Combining Open and Closed Forms of Innovation: An Investigation of Emerging Tensions and Management Approaches

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Résumé :

Aujourd'hui, les entreprises s'engagent communément dans des stratégies de recherche simultanément ouvertes et fermées. Par exemple, de plus en plus d'entreprises ont recours au crowdsourcing (CS) interne et externe pour accéder à des idées et solutions provenant d'une foule externe, mais aussi de leurs employés, en interne. Le CS peut être défini tant comme une forme d'innovation ouverte que fermée : le CS « externe » permet ainsi à l'entreprise de faire de la recherche distante au-delà de ses frontières, tandis que le CS « interne » lui permet de faire de la recherché locale en explorant les connaissances dont l'entreprise dispose déjà. Cependant, en dépit de l'intérêt de ces deux types de CS, et plus vastement de ces deux formes d'innovation, la littérature ne s'est que peu intéressée à l'étude des tensions émergent de la combinaison de ces stratégies d'innovation ouverte et fermée ainsi qu'à leur résolution. Ce travail de recherche étudie ce sujet en s'appuyant sur la théorie des paradoxes. En menant une étude de cas au sein d'une grande entreprise française, cet article identifie et discute trois paradoxes principaux émergents de la combinaison des stratégies d'innovation ouverte et fermée : (1) le paradoxe de l'identité, relatif aux valeurs d'innovation conflictuelles et aux multiples rôles endossés par les équipes de R&D; (2) le paradoxe de l'organisant, lié aux processus d'innovation inhérent à chaque type de CS, et à leur mode d'organisation divergent et (3) le paradoxe de la connaissance, lié à l'équilibre entre les connaissances internes et externes mobilisées par les salariés. De plus, nous identifions les modes de résolution de ces paradoxes, reposant sur différentes approches managériales (intégration, différenciation et acceptation).

Mots-clés : innovation ouverte – crowdsourcing interne – crowdsourcing externe – tensions paradoxales – mode de résolution – approches managériales

Abstract

It is increasingly common for firms to engage in both external and internal search practices to access diverse inputs for innovation. An example is represented by the implementation of both external and internal crowdsourcing (CS) within the same organization to access ideas and solutions coming from the external crowd of customers and internal employees. Arguably, these platforms can be seen as forms of open and closed innovation search, where external CS is directed at performing distant search beyond the organizational boundaries, while internal CS is used to conduct local search within the firm to build upon existing knowledge bases. Nevertheless, limited attention has been placed on investigating which tensions emerge when firms combine these conflicting innovation search strategies and related management approaches to address them. We build on the paradox theory to shed more light on this important question. By drawing on a qualitative, inductive case study of a large organization headquartered in France, our study identifies and discusses three key paradoxes emerging from pursuing both innovation forms: (1) paradox of identity, due to conflicting innovation values and multiple roles R&D employees have to adhere to; (2) paradox of organizing the innovation process, emerging from conflicting design requirements; and (3) paradox of boundary management, emerging from employees having to value both internal and external knowledge. Moreover, we discuss the use of different management approaches (integration, differentiation and acceptance) implemented by managers in the attempt to address the identified paradoxes. Implications for innovation management research and practice are discussed.

Keywords: open innovation –internal crowdsourcing – external crowdsourcing - paradoxes – management approaches

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INTRODUCTION

Open innovation has attracted the attention of both researchers and practitioners over the last decade (Chesbrough, 2003). Various studies highlight the importance for firms to open up their boundaries to external sources of innovation to access novel ideas and solutions, thus leading to boundaries that are increasingly permeable (Lakhani and Panetta, 2007). The innovation management literature has focused on highlighting the benefits and costs of conducting open innovation activities, usually investigated in opposition to more closed innovation forms (Felin and Zenger, 2014; Nickerson and Zenger, 2004). However, more recent studies point to the importance of going beyond the distinction between open vs. closed innovation to consider the notion of complex organizational boundaries (Tushman et al., 2012). That is, firms can combine both open and closed innovation search strategies to organize and support their innovation activities and access diverse inputs (Dahlander and Gann, 2010; Lakhani et al., 2013). In fact, together with the reliance on external innovation sources, it is common for firms to also engage in internal search practices for innovation to build on their existing domain knowledge (Birkinshaw, 2017; Laursen, 2012).

A typical example is represented by the increasing implementation of external and internal CS[1] within the same firm to expand innovation search both within and beyond its organizational boundaries (Birkinshaw et al., 2011; Simula and Ahola, 2014). Arguably, external and internal CS can be regarded as, respectively, forms of open and closed innovation search. On the one hand, external CS – as an in-bound open innovation tool - enables firms to perform a broader, distant search for ideas and solutions from a wider crowd of distributed actors outside the organizational boundaries (Afuah and Tucci, 2012; Dahlander and Piezunka, 2014; Poetz and Schreier, 2012). On the other hand, internal CS constitutes an

[1] Crowdsourcing (CS) is defined as 'the act of outsourcing a task to a 'crowd', rather than to a designated 'agent' […] in the form of an open call' (Afuah and Tucci 2012, p. 355).

internal search practice that enables firms to perform local search within the organizational boundaries by involving distributed employees in the innovation process (Bjork and Magnusson, 2009). As such, when pursuing both search modes, firms aim to create value and increase innovation potential by harnessing both the external crowd of contributors and internal employees.

However, engaging in open innovation activities is likely to create tensions with other internal search practices implemented within the organization for innovation purposes (Dahlander and Gann, 2010). This is especially due to the fact that open and closed innovation forms are depicted by existing literature as being driven by inconsistent logics – i.e. by "contrasting assumptions of agency, control, motivation and locus of innovation" (Lakhani et al. 2012, p. 35). These contrasting logics are likely to create substantial managerial and organizational challenges, making it more difficult for firms to combine them (Tushman et al., 2012). Relatedly, external and internal CS initiatives are depicted by existing research as distinct innovation search forms - being characterized by a different locus of innovation, design requirements and type of targeted crowd (Erickson et al., 2012; Simula and Ahola, 2014). As such, their combination may potentially create inherent tensions with respect to how to organize and manage the innovation process. This raises the question of how firms can simultaneously manage closed and open search activities and thus attend to both types of innovation logics (Lakhani et al., 2013). Nevertheless, limited attention has been placed by current research on unfolding this question.

