate and refine the contextual framework presented in this paper. This in turn would facilitate comparative investigation of IP management strategies in the distinctive

contexts of online crowdsourcing competitions and innovation communities, as well as of offline single expert sessions and lead user workshops.

In order to overcome the limitations of the study reported here we suggest that a more sophisticated research methodology—one that combines the best of both qualitative and quantitative methods, and that would allow more nuanced exploration of the interactions among different IP management strategies across a variety of co-creation contexts—be adopted to implement our proposals for future research. The “Qualitative Comparative Analysis” (QCA) approach, that has developed in recent years following the pioneering work of Charles C. Ragin (1987, 1998) and others (Marx, Rihoux & Ragin, 2014), appears to be particularly well suited to this challenge. The QCA approach is especially suitable for cross-case, diversity based research—as distinct from case-oriented and variable-oriented research—and hence lends itself to the kind of inquiry we propose here that incorporates both contextual analysis and configurational analysis.

### ***Managerial implications***

The overview of IP management strategies in co-creation that we have presented here may be useful for co-creation project managers in multiple ways.

First, the contextual perspective employed in this study generated results that may be a source of guidance for project managers wishing to hone their IP management strategies within particular co-creation contexts. Choosing more restrictive IP management strategies in the context of company-to-one co-creation, and more permissive IP management strategies in the context of company-to-many co-creation, may help project managers to avoid potential difficulties and take advantage of specific contexts, while effectively managing IP outcomes emanating from their co-creation projects.

Further, project managers who aspire to enhance their IP management strategies in co-creation may get useful insights from applying the configurational perspective adopted in this study. Understanding IP management strategies in co-creation as configurations of different IP dimensions may support managers to customize contractual terms and conditions for the purpose of harmonizing control and openness of the IP in specific contexts. Adoption of a configurational approach in building an IP management strategy may help managers to create mutually beneficial arrangements, ensuring proper, fair and transparent treatment of IP.

Finally, the exploratory research reported in this paper reveals—in contradistinction to the assertions of those who may believe that IP belongs to the era before the emergence of co-creation—that companies that engage in co-creation in fact deal intensively with the management of IP. The existence of a great variety of IP management strategies adopted by companies in co-creation indicates that involvement of individual external contributors in corporate innovation projects amplifies, rather than lessens, the need for prowess in the management of intellectual property. Thus, we consider that this paper has potential for great impact in building awareness of the importance of the IP management in co-creation in the era of open and collaborative innovation with external parties.

## References

- Abhari, K., Davidson, E. J., & Xiao, B. (2018). A risk worth taking? The effects of risk and prior experience on co-innovation participation. *Internet Research*, 28(3), 804–828. <http://doi.org/10.1108/IntR-05-2017-0196>
- Albors, J., Ramos, J. C., & Hervas, J. L. (2008). New learning network paradigms: communities of objectives, crowdsourcing, wikis and open source. *International Journal of Information Management*, 28(3), 194–202. <http://doi.org/10.1016/j.ijinfomgt.2007.09.006>
- Alexy, O., Criscuolo, P., & Salter, A. (2009). Does IP strategy have to cripple open innovation? *MIT Sloan Management Review*, 51(1), 71–77.

- Aloini, D., Lazzarotti, V., Manzini, R., & Pellegrini, L. (2017). IP, openness, and innovation performance: an empirical study. *Management Decision*, *55*(6), 1307–1327.  
<http://doi.org/10.1108/MD-04-2016-0230>
- Antorini, Y. M., & Muñoz Jr., A. M. (2013). The benefits and challenges of collaborating with user communities. *Research-Technology Management*, *56*(3), 21–28.  
<http://doi.org/10.5437/08956308X5603931>
- Bartl, M., Füller, J., Mühlbacher, H., & Ernst, H. (2012). A managers perspective on virtual customer integration for new product development. *Journal of Product Innovation Management*, *29*(6), 1031–1046. <http://doi.org/10.1111/j.1540-5885.2012.00946.x>
- Bauer, J., Franke, N., & Tuertscher, P. (2016). Intellectual property norms in online communities: How user-organized intellectual property regulation supports innovation. *Information Systems Research*, *27*(4), 724–750. <http://doi.org/10.1287/isre.2016.0649>
- Belderbos, R., Cassiman, B., Faems, D., Leten, B., & Van Looy, B. (2013). Co-ownership of intellectual property: Exploring the value-appropriation and value-creation implications of co-patenting with different partners. *Research Policy*, *43*(5), 841–852.  
<http://doi.org/10.1016/j.respol.2013.08.013>
- Belenzon, S., & Schankerman, M. (2015). Motivation and sorting of human capital in open innovation. *Strategic Management Journal*, *36*(6), 795–820.  
<http://doi.org/10.1002/smj.2284>
- Benkler, Y. (2016). Peer production, the commons, and the future of the firm. *Strategic Organization*, *15*(2), 264–274. <http://doi.org/10.1177/1476127016652606>
- Benkler, Y. (2017). Law, innovation, and collaboration in networked economy and society. *Annual Review of Law and Social Science*, *13*, 231–250. <http://doi.org/10.1146/annurev-lawsocsci-110316-113340>
- Bockstedt, J., Druehl, C., & Mishra, A. (2016). Heterogeneous submission behavior and its implications for success in innovation contests with public submissions. *Production and Operations Management*, *25*(7), 1157–1176. <http://doi.org/10.1111/poms.12552>
- Bogers, M. (2011). The open innovation paradox: Knowledge sharing and protection in R&D collaborations. *European Journal of Innovation Management*, *14*(1), 93–117.  
<http://doi.org/10.1108/14601061111104715>
- Bogers, M., & West, J. (2012). Managing distributed innovation: strategic utilization of open and user innovation. *Creativity and Innovation Management*, *21*(1), 61–75.  
<http://doi.org/10.1111/j.1467-8691.2011.00622.x>
- Bonabeau, E. (2009). Decisions 2.0: the power of collective intelligence. *MIT Sloan Management Review*, *50*, 45–52.
- Boudreau, K. J., & Lakhani, K. R. (2013). Using the crowd as an innovation partner. *Harvard Business Review*, *91*(4), 61–69.

