The Role of Technology-Enabled Sponsor-Member Interactions in the Sustainability of Organization-Sponsored Online Communities

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Abstract

The proliferation of social platforms that host online communities calls for a better understanding of the phenomenon of online communities in general and what constitutes their sustainability in particular. Social groups and formal organizations increasingly seek online alternatives to social connection and exchange, yet only a fragment of their efforts succeed. This situation requires more research to understand how sustainable online communities can be created and nurtured. Organizations are also increasingly relying on social solutions to grow the value of their offerings. Therefore, it is crucial to understand how they function socially and technologically.

This thesis focuses on the less-studied phenomenon of sponsored online communities, which are communities that are started and managed by formal organizations. While networks of participants create online communities, how these networks emerge is influenced by the management practices they are subjected to, which can take the form of technological design or human intervention. These interventions have varying critical consequences on the trajectory of activities the online community takes and its ability to sustain activity.

We present three manuscripts that tackle the issue of sponsor-community interactions and how these interactions influence online communities' sustainability. The first essay is a conceptual manuscript investigating how member-member interactions at the micro level emerge as the community's capacity to remain active at the collective level (i.e., sustainability). We focus on technology-enabled interactions and the sponsor's role in controlling and changing the possibilities for action through technological modification. We argue that different levels of

control or openness have varying benefits and challenges for helping the community evolve into becoming more sustainable or less sustainable.

The second essay focuses on the role direct sponsor-community interactions play in changing the online community's trajectory through time. We investigate the tension between an actively participating sponsor and its users at the macro level and the effort of each side to resolve the tension through redefining relationships. We theorize how different tension resolution practices lead to positive or negative consequences for the online community. Finally, the third essay zooms into individual interactions between members of the sponsoring organization and community users. We study the influence different sponsor interactions with a user have on that user's collaboration ties with others.

This study sheds light on the less studied area of sponsored online communities. First, we uncover the unique dynamics between an organization and its online community and theorize positive and challenging consequences. We also tie the concept of sustainability between different units of analysis and theorize its emergence. We explain the critical implications this work has for both theory and practice

Resumé

La multiplication des plateformes sociales qui hébergent des communautés en ligne appelle à une meilleure compréhension du phénomène des communautés en ligne en général, et de ce qui constitue leur durabilité en particulier. Les groupes sociaux et les organisations formelles recherchent de plus en plus des alternatives en ligne à la connexion et aux échanges sociaux, mais seule une partie de leurs efforts réussit. Cela nécessite plus de recherches pour comprendre comment créer des communautés en ligne durables. Les organisations s'appuient également de plus en plus sur les solutions sociales pour développer la valeur de leurs offres. Il est donc crucial de comprendre leur fonctionnement à la fois social et technologique.

Cette thèse se concentre sur le phénomène moins étudié des communautés en ligne sponsorisées, qui sont des communautés créées et gérées par des organisations formelles. Alors que ces communautés sont créées par des participants, la façon dont elles émergent est influencée par les pratiques de gestion auxquelles elles sont soumises, qui peuvent prendre la forme d'une conception technologique ou d'une intervention humaine. Ces interventions entraînent des conséquences critiques sur la trajectoire et la capacité à maintenir l'activité de la communauté en ligne.

Nous présentons trois manuscrits qui abordent la question des interactions organisme-communauté et comment ces interactions influencent la durabilité des communautés en ligne. Le premier essai est un manuscrit conceptuel qui étudie comment les interactions membre-membre au niveau micro émergent comme la capacité de la communauté à rester active au niveau collectif (durable). Nous nous concentrons sur le rôle des interventions des sponsors dans la création de tensions et sur la capacité de la communauté en ligne à résoudre les tensions de

manière générative. Nous soutenons qu'une communauté en ligne ne peut résoudre les tensions d'une manière qui améliore la durabilité que lorsque des boucles de rétroaction génératives sont en jeu.