Our study aims to contribute to this discussion by investigating *which tensions emerge when firms combine open and closed innovation forms and corresponding management approaches to address them*. In our study, this is exemplified by the simultaneous pursue of local and distant search activities through the combination of external and internal CS. To this end, we draw on the paradox theory as a theoretical lens to shed more light on this aspect. This theory constitutes a relevant lens through which understand how firms manage contradictions (Smith and Tushman, 2005) and has been used by various studies to explore complex tensions related to different organizational aspects, such as ambidexterity (Andriopoulos and Lewis, 2009) and creativity (Gotsi et al., 2010). Paradoxes are usually depicted as "contradictory yet interrelated elements that exist simultaneously and persist over time" (Smith and Lewis, 2011 p.382). It is highlighted that managing paradoxes does not entail the elimination of emerging tensions, but rather it means to find ways to handle contradictory elements simultaneously

(Oinonen et al., 2017). In order to address our research question, we conducted an inductive, qualitative case study of a large French firm which has attempted to combine open and closed innovation search through the implementation of both external and internal CS.

Our study contributes to current innovation literature in a number of ways. First, we extend recent calls on advancing a theory of the innovative firm that takes into account complex organizational boundaries where firms govern through a mix of contrasting innovation forms (Felin and Zenger, 2014; Lakhani et al., 2013; Nickerson and Zenger, 2004). We shed more light on the tensions emerging when firms attempt to organize for innovation through a combination of both forms and corresponding management approaches to address them. Second, we integrate insights from the paradox literature as a way to reframe current discussion about open and closed innovation forms. We show how integrating the paradox lens enables to blend seemingly conflicting search strategies, thus highlighting the importance of seeing them as complementary rather than as polarized contradictions.

1. THEORETICAL BACKGROUND

1.1. OPEN AND CLOSED INNOVATION FORMS

The increasing interest in the open innovation paradigm is based on the consideration that firms can access diverse external sources for innovation, including users, customers, suppliers, competitors and universities (Laursen and Salter, 2006). Firms can rely on a variety of alternatives to access external knowledge, such as CS (Poetz and Schreier, 2012), open source platforms (West and O'Mahony, 2008) and participation in online innovation communities (Dahlander and Frederiksen, 2012). Previous innovation studies have focused on contrasting open innovation[2] (in its different forms and manifestations) with traditional 'proprietary' forms where internal employees generate ideas for new products, processes or services (Felin et al., 2017; Felin and Zenger, 2014). Increasing focus has been placed on addressing governance-related questions in the attempt to shed light on the benefits and costs of open and closed innovation forms (Afuah and Tucci, 2012; Felin and Zenger, 2014).

However, although it is acknowledged that paradoxical tensions may be present (Laursen and Salter, 2014), the open innovation literature often tends to examine open and closed

[2] Although open innovation also entails inside-out innovation processes, our focus in this paper is on in-bound open innovation.

innovation forms as strategic dilemmas or trade-offs – i.e. as choices that firms make between the two poles in order to organize for innovation (Felin and Zenger, 2014). Open and closed (internal) innovation are, in fact, often depicted as competing organizational modes for generating new knowledge and innovation (Felin et al., 2017). Different insights have been generated on the contingencies of these forms – i.e. when and under what conditions firms would benefit from conducting open innovation compared to closed (internal) innovation practices and vice versa (Afuah and Tucci, 2012; Felin and Zenger, 2014; Nickerson and Zenger, 2004). For instance, it is found that these governance choices depend on the nature of the problem broadcasted (Afuah and Tucci, 2012; Felin and Zenger, 2014) and the degree of task decomposition (Lakhani et al., 2013). However, it is also recognized that such comparisons represent an idealized approach to facilitate theorization. In fact, firms are likely to organize and manage innovation through a more complex combination of open and closed governance forms, where innovation is managed both through internal and external search mechanisms (Felin and Zenger, 2014; Lakhani et al., 2013). This is based on the insight that different types of sources of knowledge and ideas for innovation should be exploited, both within and outside the organizational boundaries. Hence, this highlights the need to better understand how innovation is managed in contexts where firms rely on a mix of open and closed innovation search strategies in a complementary manner – an aspect that is also referred to as 'complex organizational boundaries' (Tushman et al., 2012). This is especially relevant considering that the combination of open and closed innovation forms is likely to generate tensions for the firm, due to the contrasting logics and organizing assumptions underpinning them (Lakhani et al., 2013).

In our study, we particularly zoom in on two forms of organizing for innovation: internal and external CS. We argue that these two forms can be regarded, respectively, as manifestations of open (external) and closed (internal) innovation search strategies. In fact, several innovation studies conceive external CS as a form of in-bound open innovation directed at accessing new ideas and solutions outside the organizational boundaries by leveraging Web 2.0 technologies (Dahlander and Piezunka, 2014; Poetz and Schreier, 2012). At the same time, the increasing implementation of CS via web-enabled ideation systems within the organizational boundaries is based on the principle of high-involvement innovation (Tidd et al., 1997), where all employees are regarded as a crucial source of new ideas. In this case, innovation is regarded as the responsibility of the entire organization (Birkinshaw et al.,

2011). By combining both approaches, firms aim to involve both the crowd of employees and external contributors in setting strategies for the creation of new products, processes and services (Birkinshaw, 2017). While current research shed light on the benefits and challenges of CS, in this study we argue that combining these two approaches is likely to generate tensions for the firm, arising from specific elements of these search strategies and underlying goals. We show how these tensions can be regarded as paradoxes, due to contradictory elements that need to be simultaneously managed by organizations (Smith and Lewis, 2011). There are several reasons for the emergence of paradoxes when combining external and internal CS search practices. In the following section, we unfold the contrasting logics of these two innovation forms as discussed by existing innovation literature with respect to: (1) the locus of innovation; (2) type of search conducted; and (3) design requirements.