- Brem, A., Bilgram, V., & Gutstein, A. (2018). Involving lead users in innovation: A structured summary of research on the lead user method. *International Journal of Innovation and Technology Management*, 15(3), 1850022(1-27).  
<http://doi.org/10.1142/S0219877018500220>
- Candelin-Palmqvist, H., Sandberg, B., & Mylly, U.-M. (2012). Intellectual property rights in innovation management research: A review. *Technovation*, 32(9–10), 502–512.  
<http://doi.org/10.1016/j.technovation.2012.01.005>
- Chatterji, A. K., & Fabrizio, K. R. (2014). Using users: when does external knowledge enhance corporate product innovation? *Strategic Management Journal*, 35(10), 1427–1445.  
<http://doi.org/10.1002/smj.2168>
- Chesbrough, H. (2003). The logic of open innovation: Managing intellectual property. *California Management Review*, 45(3), 33–58. <http://doi.org/10.2307/41166175>
- Chesbrough, H. W. (2003). The era of open innovation. *MIT Sloan Management Review*, 44(3), 35–41.
- Cornish, W. R., Llewelyn, D., & Alpin, T. F. (2013). *Intellectual property: patents, copyright, trademarks and allied rights* (8th ed.). London, UK: Sweet and Maxwell.
- Dahlander, L., & Gann, D. M. (2010). How open is innovation? *Research Policy*, 39(6), 699–709. <http://doi.org/10.1016/j.respol.2010.01.013>
- de Beer, J., McCarthy, I. P., Soliman, A., & Treen, E. (2017). Click here to agree: Managing intellectual property when crowdsourcing solutions. *Business Horizons*, 60(2), 207–217.  
<http://doi.org/10.1016/j.bushor.2016.11.002>
- de Laat, P. B. (2005). Copyright or copyleft? An analysis of property regimes for software development. *Research Policy*, 34(10), 1511–1532.  
<http://doi.org/10.1016/j.respol.2005.07.003>
- Dess, G. G., Ireland, R. D., & Hitt, M. A. (1990). Industry effects and strategic management research. *Journal of Management*. <http://doi.org/10.1177/014920639001600102>
- Drechsler, W., & Natter, M. (2012). Understanding a firm's openness decisions in innovation. *Journal of Business Research*, 65(3), 438–445.  
<http://doi.org/10.1016/j.jbusres.2011.11.003>
- Ernst, H. (2017). Intellectual property as a management discipline. *Technology and Innovation*, 19(2), 481–492. <http://doi.org/10.21300/19.2.2017.481>
- Fauchart, E., & von Hippel, E. (2008). Norms-based intellectual property systems: The case of French chefs. *Organization Science*, 19(2), 187–201.  
<http://doi.org/10.1287/orsc.1070.0314>
- Feldman, M. P., & Florida, R. (1994). The geographic sources of innovation: technological infrastructure and product innovation in the United States. *Annals of the Association of American Geographers*, 84(2), 210–229. <http://doi.org/10.1111/j.1467->



8306.1994.tb01735.x

- Felin, T., & Zenger, T. R. (2014). Closed or open innovation? Problem solving and the governance choice. *Research Policy*, 43(5), 914–925.  
<http://doi.org/10.1016/j.respol.2013.09.006>
- Feller, J., Finnegan, P., Hayes, J., & O'Reilly, P. (2012). 'Orchestrating' sustainable crowdsourcing: s characterisation of solver brokerages. *The Journal of Strategic Information Systems*, 21(3), 216–232. <http://doi.org/10.1016/j.jsis.2012.03.002>
- Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods*, 5(1), 80–92. <http://doi.org/10.1177/160940690600500107>
- Fowles, S., & Clark, W. (2005). Innovation networks: good ideas from everywhere in the world. *Strategy & Leadership*, 33(4), 46–50. <http://doi.org/10.1108/10878570510608040>
- Füller, J. (2010). Refining virtual co-creation from a consumer perspective. *California Management Review*, 52(2), 98–122. <http://doi.org/10.1525/cm.2010.52.2.98>
- Füller, J., & Matzler, K. (2007). Virtual product experience and customer participation - a chance for customer-centred, really new products. *Technovation*, 27(6–7), 378–387. <http://doi.org/10.1016/j.technovation.2006.09.005>
- Gama, F. (2018). Managing collaborative ideation: the role of formal and informal appropriability mechanisms. *International Entrepreneurship and Management Journal*, (Article in Press). <http://doi.org/10.1007/s11365-018-0544-1>
- Ghezzi, A., Gabelloni, D., Martini, A., & Natalicchio, A. (2018). Crowdsourcing: A review and suggestions for future research. *International Journal of Management Reviews*, 20(2), 343–363. <http://doi.org/10.1111/ijmr.12135>
- Giannopoulou, E., Yström, A., & Ollila, S. (2011). Turning open innovation into practice: open innovation research through the lens of managers. *International Journal of Innovation Management*, 15(03), 505–524. <http://doi.org/10.1142/S1363919611003465>
- Goldstein, P., & Landova, M. T. (2015). *International intellectual property law: Cases and materials* (4th ed.). St. Paul, MN: West Academic Publishing.
- Greer, C. R., & Lei, D. (2012). Collaborative innovation with customers: a review of the literature and suggestions for future research. *International Journal of Management Reviews*, 14(1), 63–84. <http://doi.org/10.1111/j.1468-2370.2011.00310.x>
- Harwood, T., & Garry, T. (2014). Co-creation and ambiguous ownership within virtual communities: the case of the Machinima community. *Journal of Consumer Behaviour*, 13(2), 148–156. <http://doi.org/10.1002/cb.1437>
- Henkel, J., Baldwin, C. Y., & Shih, W. (2013). IP Modularity: Profiting from Innovation by Aligning Product Architecture with Intellectual Property. *California Management Review*, 55(4), 65–82. <http://doi.org/10.1525/cm.2013.55.4.65>