Le deuxième manuscrit se concentre sur les interactions organisme-communauté en demandant comment ces interactions changent la trajectoire de la communauté en ligne avec le temps. Nous étudions la tension entre un organisme parrain qui participe activement avec sa communauté au niveau macro, et nous étudions les efforts de chaque côté pour résoudre la tension en redéfinissant les relations. Nous théorisons comment différentes pratiques de résolution de tension entraînent des conséquences positives ou négatives pour la communauté en ligne. Enfin, le troisième manuscrit se penche sur les interactions au niveau individuel entre les membres de l'organisation de parrainage et les utilisations communautaires. Nous étudions l'influence de différentes formes d'interactions des sponsors avec un utilisateur sur les liens de collaboration de cet utilisateur avec les autres.

Cette étude met en lumière le domaine moins étudié des communautés en ligne sponsorisées. Tout d'abord, nous découvrons la dynamique unique entre une organisation et sa communauté en ligne et théorisons les conséquences positives et négatives. Nous lions également le concept de durabilité à différentes unités d'analyse et théorisons son émergence. Nous expliquons les implications importantes que ce travail a à la fois sur la théorie et la pratique.

Contributions to Original Knowledge

This thesis provides several contributions to the fields of information systems and organizational science in better understanding online communities as a unique technology-enabled form of organizing and how they interact with formal organizations. Each of the presented essays brings forward unique contributions to science. They collectively argue that an organization's interventions to control and direct users' activity in an online community affect the online community's sustainability for value creation. They explain these relationships by focusing on the problem from different angles.

Before we visit the contributions of each essay, we start the thesis by presenting a typology of online communities. This thesis is the first attempt to theoretically classify the different forms of online communities available in past literature. By doing so, we situate the specific type of online communities we investigate in our essays, that is, sponsored online communities, and clarify its scope and boundary conditions. This typology is also valuable for navigating previous literature and making sense of the theoretical consequences of different types of online communities.

Essay 1 contributes to original knowledge by theorizing the emergence of online community sustainability from micro-level interaction. It also contributes to understanding how control through technology design influences the ability of the online community to adapt to changes. Not only does this study contributes to a better understanding of a less explained concept (i.e., online community sustainability), but it also contributes to the ongoing conversation of the new terrain of algorithmic control (Kellogg et al. 2020) not investigated before in the context of online communities.

Essay 2 contributes to original knowledge by theorizing how tensions build up between a sponsoring organization and its online community of users. While earlier literature identified the existence of such tension, no previous work theorized its consequences regarding community dynamics and sustainability. We theorize the tension resolution mechanisms the sponsor and users engage in and the positive and negative consequences of these tension resolutions.

Finally, essay 3 focuses on sponsor-community interactions at the individual level, investigating how different forms of employee-member interaction can affect members' collaborative activity. We present several hypotheses that explain the relationship between a sponsor's directive versus collaborative activity and the development of the social network of the online community.

Together, these essays expand the literature on online community sustainability by first redefining online communities, theorizing online community sustainability, and investigating sustainability-related dynamics in complex, less-studied, sponsored online communities.

Contributions of Authors

Assia Lasfer is the primary author of this dissertation. Her main contribution was to collect empirical data and negotiate data access with the providing organization. She also wrote the thesis in its entirety. Emmanuelle Vaast acts as a secondary author. She referred Assia to the data-providing organization. She also provided critical feedback and review of the work, as well as guidance in improving the structure and content of the dissertation. The authors presented earlier versions of the dissertation at the Academy of Management Meeting (AOM) 2018 and 2019 (Essay 1) and the International Conference on Information Systems (ICIS) 2021 (Essay 2).