1.2. LOCUS OF INNOVATION

Internal and external CS enable firms to simultaneously involve two different types of crowds in the innovation process (Erickson et al., 2012). This can be related to the current debate in the innovation literature about whether firms should involve external contributors or internal professionals in the generation of new ideas (Poetz and Schreier, 2012). On the one hand, it is claimed that involving a large and diverse crowd of external contributors through CS may be beneficial for the firm, due to the possibility to access both need-based and solution-based information (Piller and Walcher, 2006). This also relates to the key argument of open innovation that knowledge is distributed worldwide and that firms need to find ways to access such knowledge (Chesbrough, 2003). External contributors may be able to generate innovative ideas and solutions that can provide benefits to the organization (Jeppesen and Lakhani, 2010). For instance, it is found that some contributors may represent lead-users, who innovate for themselves and are ahead of market trends (Von Hippel, 2005). Especially contributors who are marginal to the domain of a problem may be able to generate novel solutions and ideas (Jeppesen and Lakhani, 2010). On the other hand, many companies still tend to rely on internal expertise and knowledge bases to generate innovations (Laursen, 2012). Firms can be regarded as knowledge-distributed systems where it is possible to access diverse knowledge and competences held by widely distributed employees (Tsoukas, 1996). Internal employees are often associated with domain-specific knowledge, accumulated through training and localized expertise that may be relevant for the generation of new ideas

(Unsworth, 2001). Moreover, they possess rich tacit knowledge about customers' needs and firms' products and processes (Simula and Ahola, 2014) as well as an in-depth understanding of the organizational context (Santos and Spann, 2011). Differently from external crowds, employees (being part of the organizational hierarchy) are also more likely to be aligned with the organization's goals and strategy, making it easier to develop products with a strategic fit (Simula and Ahola, 2014).

1.3. TYPE OF INNOVATION SEARCH

Relatedly, external and internal CS can be regarded as having different starting points in the search for ideas and solutions. External CS is implemented by firms with the aim to perform a distant search for ideas and solutions – i.e. going further away from the firm's current knowledge base (Lopez-Vega et al., 2016; Piezunka, 2015). When accessing a large and diverse crowd of contributors, the likelihood of identifying 'extreme-value outcomes' from non-obvious sources increases (Boudreau et al., 2011). For instance, Poetz et al. (2012) found that external contributors were able to generate more novel ideas compared to internal employees, thus highlighting the benefits of performing distant search. However, it is also found that distant search creates challenges for firms in terms of absorptive capacity – i.e. of integrating and assimilating the inputs provided (Cohen and Levinthal, 1990). Moreover, this type of search bears the risk of loss of control for the firm, as it becomes more difficult to align contributors' ideation efforts with the organization's needs and strategies (Keinz et al., 2012). On the other hand, internal CS enables firms to perform a broader local search spanning diverse boundaries within the organization, although still in the vicinity of the firm's current knowledge bases. Although local search decreases the probability of finding novel solutions, it increases the chances of identifying and integrating more feasible solutions (Lopez-Vega et al., 2016; Poetz and Schreier, 2012). This can especially be favored by the alignment of employees' creative efforts with the firm's strategy (Bjork et al., 2010), thus leading to higher levels of control compared to external CS. The challenge is then how to attend to and combine both approaches.

1.4. DESIGN REQUIREMENTS

Current innovation literature highlights how in-bound open innovation tools like external CS require firms to develop new practices and capabilities to favor the participation of external

contributors and the integration of their inputs into the innovation processes (Hienerth et al., 2011). When combining both forms of innovation, the organizational structure needs to be redesigned in a way to accommodate different search behaviors (in terms of local and distant search processes) and favor the sourcing and integration of external and internal knowledge. One set of practices relates to the design of incentive mechanisms to support the involvement of external contributors and employees in innovation. These two types of crowds are likely to be driven by different motivations to participate in innovation activities, opening up the question of how firms can develop incentive systems that would align to the motivations of these crowds (Erickson et al., 2012). For instance, it is found that both monetary and non-monetary incentives are important to motivate external contributors (Pisano and Verganti, 2008). Employees, on the other hand, are less likely to value monetary rewards (Birkinshaw et al., 2011). At the same time, firms need to provide incentives that would motivate employees to integrate external contributions into the innovation process, thus overcoming challenges related to the Not-Invented-Here syndrome and internal resistance (Katz and Allen, 1982).

A second set of practices relates to the development of receiving mechanisms that enable the efficient processing, selection, transfer and integration of external and internal inputs. Considering the limited attentional capabilities of firms (van den Ende et al., 2015), a key question relates to how firms pay attention to and value the diverse knowledge generated through these different search processes. In fact, it is found that managers are likely to value external and internal knowledge differently (Menon and Pfeffer, 2003), an aspect that can have implications for how generated inputs may be filtered and processed. Moreover, current studies highlight the need for firms to establish new roles within the organization to enable the transfer and integration of externally generated ideas (Whelan et al., 2011). Involving internal and external crowds also require a different approach when it comes to managing intellectual property (IP) rights to the ideas and solutions generated (Birkinshaw et al., 2011). In fact, by relying on internal expertise firms can benefit from employees' ideas without facing the risks of additional costs or losing essential knowledge to the public (Lee and Cole, 2003). On the other hand, the management of IP and appropriability rights constitutes a key issue when it comes to capturing ideas from external contributors (Alexy et al., 2012).

Summary of the Key Logics Underlying Internal and External Crowdsourcing

In Table 1 we summarize the key logics underlying internal and external crowdsourcing as forms of closed and open search strategies.

Table 1: Key Logics Underlying External and Internal Crowdsourcing

Dimensions	**External Crowdsourcing**	**Internal Crowdsourcing**
Locus of innovation	Outside the organizational boundaries. Aims at accessing ideas and solutions from a large, unknown crowd of external contributors.	Within the organizational boundaries. Aims at accessing ideas and solutions from internal employees.
Type of search	Focuses on distant search – the aim is to access knowledge that is less familiar and more distant from the firm's current knowledge base (i.e. residing outside the organizational boundaries). Increases novelty of ideas.	Focuses on local search – the aim is to access knowledge that is familiar with respect to the firm's current knowledge base (i.e. residing within the organizational boundaries). Increases feasibility and alignment of ideas with current activities and strategies.
Design requirements	Incentives schemes to favor the sustained participation of individuals. Incentive schemes to stimulate employees to work with externally generated ideas. Evaluation mechanisms to enable the efficient processing of ideas. Establishment of roles to enable their integration and transfer. Management of IPR issues.	Incentives schemes to favor the sustained participation of employees. Evaluation mechanisms to enable the efficient processing of ideas. Formulation of an ideation strategy to align employees' efforts with current needs and objectives. Management of IPRs is not an issue.

2. METHOD & DATA

Our exploratory research entails a qualitative single case study (Yin, 2009) based on data collected from a large French firm (labeled 'Gamma' for confidentiality reasons). Below, we describe more in detail the research setting and the data collection and analysis.