- Henkel, J., Schöberl, S., & Alexy, O. (2014). The emergence of openness: how and why firms adopt selective revealing in open innovation. *Research Policy*, *43*(5), 879–890.  
<http://doi.org/10.1016/j.respol.2013.08.014>
- Hienerth, C., Keinz, P., & Lettl, C. (2011). Exploring the nature and implementation process of user-centric business models. *Long Range Planning*, *44*(5–6), 344–374.  
<http://doi.org/10.1016/j.lrp.2011.09.009>
- Hitachi Consulting. (2017). *Co-creating the future*. Retrieved from  
<https://www.hitachiconsulting.com/documents/insights/social-innovation/hitachi-consulting-co-creating-the-future-tl.pdf>
- Hofstede, G. (1994). Management scientists are human. *Management Science*, *40*(1), 4–13.  
<http://doi.org/10.1287/mnsc.40.1.4>
- Hoyer, W. D., Chandy, R., Dorotic, M., Krafft, M., & Singh, S. S. (2010). Consumer cocreation in new product development. *Journal of Service Research*, *13*(3), 283–296.  
<http://doi.org/10.1177/1094670510375604>
- Hsieh, H.-F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, *15*(9), 1277–1288.  
<http://doi.org/10.1177/1049732305276687>
- Huff, A. S., Moeslein, K. M., & Reichwald, R. (2013). Introduction to open innovation. In A. S. Huff, K. M. Moeslein, & R. Reichwald (Eds.), *Leading Open Innovation* (pp. 3–18). Cambridge, MA: MIT Press.
- Huizingh, E. K. R. E. (2011). Open innovation: state of the art and future perspectives. *Technovation*, *31*(1), 2–9. <http://doi.org/10.1016/j.technovation.2010.10.002>
- Hutter, K., Hautz, J., Fuller, J., Mueller, J., & Matzler, K. (2011). Communitition: The tension between competition and collaboration in community-based design contests. *Creativity and Innovation Management*, *20*(1), 3–21. <http://doi.org/10.1111/j.1467-8691.2011.00589.x>
- Ili, S., Albers, A., & Miller, S. (2010). Open innovation in the automotive industry. *R and D Management*, *40*(3), 246–255. <http://doi.org/10.1111/j.1467-9310.2010.00595.x>
- Jeppesen, L. B., & Frederiksen, L. (2006). Why do users contribute to firm-hosted user communities? The case of computer-controlled music instruments. *Organization Science*, *17*(1), 45–63. <http://doi.org/10.1287/orsc.1050.0156>
- Jeppesen, L. B., & Lakhani, K. R. (2010). Marginality and problem solving effectiveness in broadcast search. *Organization Science*, *21*(5), 1016–1033.  
<http://doi.org/10.1287/orsc.1090.0491>
- Lakhani, K. R., & Panetta, J. A. (2007). The principles of distributed innovation. *Innovations: Technology, Governance, Globalization*, *2*(3), 97–112.  
<http://doi.org/10.1162/itgg.2007.2.3.97>