List of Abbreviations

CAS – Complex Adaptive Systems

IT – Information Technology

OC – Online Community

SET – Social Exchange Theory

CHAPTER 1

Introduction: Online Communities as a Technology-Enabled Form of Organizing

The term Online Community describes groups of people that meet over the internet to share knowledge around a common interest, give and receive support, or together work on producing a collective good or performing a collective action (Sproull and Arriaga 2007). The first social collectives that were considered online communities formed in bulletin board websites, around mailing lists, and in early Q&A forums. Recently, the proliferation of social media and social features on internet platforms created a fertile ground for people to self-organize into supportive communities in many different forms and shapes. Moreover, for-profit and non-profit organizations embraced and are still embracing the benefits that social elements bring to both organizations and participants. Consequently, specialized social platforms are continuously born around specific products and services. Organizations now offer online communities as a social support service or form partnerships with autonomous online communities to exchange sponsorship benefits for community-produced innovative products. Social platforms are continuously being developed in all shapes and forms to host online communities of individuals, affiliated professionals, or even inter-organizational communities with organizational representatives as members.

Online communities have received increasing interest in the past two decades from management and information systems scholars. Primary research questions include the reason people volunteer knowledge and effort while expecting no tangible compensation (Wasko and Faraj 2005), how individual efforts are coordinated for collective results (Hemetsberger and Reinhardt

2009), what the degree of knowledge quality is produced (Greenstein and Zhu 2016), and how activity can be sustained to ensure the survival of an online community (Ridings and Wasko 2010). This thesis focuses on the later issue: the sustainability of online communities, which is defined as the ability to maintain a rate and form of activity that allows an online community to remain attractive for existing and new members as well as preserve the creation of value for all its involved stakeholders (Bateman et al. 2011; Butler 2001; Mindel et al. 2018).

Several important reasons make the sustainability of online communities beg for further research. Practically, not only are the advancements in social media and innovation in social connection technologies skyrocketing, but the post-pandemic era has also pushed people to search for and appreciate the benefits of online solutions that can serve as complements or replacements for offline interaction. These changes gave rise to new and exciting forms of connection and bonding through the internet. Changes also pushed organizations towards digital transformation and social connection strategies. A recent survey indicates that 87% of companies view communities as critical to their mission in 2022, more so after the pandemic, which marks a sharp increase from 56% in 2021 (CMXHub 2022, CMXHub 2021). Organizations are also more willing to invest in building communities around their offerings (ibid). These observations lead us to suggest that sustaining online communities is becoming essential for maintaining organizational value. Even with the rich research repository, online communities' rapid and continuous development requires certain theories to be revisited and expanded. Online communities no longer comprise volunteering individuals connected through simple discussion forums or mailing lists. Hosting platforms are becoming more sophisticated with different social features and are designed for diverse purposes. Individuals are also connecting for more goals, and collective members -organizations- are becoming crucial players either as sponsors,

managers, or just participating members. Moreover, the development in cognitive technology is introducing algorithmic members who can take the role of contributors or moderators alike (Safadi et al. 2021).

This expansion in the form and purpose of online communities led to three problematic research-relevant outcomes. The first is that a large portion of the scholarly work is still dependant on the assumption that online communities are a collection of individual volunteers who meet around a common interest and create knowledge through discussions (Preece 2001; Sproull 2004). This assumption excludes the myriad of later-formed online communities involving technological and collective members. It also does not include more complex interactions and exchanges beyond simple discussion. The second problem with earlier research concerning online community sustainability is that scholarly work diverged over time to study many different forms of online communities (examples: electronics networks of practice, online feedback forums, online health communities, business customer communities, open collaboration communities, knowledge co-production communities, and many others, e.g., (Erat et al. 2006; Goh et al. 2016; Meservy et al. 2014a; Young et al. 2020). This diversity partially contributed to many unconnected theoretical explanations of sustainability, such as volume of participation, quality of participation, knowledge retention, diffusion and use of knowledge products, adapting to change, and many others (Bateman et al. 2011; Ludwig et al. 2014; Ransbotham and Kane 2011; Setia et al. 2012). Finally, the assumption that members are a homogeneous set of individual volunteers excluded the role that organizations as members play in socio-technical dynamics. Earlier research considered organizations as part of the contextual environment of an online community, as sponsors or employers of certain individual members, but not as active members themselves that interact, affect, and are affected by the dynamics between them and other individual or

organizational members (Spaeth et al. 2015a; Zhao et al. 2018). While existing research successfully provides differences between autonomous and sponsored online communities, the contextual assumption of organizations gives little room to offer practical insights on how organizations can interact with their communities to improve or challenge their online communities' sustainability. While few studies examine the influence of a sponsor's activity on individuals' participation, e.g. (Bapna et al. 2019), more needs to be done to demystify the forms of interaction between organizational and individual members. More importantly, when the sponsoring organization plays a major role in changing the technological platform that affords user communication and participation.