2.1. RESEARCH SETTING

Gamma is a large French firm employing more than 30000 employees worldwide and leader in the small electric appliance market. The company is active in numerous geographical locations. It produces small appliances which are distributed through more than 20 national and international brands, including kitchen, home and personal care appliances. In order to

support Gamma's innovation strategy and process, the firm decided to implement both internal and external CS platforms.

In 2012, Gamma launched an internal collaborative platform in order to develop an internal community of innovators. The main aim with such initiative was to involve employees in innovation by encouraging the submission of unsolicited ideas and solutions to solve relevant technological problems. This initiative responded to the objective to facilitate sharing of knowledge across employees. The internal platform was managed by the Corporate Innovation Team. However, in 2016 the company decided to close this initiative due to a reorganization of the entire group, with the manager in charge of this platform leaving the firm. Yet, convinced by the value of internal collaborative innovation, Gamma decided to launch a new internal CS platform in 2016 with the aim of collecting new ideas from the diverse crowd of distributed employees. This new platform is managed by another part of the group, the internal FabLab. For the first edition of the contest, 63 employees submitted solutions to the challenge.

In 2014, Gamma also decided to create an external CS platform on the impulsion of its Innovation Process Director, who believed in the importance of adopting open innovation practices. The objective of this platform was to enable the generation of new ideas and solutions by broadcasting complex problems that the firm was not able to solve to the crowd of external customers. Gamma thus implemented another platform in order to outsource problem solving and idea generation to the external crowd, as a way to complement the first internal CS initiative. The external platform was managed by employees from the Corporate Innovation Team, supported by the Innovation Process Director.

Table 2: Crowdsourcing Initiatives at Gamma

	"Internal CS platform 1"	**"Internal CS platform 2"**	**External CS platform**
First implementation	2012	2017	2014
Aim	Encourage collaborative innovation across the 3 business units. Identify hidden internal knowledge. Develop new innovation projects and solve problems.	Identify hidden internal knowledge. Develop new innovation projects and solve problems – focus on the use of challenges.	Develop new innovation projects and solve problems. Identify external relevant knowledge.
Management	Corporate: Innovation Process team	Corporate: Innovation Process team	Internal Fab Lab
Status	Closed in 2016	In progress	In progress

2.2. DATA COLLECTION

We collected our data through multiple sources. Semi-structured interviews constituted the primary source of data collection, augmented by different secondary data. Using several data sources was important to increase construct validity and allow for triangulation of results (Yin, 2009). We collected our data between October 2015 and November 2017. We conducted 18 semi-structured interviews with a number of different employees who were involved in the internal and/or external CS platform. For instance, we interviewed managers involved in the management of both platforms and R&D teams in different business units, which were supposed to use both initiatives (as participants in the internal platform and as internal customers for the external platform). We developed an interview guide to structure the interviews which included questions derived from the wide initial theoretical framework. We first asked general questions about Gamma's innovation processes and strategy to gain a better understanding of the context. We then asked more specific questions related to the factors and motivations influencing the adoption of both CS platforms and related difficulties in combining and managing both initiatives. The interviews lasted between 20 and 186 minutes. All the interviews were recorded and fully transcribed in order to increase reliability (Eisenhardt, 1989). In addition, we collected different secondary data sources (internal communication documents, reports, and presentations) in order to fully understand the aim of each platform, the way both initiatives were implemented and managed, their performance and related challenges.

Table 3 - List of interviewees

Date	Profile	Duration
17/12/2014	Innovation Process Director	186 minutes
17/12/2014	External CS platform manager	186 minutes
24/06/2015	Innovation Process Director	102 minutes
24/06/2015	External CS platform manager	102 minutes
12/11/2015	Innovation manager	31 minutes
19/11/2015	Project leader	30 minutes
19/11/2015	Research Director	36 minutes

20/11/2015	Research Director 2	35 minutes
20/11/2015	Deputy Research Director 2	64 minutes
25/11/2015	Research project manager	52 minutes
30/11/2015	Research manager	60 minutes
25/02/2016	Innovation Process Director	70 minutes
25/02/2016	External CS platform employee	70 minutes
14/06/2017	External CS platform employee	24 minutes
19/06/2017	Ex internal CS platform manager	20 minutes
04/07/2017	Research manager	22 minutes
13/07/2017	Fab Lab employee (internal CS challenge manager)	110 minutes
10/11/2017	Fab Lab employee (internal CS challenge manager)	32 minutes

2.3. DATA ANALYSIS

Our data analysis was conducted in an iterative manner and proceeded in different stages (Miles and Huberman, 1994). During this process, we focused on constantly comparing the data, emerging categories and relevant literature. We conducted three rounds of coding using the Atlas.ti software. In the first stage, we read through the interview transcripts to identify relevant first-order concepts. We focused on categorizing underlying tensions as they were described by the interviewees. In order to do so, we followed the recommendations provided by Andriopoulos and Lewis (2009). More precisely, we focused on identifying tensions based on the use of language indicators as well as contradictory statements in the interviews (Andriopoulos and Lewis, 2009). Tensions are usually depicted as "the sources of paradoxes and evident in interrelated, yet seemingly contradictory polarities" (Andriopolous and Lewis 2009, p. 702). In the second stage, we aggregated the identified first-order concepts into second-order dimensions based on either emerging higher-level abstract concepts or concepts from existing literature (Miles and Huberman, 1994). In the final stage, the identified dimensions were compared to detect patterns and relationships (Miles and Huberman, 1994).

In particular, in order to label and refine the identified dimensions, we built on previous studies on paradoxes in innovation management (Lewis, 2000; Smith and Lewis, 2011). This is because it was particularly evident from the interview material that interviewees were

aware that combining both forms of innovation would determine the emergence of tensions. However, we noticed that such tensions were described by the interviewees not as either/or dilemmas or trade-offs with related advantages and disadvantages (leading to choose one of the two poles), but rather as paradoxes, being seen as complementary and valuable elements of innovation. The contradictory elements constituting paradoxes may seem indisputable when taken singularly, but inconsistent or incompatible when considered together (Poole and Van de Ven, 1989). In our cases, managers highlighted the importance of exercising a dual innovation focus in terms of attending to both competing demands to better organize and manage innovation. At the same time, they described various tensions emerging from such combination attempt and negative consequences. Building on this, during the coding process[3] we also focused on identifying which approaches managers implemented to address such tensions. To better refine the identified approaches, we built on paradox studies which have mainly discussed three main approaches to the management of tensions: (1) integration approaches which focus on embracing and leveraging the synergies between the opposing poles (Andriopoulos and Lewis, 2009); (2) differentiation approaches (spatial or temporal) which focus on splitting the two poles to leverage their distinct benefits (Poole and Van de Ven, 1989); and (3) opposition approaches which entail the acceptance of the paradox (Poole and Van de Ven, 1989).