- Laursen, K., & Salter, A. J. (2014). The paradox of openness: Appropriability, external search and collaboration. *Research Policy*, 43(5), 867–878.  
<http://doi.org/10.1016/j.respol.2013.10.004>
- Lee, N. (2009). Exclusion and coordination in collaborative innovation and patent law. *International Journal of Intellectual Property Management*, 3(1), 79–93.  
<http://doi.org/10.1504/IJIPM.2009.022957>
- Lettl, C., Herstatt, C., & Gemuenden, H. G. (2006). ‘Users’ contributions to radical innovation: evidence from four cases in the field of medical equipment technology. *R and D Management*, 36(3), 251–272. <http://doi.org/10.1504/IJTM.2006.008190>
- Mayring, P. (2004). Qualitative content analysis. In U. Flick, E. von Kardoff, & I. Steinke (Eds.), *A Companion to Qualitative Research* (pp. 266–269). London, UK: SAGE Publications, Inc.
- Mazzola, E., Acur, N., Piazza, M., & Perrone, G. (2018). “To own or not to own?” A study on the determinants and consequences of alternative intellectual property rights arrangements in crowdsourcing for innovation Contests. *Journal of Product Innovation Management*, 35(6), 908–929. <http://doi.org/10.1111/jpim.12467>
- Miles, M. B., & Huberman, A. M. (1984). Drawing valid meaning from qualitative data: Toward a shared craft. *Educational Researcher*, 13(5), 20–30.  
<http://doi.org/10.3102/0013189X013005020>
- Miozzo, M., Desyllas, P., Lee, H. fen, & Miles, I. (2016). Innovation collaboration and appropriability by knowledge-intensive business services firms. *Research Policy*, 45, 1337–1351. <http://doi.org/10.1016/j.respol.2016.03.018>
- Mortara, L., Ford, S. J., & Jaeger, M. (2013). Idea competitions under scrutiny: Acquisition, intelligence or public relations mechanism? *Technological Forecasting and Social Change*, 80(8), 1563–1578. <http://doi.org/10.1016/j.techfore.2013.01.008>
- Mueller-Seitz, G., & Reger, G. (2010). Networking beyond the software code? An explorative examination of the development of an open source car project. *Technovation*, 30(11–12), 627–634. <http://doi.org/10.1016/j.technovation.2010.07.006>
- Nagle, F. (2018). Learning by contributing: Gaining competitive advantage through contribution to crowdsourced public goods. *Organisation Science*, 29(4), 547–753.  
<http://doi.org/10.1287/orsc.2018.1202>
- Nakata, C., & Sivakumar, K. (1996). National culture and new product development: an integrative review. *Journal of Marketing*, 60(1), 61–72. <http://doi.org/10.2307/1251888>
- Natalicchio, A., Messeni Petruzzelli, A., & Garavelli, A. C. (2014). A literature review on markets for ideas: emerging characteristics and unanswered questions. *Technovation*, 34(2), 65–76. <http://doi.org/10.1016/j.technovation.2013.11.005>
- O’Hern, M., & Rindfleisch, A. (2010). Customer co-creation: A typology and research agenda.

- Review of Marketing Research*, 6, 84–106. [http://doi.org/10.1108/S1548-6435\(2009\)0000006008](http://doi.org/10.1108/S1548-6435(2009)0000006008)
- Ortt, J. R., & Duin, P. A. Van Der. (2008). The evolution of innovation management towards contextual innovation. *European Journal of Innovation Management*, 11(4), 522–538. <http://doi.org/10.1108/14601060810911147>
- Parmentier, G., & Mangematin, V. (2014). Orchestrating innovation with user communities in the creative industries. *Technological Forecasting and Social Change*, 83, 40–53. <http://doi.org/10.1016/j.techfore.2013.03.007>
- Pitkänen, O., & Lehto, H. (2012). Legal aspects of Living Labs. *International Journal of Product Development*, 17(1/2), 8–22. <http://doi.org/10.1504/IJPD.2012.051155>
- PwC. (2013). *Looking ahead: Driving co-creation in the auto industry*. Retrieved from <https://www.pwc.com/gx/en/automotive/industry-publications-and-thought-leadership/assets/pwc-looking-ahead-driving-co-creation-in-the-auto-industry-pdf.pdf>
- Rayna, T., & Striukova, L. (2015). Open innovation 2.0: is co-creation the ultimate challenge? *International Journal of Technology Management*, 69(1), 38–53. <http://doi.org/10.1504/IJTM.2015.071030>
- Schaarschmidt, M., & Kilian, T. (2014). Impediments to customer integration into the innovation process: A case study in the telecommunications industry. *European Management Journal*, 32(2), 350–361. <http://doi.org/10.1016/j.emj.2013.04.004>
- Schuster, G., & Brem, A. (2015). How to benefit from open innovation? An empirical investigation of open innovation, external partnerships and firm capabilities in the automotive industry. *International Journal of Technology Management*, 69(1), 54–76. <http://doi.org/10.1504/IJTM.2015.071031>
- Standing, S., & Standing, C. (2018). The ethical use of crowdsourcing. *Business Ethics*, 27(1), 72–80. <http://doi.org/10.1111/beer.12173>
- Stefan, I., & Bengtsson, L. (2016). Appropriability: a key to opening innovation internationally? *International Journal of Technology Management*, 71(3/4), 232–252. <http://doi.org/10.1504/IJTM.2016.078570>
- Tekic, A., & Willoughby, K. (2018). Co-creation – child, sibling or adopted cousin of open innovation? *Innovation: Organization & Management*, (Article in Press). <http://doi.org/10.1080/14479338.2018.1530565>
- Tekic, A., & Willoughby, K. W. (2017). Contextualised co-creation: innovating with individual external contributors throughout the product life cycle. *International Journal of Product Development*, 22(3), 230–245. <http://doi.org/10.1504/IJPD.2017.087380>
- Terwiesch, C., & Xu, Y. (2008). Innovation contests, open innovation, and multiagent problem solving. *Management Science*, 54(9), 1529–1543. <http://doi.org/10.1287/mnsc.1080.0884>
- Tidd, J. (2001). Innovation management in context: environment, organization and

- performance. *International Journal of Management Reviews*, 3(3), 169–183.  
<http://doi.org/10.1111/1468-2370.00062>
- Wilhelm, M., & Dolfsma, W. (2018). Managing knowledge boundaries for open innovation – lessons from the automotive industry. *International Journal of Operations and Production Management*, 38(1), 230–248. <http://doi.org/10.1108/IJOPM-06-2015-0337>
- Willoughby, K. W. (2013). Intellectual property management and technological entrepreneurship. *International Journal of Innovation and Technology Management*, 10(6), 1–42. <http://doi.org/10.1142/S0219877013400270>
- WIPO. (2003). *What is Intellectual Property?* Geneva, Switzerland.
- Zobel, A. K., Lokshin, B., & Hagedoorn, J. (2017). Formal and informal appropriation mechanisms: The role of openness and innovativeness. *Technovation*, 59, 44–54.  
<http://doi.org/10.1016/j.technovation.2016.10.001>