With the current situation, this thesis aims at advancing scholarship on online community sustainability with a focus on sponsored online communities. We define sponsored online communities as communities that are started or supported by a formal organization through technological, financial, or intellectual support. We aim to do this by first detangling and redefining the concept of online communities and classifying types of online communities studied in the literature. These first steps allow us to situate sponsored online communities in the overall sphere of online communities. We then move into theorizing the emergence of sustainability in sponsored online communities and the role of the sponsoring organization's control through technology in changing the trajectory of online community adaptation to such control. We then follow with an empirical investigation focusing on the interplay between organizational and individual members and the effects on the sustainability of the online community. Overall, this thesis aims to answer the following research questions: *How does online community sustainability develop and evolve through the technology-enabled interactions*

of its sponsoring organization and community members? We provide a more detailed summary of the thesis structure below.

- In Chapter 2, we redefine online communities as complex collectives and present a typology of online communities based on a literature review of IS scholarship in the past 20 years
- In Chapter 2, we draw on Complex Adaptive Systems theory to build a multi-level theoretical model of sustainability emergence and evolution due to different technology control mechanisms by the sponsor. We answer the following research question: how does a sponsor's technology control influence online community sustainability?
- Chapter 3 presents our first empirical investigation of a sponsored online community. This essay shows how a sponsor and its online community negotiation their relational tensions and how these tensions affect the activity and sustainability of the online community.
- In Chapter 4, we present the second empirical essay, which focuses on understanding a sponsor's influence on collaborative network formation in an online community. It investigates how the different forms of sponsor interaction with individual online community members influence those members' connection with the community.
- Finally, Chapter 5 gives us the space to reflect on the results of our empirical and theoretical activity and develop high-level theoretical takeaways while linking this work to existing literature and drawing plans for future research. We also mention implications to research and practice.

CHAPTER 2

A Typology of Online Communities – A Social Exchange Theory Perspective

In what follows, we present a definition of an online community, a typology of online communities, and a description of the specific type of online community that we study in the three essays.

What Exactly Are Online Communities?

There is no single agreed-upon definition of an online community is (Farah et al. 2016, O'Mahony and Lakhani 2011). Although traditionally, they have been restricted to discussion forums and mailing lists, their design, purpose, and membership proliferation have made the concept even fuzzier. Scholars first defined an online community as a large collective of volunteering individuals who have shared goals and interests and who interact primarily via the Internet (Preece 2000; Sproull and Arriaga 2007). Nevertheless, online communities have soon outgrown this definition to include non-volunteering individuals who may be paid to participate and members who represent sponsoring organizations (Huang et al. 2018; Stewart et al. 2006). With the rapid development of AI technology, we are also starting to see artificially intelligent members as part of the social-technical mesh of members (Geiger 2014; Safadi et al. 2021).

But the type of members is not the only thing that soon developed. The function of online communities also developed. While previously restricted to discussion forums, online communities soon included social support groups, political groups for collective action, groups that create content together, and innovating groups of people that build things collaboratively (Goh et al. 2016; Ransbotham and Kane 2011). Even previously unsocial activities over the internet, such as games or file repositories, now include capabilities allowing people to interact

and talk. These developments also created theoretical links to open-source software, which was studied as a separate phenomenon. Behind every open-source software is a group of developers interacting heavily to coordinate their work (Shaikh and Vaast 2016). They form online communities that interact to build software together, and their forms of communication are increasingly sophisticated, especially with many organizations joining the open-source movement (Fitzgerald 2006).