3. FINDINGS

By building on the paradox theory as a lens, in this section we present the key findings of this study. We identified three key paradoxes emerging from combining internal and external CS within the same firm. These paradoxes revolved around: (1) identity; (2) organization of innovation processes; and (3) boundary management. We unfold each paradox by presenting and discussing its underlying tensions and corresponding management approaches as emerging from our interview material.

3.1. PARADOX OF IDENTITY: CONFLICTING EMPLOYEE ROLES

3.1.1. Underlying tensions.

[3] A coding sample can be provided if requested.

Combining both external and internal CS initiatives created tensions of multiple identity demands (Gotsi et al., 2010) for employees, as they were required to be open (externally-focused) and closed (internally-focused) at the same time. On the one hand, by opening the organizational boundaries to the external crowd, the firm aimed to encourage employees to be open and innovate with external unidentified stakeholders. For example, in order to support the external CS platform, top management decided to implement KPIs (Key Performance Indicators) to encourage employees to innovate with the external crowd. In this case, R&D employees were required to shift their identity from problem solvers to solution seekers, broadcasting challenges to the external crowd. On the other hand, by focusing on internal CS, employees were encouraged by the firm to innovate internally and to contribute to the organization as idea creators and problem-solvers. This emphasis on both *open and closed values* contributed to create ambiguity in identity work for employees, leading to confusion in terms of who they were and what they were supposed to do in their role. Conflicting identities emanated from employees' need to assume opposing but coexisting roles and memberships (related to both platforms) creating ambiguity about what they were supposed to do. This tension stems from the fact that employees were required to assume new roles along with their current ones. Our interviewees highlighted that such ambiguity lead to a lack of interest and involvement in using both platforms over time, as they were trying to satisfy both competing demands. Employees were in fact divided between the necessity to be open and the desire to innovate internally as well as between the demands of specialization and differentiation.

For instance, different employees initially seemed willing to adhere to the open strategy, considering the collaboration with external stakeholders relevant: *"open innovation is what we have to do today as a large firm"* (Research Director 2). At the same time, while agreeing about the relevance for the firm of doing open innovation, most interviewees viewed openness as something that should be directed toward identified, relevant stakeholders rather than to an undefined group of individuals: *"More often than not, we can find solutions thanks to our own external network…being open yes, but to the right people"* (Deputy Research Director 2). On the other hand, the implementation of the first internal CS platform encouraged the opposing way of thinking because employees were supposed to dedicate time and efforts on collaborating internally to develop innovations related to different topics. As reported by the

previous manager of the platform, "*The aim was to create an innovation community within Gamma, aware of the internal unexploited potential"*.

Another aspect of identity paradox emerging from our analysis related to the underlying tension faced by employees in terms of adhering to the competing demands of *specialization and differentiation.* The company has particularly supported over the years the specialization of its employees when it comes to the conduction of work activities. For instance, in addition to the division of work among the three business units related to the family products, the firm also separates Research from Development teams. Working contracts typically specify the activities and tasks employees are supposed to conduct, an aspect that limits their autonomy and freedom to engage in extra-role behaviors. For instance, if an employee of the Research team in Business Unit A had an idea that was not completely related to the business unit and product family, he or she would not be allowed to pursue it. In the context of the external CS platform, this employee's specialization was valued and supported by the firm. When the innovation manager received an idea through the external platform, great attention was provided in identifying the right internal organizational members for its further development: *"We have to identify carefully who will be involved with the external user to be sure that the idea has all the chances to be integrated"* (Innovation Process Director). In this case, employees were required to focus on their area of expertise when collaborating with external actors to further develop their ideas.

However, this focus on specialization was in contrast with the way the internal CS platform aimed to involve employees. In this case, it was considered important that employees would go beyond their expected roles and responsibilities when engaging in innovation, thus seeking ideas and solutions in new knowledge areas. The intention was to attract employees at the margins of knowledge boundaries (Jeppesen and Lakhani, 2010). At the same time, it aimed at encouraging employees to act as problem-solvers internally, going beyond their 'comfort' area of knowledge expertise to engage in other domains. For instance, the communication campaign of the internal platform highlighted that all employees could submit an idea related to any aspect of the firm's activities and strategies, even if it was not related to their expertise and functional knowledge domain. This somehow required a shift in the professional identity of employees to embrace new roles directed at applying their knowledge and skills in less familiar areas as well as at engaging in creative efforts outside their particular knowledge

comfort zone. The manager in charge of the internal initiative, who was aware of this tension, further reported:

> *"From a legal perspective, an employee who is out of his mission - who innovates on something that is not clearly depending on his business unit - is sanctioned on his salary. I know it can be a barrier for the internal challenge, where we encourage submission of ideas without business unit frontiers…but maybe it can help someone who wants to be open." (Lab employee, internal challenge manager)*

As highlighted by our interviewees, such competing demands created confusion as well as challenges for employees with respect to distinguishing their individual vs. professional role within the firm.

3.1.2. Management approaches.

We found that, in order to address the identified tensions related to identity, managers resorted to a mixed approach. On the one hand, they resorted to an acceptance approach (Poole and Van de Ven, 1989). Acceptance means to "embrace or live with the paradox" (Smith and Lewis 2011, p. 385), with the aim to appreciate tensions' differences and use them constructively (Poole and Van de Ven, 1989). It is important to point out that managers did not simply ignore this paradox. However, as reported by the Research Director, it seemed difficult to conciliate both open and closed values as well as specialization and differentiation roles for employees when innovating. As such, acceptance led somehow to a view of the paradox as unsolvable and persistent (Smith and Lewis, 2011).