**Table 1.** Summary of IP management strategies in company-to-one projects

<b>No.</b>	<b>Transfer of ownership</b>	<b>Licensing arrangement</b>	<b>Compensation structure</b>	<b>NDA</b>	<b>Additional agreement</b>	<b>Waiver option</b>	<b>Number of cases</b>
1	Full transfer	NA	Monetary compensation	No NDA	No additional agreement	No waiver	15
2	Full transfer	NA	Monetary compensation	NDA	No additional agreement	No waiver	35
3	Full transfer	NA	Non-monetary compensation	No NDA	No additional agreement	No waiver	1
4	No transfer	Exclusive license	Monetary compensation	No NDA	No additional agreement	No waiver	12
5	No transfer	Exclusive license	Monetary compensation	NDA	No additional agreement	No waiver	2
6	No transfer	Exclusive license	Monetary compensation	No NDA	Additional agreement	No waiver	1
7	No transfer	Exclusive license	Monetary compensation	No NDA	Additional agreement	Waiver	2
8	No transfer	Exclusive license	Non-monetary compensation	No NDA	No additional agreement	No waiver	1
9	No transfer	Open Source / Creative Commons	Monetary compensation	No NDA	No additional agreement	No waiver	2
10	No transfer	Open Source / Creative Commons	Non-monetary compensation	No NDA	No additional agreement	No waiver	7
11	No transfer	No licensing arrangement	Monetary compensation	No NDA	Additional agreement	No waiver	1

**Table 2.** Summary of IP management strategies in company-to-many projects

<b>No.</b>	<b>Transfer of ownership</b>	<b>Licensing arrangement</b>	<b>Compensation structure</b>	<b>NDA</b>	<b>Additional agreement</b>	<b>Waiver option</b>	<b>Number of cases</b>
1	Full transfer	NA	Monetary compensation	No NDA	No additional agreement	No waiver	3
2	No transfer	Non-exclusive license	Monetary compensation	No NDA	No additional agreement	No waiver	1
3	No transfer	Non-exclusive license	Monetary compensation	No NDA	Additional agreement	No waiver	3
4	No transfer	Non-exclusive license	Non-monetary compensation	No NDA	No additional agreement	No waiver	1
5	No transfer	Open Source / Creative Commons	Monetary compensation	No NDA	No additional agreement	No waiver	20
6	No transfer	Open Source / Creative Commons	Monetary compensation	NDA	Additional agreement	No waiver	1
7	No transfer	No licensing arrangement	Monetary compensation	No NDA	Additional agreement	No waiver	1
8	No transfer	No licensing arrangement	Monetary compensation	NDA	Additional agreement	No waiver	1
9	No transfer	No licensing arrangement	Non-monetary compensation	No NDA	Additional agreement	No waiver	1

**Table 3.** Comparative summary of IP management strategies across the co-creation contexts

No.	IP management strategy	Company-to-one co-creation		Company-to-many co-creation	
		Number of cases	%	Number of cases	%
<b>1</b>	<b>IP management strategies based on full transfer of ownership</b>	<b>51</b>	<b>64.6%</b>	<b>3</b>	<b>9.4%</b>
1.1	Full transfer of ownership, combined with monetary compensation	15	19%	3	9.4%
1.2	Full transfer of ownership, combined with monetary compensation and NDA	35	44.3%	0	0%
1.3	Full transfer of ownership, combined with non-monetary compensation	1	1.3%	0	0%
<b>2</b>	<b>IP management strategies based on exclusive licensing</b>	<b>18</b>	<b>22.8%</b>	<b>0</b>	<b>0%</b>
2.1	Exclusive license, combined with monetary compensation	12	15.2%	0	0%
2.2	Exclusive license, combined with monetary compensation and NDA	2	2.5%	0	0%
2.3	Exclusive license, combined with monetary compensation and additional agreement	1	1.3%	0	0%
2.4	Exclusive license, combined with monetary compensation, additional agreement and waiver option	2	2.5%	0	0%
2.5	Exclusive license, combined with non-monetary compensation	1	1.3%	0	0%
<b>3</b>	<b>IP management strategies based on non-exclusive licensing</b>	<b>0</b>	<b>0%</b>	<b>5</b>	<b>15.6%</b>
3.1	Non-exclusive license, combined with monetary compensation	0	0%	1	3.1%
3.2	Non-exclusive license, combined with monetary compensation and additional agreement	0	0%	3	9.4%
3.3	Non-exclusive license, combined with non-monetary compensation	0	0%	1	3.1%
<b>4</b>	<b>IP management strategies based on Open Source / Creative Commons licensing</b>	<b>9</b>	<b>11.4%</b>	<b>21</b>	<b>65.6%</b>
4.1	Open Source / Creative Commons license, combined with monetary compensation	2	2.5%	20	62.5%
4.2	Open Source / Creative Commons license, combined with monetary compensation, NDA and additional agreement	0	0%	1	3.1%
4.3	Open Source / Creative Commons license, combined with non-monetary compensation	7	9.9%	0	0%
<b>5</b>	<b>IP management strategies involving neither transfer of ownership nor licensing arrangements</b>	<b>1</b>	<b>1.3%</b>	<b>3</b>	<b>9.4%</b>
5.1	No transfer of ownership nor licensing arrangement; monetary compensation, combined with additional agreement	1	1.3%	1	3.1%
5.2	No transfer of ownership nor licensing arrangement; monetary compensation, combined with NDA and additional agreement	0	0%	1	3.1%
5.3	No transfer of ownership nor licensing arrangement; non-monetary compensation, combined with additional agreement	0	0%	1	3.1%
	<b>Total:</b>	<b>79</b>	<b>100%</b>	<b>32</b>	<b>100%</b>