Nevertheless, conceptual disorder came with the expansion of types and forms of online communities. On one side, we find papers that call anything from file-sharing platforms to YouTube followers an online community (Cao et al. 2018; Dewan et al. 2017; Xu et al. 2016). On the other hand, we see discussions arguing whether online communities are indeed a community and whether they deserve special attention as a new form of organizing (Puranam et al. 2014; Wasko and Faraj 2000). For this reason, we see it essential to write this piece, to reconceptualize online communities and clarify the boundaries of this concept. It is crucial not only to build bridges between existing literature and facilitate cross-study generalizability and validity but also to classify online communities, learn about their similarities and differences, and create a framework for the new forms of online communities to come soon.

O'Mahony and Lakhani (2011) differentiate between several types of communities based on purpose. They reserve the name “online communities” to those communities that focus on individual goals and meet to share information about an interest or provide social support. This categorization has, however, not been reflected in how other scholars used the term “online communities,”, particularly in Information Systems research. Therefore, we aim to explore and better understand how the term “online communities” is used by looking at recent scholarship and the type of communities studied.

A Social Exchange Theory Perspective to Analyzing Online Communities

We adopt a Social Exchange Theory (henceforth SET) lens to study the different forms of online communities used in the previous empirical literature. We then theoretically categorize them to develop a typology of online communities. We use this typology to first briefly identify areas of future research concerning online communities in general. Then we use it to situate our work on sustainability that follows in the next chapters.

SET posits that agents of a social group create and maintain a structure of relations through which they exchange resources (Monge et al. 2003). Because agents possess different types and different amounts of resources, they become interdependent to achieve goals or solve problems that require extensive and complex combinations of resources (Cook and Whitmeyer 1992). SET has been repeatedly used to study online communities because of its ability to accommodate both structure and flow or resource exchange (Choi et al. 2015; Yan et al. 2015). By social structure, we mean the ties between agents, which creates a network of connections with precise positions for each agent and a clear boundary for the social group (Borgatti and Foster 2003). Flow refers to the nature and form of exchanged resources that move through the network connections (ibid).

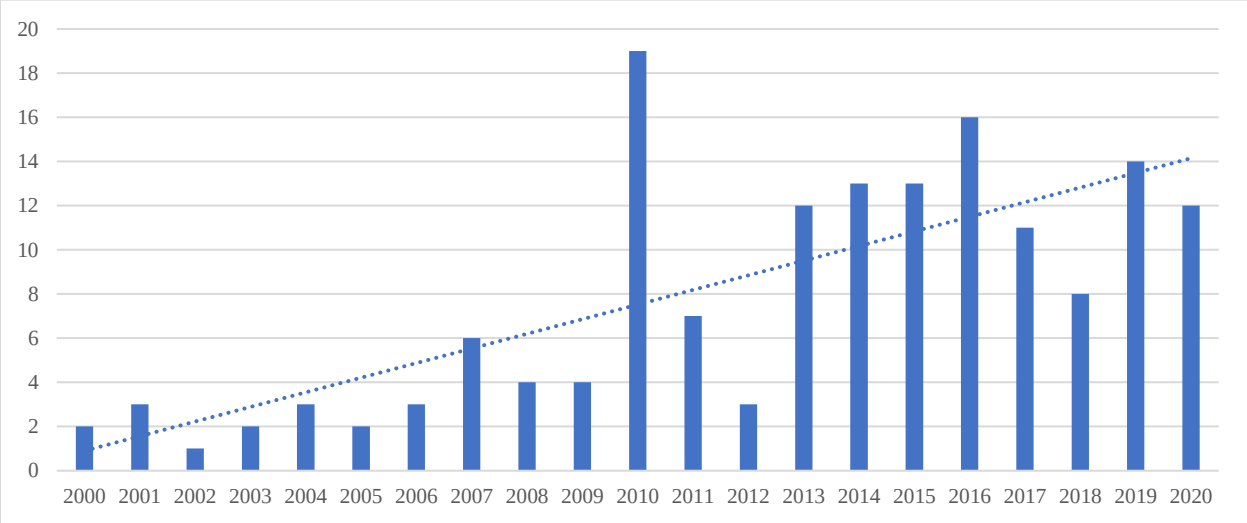
We focus on three aspects of SET to categorize online communities. These are the agents that bring in resources, the structure that defines boundaries, and the nature of exchange and resource flow. We discuss the relevance of each aspect to online community identification and categorization by reflecting on the current state of literature.