> *"We have to open, but not too much because of confidentiality; we have to go out to look for new knowledge, while we have people in here to do so. What should we do? We are all passionate about innovation but we can't do everything at the same time."*

We noticed that the organization particularly aimed to develop over time an organizational culture based on this rich identity that would embrace both types of roles and values. For instance, employees were encouraged to freely propose innovative insights, methods and activities as part of their new role (i.e. related to both internal and external CS). At the same time, the firm considered it important to not rush in changing the culture in order to find the right balance to juxtapose the identity tensions.

> *"It is our culture to go step by step: we first try and experiment new practices with few resources, we show the interest and only thereafter, when we*

demonstrate that the new practice presents interests for Gamma, we can develop and implement it." (Innovation Process Director)

The firm recognized the importance to be clear and transparent with its employees in the attempt to reduce confusions and frustrations related to the identified competing demands. For instance, communication tactics were considered important to emphasize organizational values that linked both types of identities to improve fit with organizational expectations, in the attempt to drive a cultural change. Moreover, when the second internal CS initiative was introduced subsequently to the failure of the previous one, the firm decided to adopt a differentiation (spatial) approach (Lewis, 2000) in order to separate the management of such platform from the external one. While the two platforms were initially managed within the Innovation Process Team at the corporate building, Gamma decided to separate the management of the new internal platform from the external one by assigning it to the internal Fab Lab unit, which was located in a separate building. This spatial separation was considered important to support and enable a better understanding of the distinct employees' roles. It aimed to help employees alternate between their work with the external CS platform and the internal one and thus switch their roles between the two projects. Similarly, previous research highlights that separating employees' underlying roles in space constitutes a way to leverage their distinct identities (Gotsi et al., 2010), thus enabling them to focus on one set of issues. This differentiation was seen as a way to help employees switch their roles between differentiation and specialization (i.e. explore a new knowledge domain and specialize in a knowledge domain). It also created a physical space for employees to embrace both closed and open innovation values.

3.2. PARADOX OF ORGANIZING THE INNOVATION PROCESS

3.2.1. Underlying tensions.

Our interviewees highlighted that the implementation of both initiatives created contrasting demands for employees in terms of collaborating and competing among each other. On the one hand, one of the key aspects supporting the implementation of the external CS platform related to fostering the involvement of and collaboration between cross-functional teams:

"When we receive an idea [on the external platform], it is important to involve lots of people: legal services to check the IP, legal watch to check if we don't already have the idea, industrial design director to check feasibility, marketing to

> *check if it fits our plan, BU to exploit the idea etc. It relies on our collaboration." (External platform manager)*

Employees were thus strongly encouraged by the firm to work together and collaborate across different functions to support the development and integration of external ideas and ensure their successful implementation, an aspect that however faced resistance from employees. On the other hand, the first internal CS platform was designed to foster competition among employees. Differently from the external platform, the second internal initiative required employees to work individually while not supporting team-based collaboration. Employees could submit a personal idea into the platform and further develop it in the Lab. The Lab team, in charge of the challenge, would then provide the necessary support to further develop the five most promising ideas to be presented to the final committee, where only one winning idea would be selected. As reported by the internal challenge manager:

> *"A challenge with competition mode is gratifying, stimulating. Challengers will outperform. (…) It is individual-based because we want all employees, even from purchasing or accountability, to participate. Teams would have encouraged R&D focus."*

As such, the individual and competitive character that characterized the initiative did not allow for cooperation and team-building to solve innovation-related challenges. Implementing both initiatives also determined different ways of organizing – i.e. competing demands between *control and flexibility*. On the one hand, the external CS platform was implemented with a structured process, where the firm aimed to exercise a high level of control on how employees could use the platform to support innovation and integrate external knowledge with internal innovation processes and activities. As reported by an interviewee,

> *"Every time we face a problem we can't solve we have to use the [external] platform to find a solution. This is part of the innovation process. Then, when the challenge is launched on the platform, (…) the process is clearly defined." (Research manager)*

More specifically, the firm required employees to follow a structured process when using the external platform: once a valuable solution was identified, R&D employees were expected to set up a phone meeting with the idea creator who had to previously fill in a document to further explain how the solution would contribute to the organization. If the meeting was positive, another meeting would be set up with relevant members of the R&D team with whom the idea creator would collaborate to further develop the solution. These processes and

control were considered important to encourage employees to use the platform in the intended way. Besides, our informants explained that these processes were needed to handle legal issues, an aspect that was crucial when engaging external stakeholders. However, such control was perceived as a constraint by employees on sites: *"I understand that processes are required to push us to use the platform, but lack of personal control makes it complicated." (Research project manager)*

On the contrary, when implementing the internal CS platform, the firm regarded it as crucial to provide employees with the flexibility and freedom necessary to innovate in order to engage them in such initiative. This flexibility entailed, for instance, free access to the Lab, flexible time during working hours to dedicate to innovation and creativity and lack of a process to follow when doing so. This aimed at fostering divergent thinking, thus allowing employees to generate innovative ideas and solutions. As explained by the manager in charge of the challenge, *"If we want the challenge to work, we need to let them [participants] be free, to manage them differently. We stay open on this aspect."*

3.2.2. Negative consequences.

Our findings suggest that this paradox led to negative consequences or vicious circles (Lewis 2000, Smith and Lewis 2011): "Negative, vicious cycles stem from factors such as cognitive and behavioral forces for consistency, emotional anxiety and defensiveness, and organizational forces for inertia" (Smith and Lewis, 2011, p.391). We found that these contrasting demands between collaboration and competition and between control and flexibility created an uncomfortable, even hostile environment for employees. While employees were encouraged to be collaborative when using both the first internal CS platform and the external one, the use of competition-driven challenges for the newer internal initiative led to confusion. As these platforms were meant to be complementary, employees could face situations in which they had to collaborate with other colleagues when using the external CS platform to integrate external ideas, while having to compete with the same colleagues during the internal challenge. Moreover, the encouragement of using both platforms led to feelings of overload and confusion for employees, as these initiatives were driven by different rules, structures and workflows which required employees to exert more efforts to engage in them. The discomfort and confusion of the situation led employees to lose interest in both

initiatives: *"I don't want to use these platforms anymore, this is too complicated: I just want to do my job." (Project leader)*

3.2.3. Management approaches.

We found that, in order to manage these organizing tensions, the firm resorted to both spatial and temporal differentiation (Lewis, 2000). In relation to spatial separation, the firm decided that the two initiatives would be managed separately and assigned to different units. As previously mentioned, responsibility for the new internal initiative was assigned to a separate unit, while the external platform remained within the Innovation Process team. This was thought as a way to reduce employees' confusion in relation to both initiatives. The aim was to communicate more clearly to employees that the internal CS platform was managed by a different entity, by a different manager and in a different place - while at the same time maintaining some level of integration.