**Table 4.** Variations in IP management strategies between co-creation contexts

No.	IP management strategies	Co-creation context	
		<i>Company-to-one co-creation</i>	<i>Company-to-many co-creation</i>
1	IP management strategies based on full transfer of ownership	✓✓✓	✓
2	IP management strategies based on exclusive licensing	✓✓	✗
3	IP management strategies based on non-exclusive licensing	✗	✓
4	IP management strategies based on Open Source / Creative Commons licensing	✓	✓✓✓
5	IP management strategies involving neither transfer of ownership nor licensing arrangements	✓	✓

Key: ✗ = strategy not employed  
 ✓ = strategy employed rarely  
 ✓✓ = strategy employed moderately  
 ✓✓✓ = strategy employed frequently

**Appendix 1.** Complete sample of company-to-one co-creation projects

Project label / Project name	Year	Company	Country	Setting
<b>IP management strategy: Full transfer of ownership, combined with monetary compensation</b>				
*SKODA EXPERIENCE / A customer experience to fall in love with	2018	Škoda Auto	Czech Rep.	Online - jovoto
*LM AUTONOMOUS / #AccessibleOlli challenge	2017	Local Motors	USA	Online - LM Launch Forth
LM ALLIANZ CHALLENGE / The future of mobility concept design	2018	Local Motors	USA	Online - LM Launch Forth
LM BERLIN / Urban Mobility: Berlin 2030	2015	Local Motors	USA	Online - LM Launch Forth
LM CAR SKIN / Challenge: RF custom car skins	2013	Local Motors	USA	Online - LM Launch Forth
LM CARGO / Air Force cargo transporter challenge	2018	Local Motors	USA	Online - LM Launch Forth
LM ESSENCE / Essence of autonomy	2016	Local Motors	USA	Online - LM Launch Forth
LM ISLAND / Island EV challenge	2018	Local Motors	USA	Online - LM Launch Forth
LM LITECAR / Litecar challenge	2015	Local Motors	USA	Online - LM Launch Forth
LM MLV / Modular logistics vehicle design challenge	2018	Local Motors	USA	Online - LM Launch Forth
LM MLV REFINED / MLV refined challenge	2018	Local Motors	USA	Online - LM Launch Forth
LM REDACTED / Project [Redacted]	2015	Local Motors	USA	Online - LM Launch Forth
LM SKETCHWALL ACTIVE / Sketchwall challenge: Active lifestyle vehicle	2013	Local Motors	USA	Online - LM Launch Forth
LM SKETCHWALL RACE / Sketchwall challenge: Legends race car wrap	2014	Local Motors	USA	Online - LM Launch Forth
LM SPORTS CAR / Sports car challenge	2014	Local Motors	USA	Online - LM Launch Forth
<b>IP management strategy: Full transfer of ownership, combined with monetary compensation and NDA</b>				
*VW BUZZ 2 / VW ID Buzz part 2	2018	Volkswagen AG	Germany	Online - jovoto
CONF LUXURY / Follow up experience for a luxury car manufacturer	2018	Confidential	Unknown	Online - jovoto
*CITROEN DESIGN / Citroën DS3 design contest	2012	Peugeot S.A.	France	Online - eYeka
BMW STORY / Tell the BMW story	2011	BMW AG	Germany	Online - eYeka
FIAT 500 / Fiat 500	2013	Fiat Automobiles S.p.A.	Italy	Online - eYeka
HYUNDAI EURO / Hyundai EURO 2012	2012	Hyundai Motor Company	South Korea	Online - eYeka
HYUNDAI EXPERIENCE / Hyundai brilliant experience	2013	Hyundai Motor Company	South Korea	Online - eYeka
HYUNDAI I40 / Hyundai i40	2013	Hyundai Motor Company	South Korea	Online - eYeka
HYUNDAI VELOSTER / Hyundai Veloster	2011	Hyundai Motor Company	South Korea	Online - eYeka
KIA VIBRANT / How a vibrant challenging spirit makes life fun	2012	KIA Motors	South Korea	Online - eYeka
MAZDA FAMOUS / Make Mazda famous	2015	Mazda Motor Corp.	Japan	Online - eYeka
PEUGEOT MOTION / What is your expression of Motion & Emotion?	2011	Peugeot S.A.	France	Online - eYeka
SUZUKI ALLGRIP / AllGrip	2017	Suzuki Motor Corp.	Japan	Online - eYeka
SUZUKI CHALLENGE / Extraordinary challenge	2014	Suzuki Motor Corp.	Japan	Online - eYeka