> *"When the new headquarter was built, it has been a real question: did we have to be integrated or stay aside? Being integrated seemed to be the better solution to attract people. However, as you can see, despite our integration, we have a dedicated building, separate from corporate." (Lab employee, internal challenge manager)*

As such, this was seen as a way to mitigate the paradox of organizing by spatially separating the contradictory elements of the two initiatives with respect to collaboration and competition as well as control and flexibility. In addition to this, managers resorted to temporal differentiation as a way to ease the underlying tensions. This means that employee participation to these initiatives was seen as a sequence of events (Poole and Van de Ven, 1989), meaning that employees could dedicate specific times to each platform, thus switching between them. As one side of the paradox may influence the other one (Poole and Van de Ven, 1989), Gamma currently has to deal with the challenge of how to enable employees to switch between the two activities. In fact, our interviewees highlighted that employees still face the challenge of how to flexibly adjust to different work times and spaces and how to balance this with their job responsibilities.

3.3. PARADOX OF BOUNDARY MANAGEMENT: VALUING INTERNAL VS. EXTERNAL KNOWLEDGE

3.3.1. Underlying tensions.

Managers saw the opportunity to engage in both local and distant search as full of advantages. On the one hand, it allowed the firm to benefit from internal skills and knowledge held by distributed employees to improve its current activities and strategies. On the other hand, looking outside the organizational boundaries was considered important to access less familiar knowledge that could lead to the exploration of novel opportunities for the firm (Piezunka and Dahlander, 2015). Despite these advantages, combining both local and distant search approaches created challenges for managers with respect to how to allocate attention to the knowledge generated through both initiatives and how to capture value from it. Our interviewees highlighted that the use of both initiatives created confusion for managers with regards to the evaluation of internal and external knowledge. The external platform was implemented with the clear goal of accessing valuable, external knowledge residing outside the firm. R&D employees were then assigned the responsibility to identify, absorb and exploit such knowledge. The fact that external, distant knowledge was highly valued can also be seen in the implementation of KPIs from top management to measure the performance of the external platform and its contribution to the innovation process. Employees were thus encouraged to value external knowledge. External actors also had expectations that their ideas would be valued and taken into consideration by the firm.

> *"One day, top management saw an idea from the external crowd unexploited by the BU in charge. He did not understand why. Therefore, he implemented KPIs to pressure employees to use the platform. Trust me, it helps reducing NIH. (…) The help of top management is required."* (*External CS platform manager*)

The external CS platform, however, conflicted with employees' expectations that their own ideas generated through the internal platform would be considered by the firm. In this case, the internal initiative was implemented with the ultimate goal to exploit internal knowledge residing across the whole organization to innovate. As explained by the internal challenge manager, *"The idea is simple: look at all this sleeping knowledge that we have. We need to value it and to exploit it! What a waste!"* As such, this initiative encouraged employees to support and value internal knowledge, somehow reinforcing the NIH mindset that still many employees had. Hence, the pressure from top management to value external knowledge while at the same time having to exploit internal knowledge in the innovation process created

confusion for employees in terms of how to allocate attention to both types of knowledge and how to capture value from both.

> *"Between the KPIs that pressure us to use external knowledge and all actions supporting valuation of our own knowledge, we don't know where to go." (Project leader)*

Besides, when focusing on the external platform, managers faced a challenge related to the integration of external knowledge and absorptive capacity. It became particularly difficult to integrate such knowledge with the firm's internal knowledge bases. In contrast, internal knowledge generation, building on existing knowledge bases, was seen as easier to integrate and assimilate into current practices and activities. In fact, our interviewees highlighted that the ideas submitted to the internal CS platforms were more likely to be implemented compared to the ideas identified through the external platform. As such, this highlights a preference toward internal knowledge for innovation, an aspect that seems to reinforce the NIH syndrome within the organization. Previous research highlights that, when managers face the task of valuing internal and external knowledge, they tend to prefer outsiders (Menon and Pfeffer, 2003; Piezunka and Dahlander, 2015). The main reasons for this relate to knowledge availability and scarcity, where external knowledge is considered more scarce and unique, as well as to increased costs of valuing internal knowledge due to internal competition (Menon and Pfeffer, 2003). Our findings seem to show a different picture which more closely aligns with the NIH syndrome highlighted by various studies, which leads organizational members to value the knowledge generated internally as superior to knowledge that lies outside the organizational boundaries.

3.3.2. Negative consequences.

We found that this unbalance between the use of internal and external knowledge led to various negative consequences, not only for R&D employees but also for managers and higher-level management. For instance, top managers strongly supported the use of the external CS platform, which was instead somehow avoided by employees. This was evident in the definition of KPIs to measure employees' performance which was linked to the use of the external platform. This, however, contrasted with employees' view of the external platform as less valuable compared to the internal one. Moreover, while top management strongly encouraged employees to use the external platform, actions were not taken in case employees did not use it. This led top managers to lose credibility in the eyes of employees.

As explained by the former Innovation Process Director, *"they wanted to know how many turnkey innovations we received. Do you think they really believed that we received turnkey innovations?"*. This also affected the manager in charge of the external CS platform, who lost the motivation to manage the platform and dedicate efforts in engaging people: *"Even if I am still in charge of the platform, I recently took on new responsibilities dealing with innovation and technological watch. It is more dynamic and I spend more and more time doing so."*

3.3.3. Management approaches.

In the attempt to manage such tension, the firm decided to reorganize knowledge flows to conciliate both internal and external knowledge creation activities and reduce ambiguities. In order to do so, they resorted to an integration approach (Lewis, 2000) directed at leveraging synergies between the two search strategies. For instance, when developing the new version of the internal platform, the firm decided to implement a new IT tool for internal communication. This system allowed the firm to integrate the external and internal platform by using the same IT system. By doing so, it was possible to link and more easily integrate innovation-related news, shared projects, data about generated ideas and other types of information coming from both platforms. This was seen as a way to create synergy between all the generated knowledge, whether internal or external.