TOYOTA FEELING / Oh What a Feeling!	2013	Toyota Motor Corp.	Japan	Online - eYeka
TOYOTA MOBILITY / Connected mobility	2013	Toyota Motor Corp.	Japan	Online - eYeka
TOYOTA OFFER / Toyota contest	2013	Toyota Motor Corp.	Japan	Online - eYeka
TOYOTA WAKUDOKI / Showcase Toyota's amazing "Waku-doki"	2012	Toyota Motor Corp.	Japan	Online - eYeka
VW SERVICES / Volkswagen after-sales services	2018	Volkswagen AG	Germany	Online - eYeka
CONF ACTIVE / Active aging	2016	Confidential	Unknown	Online - eYeka
CONF CLEAN / Embracing a cleaner way to travel	2018	Confidential	Unknown	Online - eYeka
CONF DOWNTOWN / Downtown mobility	2016	Confidential	Unknown	Online - eYeka
CONF DRIVERLESS / Driverless transport services in 2030	2018	Confidential	Unknown	Online - eYeka
CONF FOOD / Food meets mobility	2017	Confidential	Unknown	Online - eYeka
CONF FUTURE / How we would like to move around in 10 years?	2011	Confidential	Unknown	Online - eYeka
CONF HEROES / Real heroes	2014	Confidential	Unknown	Online - eYeka
CONF INSIDE / Inside the car in 2020	2012	Confidential	Unknown	Online - eYeka
CONF INTERDEPENDENT / Interdependent mobility	2017	Confidential	Unknown	Online - eYeka
CONF LIFE / Exciting yet stable life	2016	Confidential	Unknown	Online - eYeka
CONF MOBILITY / Meaningful mobility experience	2015	Confidential	Unknown	Online - eYeka
CONF NATURE / Engaging with nature	2017	Confidential	Unknown	Online - eYeka
CONF SENIOR / Senior fitness - smart mobility in 2030	2016	Confidential	Unknown	Online - eYeka
CONF TRAVEL / Time travel journalism	2018	Confidential	Unknown	Online - eYeka
CONF UNIVERSAL / Universal free transportation	2017	Confidential	Unknown	Online - eYeka
CONF UPCYCLING / Upcycling 1.1 billion vehicles	2018	Confidential	Unknown	Online - eYeka
<b>IP management strategy: Full transfer of ownership, combined with non-monetary compensation</b>				
*CONF PKW / The future of data transfer in commercial vehicles	2018	Confidential	Unknown	Online - HYVE Crowd
<b>IP management strategy: Exclusive license, combined with monetary compensation</b>				
*BMW TRUNK / Trunk idea contest	2013	BMW AG	Germany	Online - BMW Co-creation Lab
BMW INTERIOR / Interior idea contest	2010	BMW AG	Germany	Online - BMW Co-creation Lab
BMW URBAN / Urban mobility services idea contest	2010	BMW AG	Germany	Online - BMW Co-creation Lab
*AUDI LIGHT / Light follows function	Unknown	Audi AG	Germany	Online - jovoto
AUDI ENTERTAINMENT / Turn Audi into an entertainment palace	Unknown	Audi AG	Germany	Online - jovoto
AUDI FAMILY / Family on Board	Unknown	Audi AG	Germany	Online - jovoto
AUDI NAVIGATION / Navigate Audi into 2015	Unknown	Audi AG	Germany	Online - jovoto
MERCEDES GAMIFY / Gamify me	2017	Daimler AG	Germany	Online - jovoto
MERCEDES TOMORROW / Mercedes-Benz: Destination tomorrow	2016	Daimler AG	Germany	Online - jovoto
OPEL ENERGY / Energy redefined	Unknown	Opel Automobile GmbH	Germany	Online - jovoto

RENAULT TRUCKNROLL / TrucknRoll!	Unknown	Renault S.A.	France	Online - jovoto
VW BUZZ 1 / Design 3D-printable elements for the VW ID Buzz	2018	Volkswagen AG	Germany	Online - jovoto
<b>IP management strategy: Exclusive license, combined with monetary compensation and NDA</b>				
*AUDI SOUND / The sound of motors	Unknown	Audi AG	Germany	Online - jovoto
CONF COMPLETE / Complete the car	Unknown	Confidential	Unknown	Online - jovoto
<b>IP management strategy: Exclusive license, combined with monetary compensation and additional agreement</b>				
*DAIMLER SMART / Style your Smart design contest	2010	Daimler AG	Germany	Online - single-project platform
<b>IP management strategy: Exclusive license, combined with monetary compensation, additional agreement and waiver option</b>				
*VW APP / App my Ride - Volkswagen App contest	2011	Volkswagen AG	Germany	Online - single-project platform
*VW ENGINEERING / Engineering the future - car body manufacturing	2017	Volkswagen AG	Germany	Online - HYVE Crowd
<b>IP management strategy: Exclusive license, combined with non-monetary compensation</b>				
*FORD INNENRAUM / Ford Interieur - Deine Ideen für den Innenraum	2012	Ford Motor Company	USA	Online - single-project platform
<b>IP management strategy: Open Source / Creative Commons license, combined with monetary compensation</b>				
*LM BOTBOX / Bot Box concept blast	2015	Local Motors	USA	Online - LM Launch Forth
LM SKETCHWALL XPEL / Sketchwall: XPEL active lifestyle vehicle	2014	Local Motors	USA	Online - LM Launch Forth
<b>IP management strategy: Open Source / Creative Commons license, combined with non-monetary compensation</b>				
*LM SKETCHWALL RACER / Sketchwall challenge: Café Racer	2014	Local Motors	USA	Online - LM Launch Forth
LM SKETCHWALL FLECHE / Sketchwall challenge: Bugatti fleche	2014	Local Motors	USA	Online - LM Launch Forth
LM SKETCHWALL FLY / Sketchwall challenge: Flying car industries	2016	Local Motors	USA	Online - LM Launch Forth
LM SKETCHWALL LEMANS / Sketchwall challenge: LeMans Redux	2014	Local Motors	USA	Online - LM Launch Forth
LM SKETCHWALL P51 / Sketchwall challenge: P-51 Mustang	2014	Local Motors	USA	Online - LM Launch Forth
LM SKETCHWALL PLAY / Sketchwall: Playing with proportions	2016	Local Motors	USA	Online - LM Launch Forth
LM SKETCHWALL RALLYE / Sketchwall challenge: Group B Rallye	2014	Local Motors	USA	Online - LM Launch Forth
<b>IP management strategy: No transfer of ownership nor licensing arrangement; monetary compensation, combined with additional agreement</b>				
*MERCEDES DIGITAL / Mercedes-Benz digital challenge	2017	Daimler AG	Germany	Online - single-project platform
<i>An asterisk (*) indicates representative cases used in multiple case study to illustrate each of the identified IP management strategies in co-creation.</i>				