> *"It is much simpler to use [the IT tool]. We can communicate, access data extracted from both CS platforms and I think they want to support us to use all this knowledge." (Research manager)*

Moreover, engaging in communication activities with both internal and external platform members was seen as an important aspect of this integration approach. The key objective was to enhance internal knowledge exchange while also favoring communication with external members. However, conciliating both types of knowledge is still considered challenging by the firm, which aims to implement new practices and processes in the future in the attempt to combine both approaches.

4. DISCUSSION

4.1. THEORETICAL CONTRIBUTIONS

In this study we aimed to shed more light on the tensions emerging when combining external and internal CS (as open and closed search strategies) and management approaches to address them. Our study provides a number of contributions to the innovation management literature. First, our study addresses recent calls related to the need to go beyond the distinction between open and closed innovation processes to investigate complex organizational boundaries (Dahlander and Gann, 2010; Lakhani et al., 2013), where organizations manage innovation through the combination of both open and closed innovation search strategies and forms (Vanhaverbeke and Chesbrough, 2014). It is claimed that theories of innovation should be enriched by an exploration of the tensions emerging when dealing with contrasting innovation modes, especially considering that the firm-centered (internal) innovation logic differs from the open innovation one (Lakhani et al., 2013). We extend these studies by providing a better understanding of the tensions and challenges emerging when firms attempt to combine external and internal CS initiatives, which we argue can be regarded as forms of open and closed innovation respectively. This is important considering that it is increasingly common for firms to involve simultaneously sources both external and internal to the firm in innovation (Bogers et al., 2017). Although these forms compete for resources, leveraging both sources of innovation can be fruitful in the long-term to enhance creativity and innovative performance.

Second, by integrating insights from the paradox theory, we contribute to current literature by reframing the discussion about open and closed innovation. We show how the integration of this theory enables to develop a richer understanding of seemingly contradictory innovation search strategies, highlighting the importance of seeing them as complementary rather than as either/or dilemmas. In fact, when studying how to organize for innovation in the context of open vs. closed innovation forms, a typical approach used by previous research is represented by the contingency perspective (Felin and Zenger, 2014; Nickerson and Zenger, 2004). These studies have focused on understanding when and under which conditions firms select one innovation form over competing others (being open or closed), based on a comparison of different alternatives and specific requirements. In this case, tensions typically have been treated as dilemmas, requiring firms to choose one innovation mode over another (Lakhani et al., 2013) based on the evaluation of related advantages and disadvantages. However, it is claimed that a key issue with such an approach is that it limits the focus on a limited number of variables, while oversimplifying contexts that are often more complex and dynamic (Smith

and Lewis, 2011). Our study adopts a different approach and builds on the paradox literature to investigate how firms can engage in and attend to different types of external and internal innovation forms. We thus shift the focus of attention from choosing between different, contrasting innovation search modes to embracing their contradictions. We provide a complementary view on open and closed forms of innovation that extends current innovation research by shedding light on three key paradoxes emerging when organizing for innovation through different search modes: (1) identity; (2) organizing the innovation process; and (3) boundary management. Moreover, our findings provide insights into the management approaches used to address these emerging tensions in the attempt to support both innovation search strategies. We find that these management approaches are driven by the recognition of the interdependencies between the contradictory elements underlying the identified tensions (Andriopoulos and Lewis, 2009) and are directed at mitigating the negative consequences and challenges emerging from combining both initiatives.

Relatedly, a key contribution of our study to innovation literature relates to the role of identity in innovation, an aspect that has been understudied when it comes to innovation processes (Bogers et al., 2017). Our findings show how combining both innovation modes can led to the emergence of identity threats, as R&D employees working at the boundary of the organization face the challenge of having to cope with multiple roles (being both solution seekers and problem solvers) and innovation values (promoting both open and closeness). Our findings suggest that this may led to confusion of R&D organizational members in relation to where they actually belong as well as resistance toward the use of the external CS platform, with a reinforcement of the NIH syndrome and preference for the internal innovation initiative. We shed light on which management approaches managers implemented in the attempt to address such identity threats. In this respect, studies on creativity tensions highlight the creation of a meta-identity (Gotsi et al., 2010) as a potential integration approach to embrace multiple identity demands and mitigate ambiguity. As stated by Gotsi et al. (2010, p. 793), “A meta-identity offers a superordinate self-categorization within which discrete identities can relate”. It focuses on reconciling identity tensions by leveraging their interdependencies. In our case, the aim of the firm to build an organizational culture which embraces both values and multiple roles may be seen as a way contribute to the development of such superordinate identity over time, potentially leading employees to appreciate both internal and external knowledge.

Finally, our study contributes to the paradox literature by extending its application to open and closed innovation forms. While the paradox theory has been used as a theoretical lens by various studies to shed light on tensions emerging when organizing for innovation (Andriopoulos and Lewis, 2009; Smith and Lewis, 2011) as well as when fostering creativity in organizations (Gotsi et al., 2010), this lens seldom is employed to understand aspects related to innovation search and management within and across organizational boundaries. We extend previous research on innovation paradoxes by showing how organizing for innovation with open and closed forms involve inherent contradictions that need to be properly managed.

Overall, by shedding more light on tensions and management approaches related to the combination of open and closed search forms, our study connects to the micro-foundations of innovation (Bogers et al., 2017) to provide a better understanding of innovation processes and their management at a more micro-level.

4.2. MANAGERIAL IMPLICATIONS

Our findings have important implications for practice. When combining open and closed forms of innovation to capture both external and internal knowledge, it is important for managers to consider the tensions which may emerge and negative consequences as well as implement proper management approaches to address them. When it comes to the use of internal and external CS, managers should think about developing incentives that would motivate employees to engage in both platforms and view them as complementary and valuable search strategies to support innovation. Moreover, it is recommended that a paradox mindset (Andriopoulos and Lewis, 2009) should be developed within the organization to embrace multiple innovation approaches. An adaptation of internal processes to mitigate the NIH syndrome and favor collaboration not only within the organization but also with external actors should also be considered.

4.3. CONCLUSIONS

This article has also limitations that open up opportunities for future research. First, our study is based on a single case study, which raises issues about the generalizability of our findings. Future research could investigate whether the identified tensions and management approaches extend to other settings. Second, our analysis focuses on internal and external CS as two

innovation search modes that are open (external) and closed (internal). It could be interesting to extend the investigation of tensions and management approaches to other innovation forms employed by firms to exploit both internal and external knowledge.

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