**Appendix 2.** Complete sample of company-to-many co-creation projects

Project label / Project name	Year	Company	Country	Setting
<b>IP management strategy: Full transfer of ownership, combined with monetary compensation</b>				
*JAGUAR DEVELOPER / Jaguar Land Rover developer challenge	2017	Jaguar Land Rover Automotive	UK	Offline
*TOYOTA CONNECTED / Toyota connected vehicle ideathon	2014	Toyota Motor Corporation	Japan	Offline
*CONF DIGITAL / Digitale Lösungen im Automobilbereich	2018	Confidential	Uknown	Online - HYVE Crowd
<b>IP management strategy: Non-exclusive license, combined with monetary compensation</b>				
*AUDI ADC / Autonomous Driving Cup 2018	2018	Audi AG	Germany	Offline
<b>IP management strategy: Non-exclusive license, combined with monetary compensation and additional agreement</b>				
*LM MODULAR / Modular logistics vehicle	2018	Local Motors	USA	Online - LM Launch Forth
LM ALLIANZ BRAINSTORM / Brainstorm: Emergent mobility	2018	Local Motors	USA	Online - LM Launch Forth
LM SKETCHWALL / SketchWall brainstorm	2018	Local Motors	USA	Online - LM Launch Forth
<b>IP management strategy: Non-exclusive license, combined with non-monetary compensation</b>				
*AUDI SMART FACTORY / Smart Factory Hackathon	2016	Audi AG	Germany	Offline
<b>IP management strategy: Open Source / Creative Commons license, combined with monetary compensation</b>				
*AUDI HACKOVATION / Hackovation	2017	Audi AG	Germany	Offline
*LM STRATI / Strati: the world's first 3D-printed car	2016	Local Motors	USA	Online - LM Launch Forth
LM 3D / Road ready 3D-printed car	2015	Local Motors	USA	Online - LM Launch Forth
LM ACCESSIBLE OLLI / #AccessibleOlli brainstorm	2016	Local Motors	USA	Online - LM Launch Forth
LM ARIEL / Ariel Cruiser	2014	Local Motors	USA	Online - LM Launch Forth
LM ASU / ASU eProject	2015	Local Motors	USA	Online - LM Launch Forth
LM AXION / Axion use cases	2016	Local Motors	USA	Online - LM Launch Forth
LM CORVETTE / Corvette C7 rear harness bar	2013	Local Motors	USA	Online - LM Launch Forth
LM DARPA / Darpa XC2V: Flypmode	2011	Local Motors	USA	Online - LM Launch Forth
LM EINS / Eins.Plus - Pro	2015	Local Motors	USA	Online - LM Launch Forth
LM IMTS / 3D printed car for IMTS	2014	Local Motors	USA	Online - LM Launch Forth
LM IOT / Connected car project (Internet of Things)	2014	Local Motors	USA	Online - LM Launch Forth
LM MOTORCYCLE / Modular motorcycle	2014	Local Motors	USA	Online - LM Launch Forth
LM OLLI / Olli: self-driving, cognitive electric shuttle	2016	Local Motors	USA	Online - LM Launch Forth
LM PARDO / Camilo Pardo 3E concept	2016	Local Motors	USA	Online - LM Launch Forth
LM RALLY / Rally Fighter	2009	Local Motors	USA	Online - LM Launch Forth

LM SF / LM SF-01	2014	Local Motors	USA	Online - LM Launch Forth
LM TANDEM / Open tandem	2013	Local Motors	USA	Online - LM Launch Forth
LM URBAN / Solutions for urban mobility	2014	Local Motors	USA	Online - LM Launch Forth
LM VERADO / Verado drift trike	2012	Local Motors	USA	Online - LM Launch Forth
<b>IP management strategy: Open Source / Creative Commons license, combined with monetary compensation, NDA and additional agreement</b>				
*BMW AI / Cross-Industry AI Hack	2018	BMW AG with Siemens AG	Germany	Offline
<b>IP management strategy: No transfer of ownership nor licensing arrangement; monetary compensation, combined with additional agreement</b>				
*MERCEDES HACK / Mercedes-Benz hackathon	2015	Daimler AG	Germany	Offline
<b>IP management strategy: No transfer of ownership nor licensing arrangement; monetary compensation, combined with NDA and additional agreement</b>				
*INMOTION HACKATHON / Inmotion hackathon	2016	Jaguar Land Rover Automotive	UK	Offline
<b>IP management strategy: No transfer of ownership nor licensing arrangement; non-monetary compensation, combined with additional agreement</b>				
*DAIMLER HACK.LA / Hack.LAMobility	2018	Daimler AG	Germany	Offline
<i>An asterisk (*) indicates representative cases used in multiple case study to illustrate each of the identified IP management strategies in co-creation.</i>				