Method of Surveying Past Online Community Literature in Information Systems

The number of papers studying online communities increased dramatically in the last decade following the boom in social software. This large number of work investigating different forms of online communities creates an ideal dataset for our typology, as research is rich yet disjoint.

Understanding the different forms of online communities in literature allows us to create a classification of online communities and provide an overarching definition of the concept.

Figure 1. Number of Online Community Papers in Basket of Eight IS Journals



We reviewed all journal volumes of the IS Basket of Eight journals from 2000 to 2021 and identified all papers whose main subject is online communities. The journals surveyed are *Management Information Systems Quarterly, Information Systems Research, European Journal of Information Systems, Information Systems Journal, Journal of the Association of Information Systems, Journal of Information Technology, Journal of MIS,* and *Journal of Strategic Information Systems.*

Papers may refer to online communities in multiple ways. Thus, we included any article that describes the phenomenon it studies as a "community" or as an entity that conforms with the mainstream definition of an online community. Generally, seminal articles define an online community as a collective of members who interact primarily through online technology that affords high sociality and whose interaction is motivated by a common interest or goal (Sproull and Arriaga 2007, O'Mahony and Lakhani 2011, Faraj et al. 2016).

Summarizing and Analyzing Past Literature

Overall, we found 161 articles whose primary subject was online communities with an increasing interest in the phenomenon in the past ten years. We also found special issues dedicated to online communities or open source that boosted the research on the subject. To select these papers, we reviewed all papers in all journals from the year 2000 and filtered the articles by examining the titles and abstracts. Only articles that fit the initial definition of online communities or mentioned the concept remained on the list.

We coded the papers based on the three aspects of SET discussed above. For each of the 161 papers in our pool, we coded for the following: community type, purpose, type of members, social boundaries, the technology used, and nature of exchange. Table 1 describes the main community types found, along with a description of their purpose.

Complexity in Online Community Agents

Earlier forms of online communities included mainly volunteering individuals interested in sharing their knowledge, building support relationships with others, or collaborating to build things together. Much online community research, thus, assumed the homogeneity and

individuality in membership. For example, many studies that examine motivation, participation, or knowledge sharing test all members of an online community against the same factors or conditions. They assume an additive effect of individual actions into community-level results (Bateman et al. 2011; Phang et al. 2009; Tsai and Bagozzi 2014). Much social support or common interest communities host individuals independent of any relevant association. Examples include peer-to-peer health support groups (Huang et al. 2019), blog communities (Silva et al. 2009), discussion communities of general interest topics (Ridings and Wasko 2010), Wikipedia (Young et al. 2020), or open design communities such as Thingiverse (Kyriakou et al. 2017). While there are cases where an individual would mention their employing firm to signal professionalism or experience, the individual still is self-representing, keeping the affiliation organization outside the community boundary (Lara et al. 2015).

Table 1. Types of Online Communities in Literature

Coded Community Type	Purpose
Product Customization Brand Communities	Provided by a firm to allow mass customization of products with community feedback
Open Innovation Crowdsourcing Communities	Getting the best innovation from the crowd
Social Support Communities	Information sharing, collaboration, collective action
Online Collaborative Work Communities (OSS, Wiki, development)	Collective production of a knowledge repository or knowledge artifact
Open Design Community	Members openly share designs to be reused and repurposed
Online Discussion Communities / Q&A Forums/news communities	Exchange information and opinions on a particular topic
Online networks of practice	Knowledge sharing and development on a professional topic through the exchange
Online Trading communities	Trading tangible or non-tangible goods
Online User or Brand Communities	Product support, customer community, innovation extraction by a firm providing a product or service
health support communities (Peer-to-peer or Doctor-patient)	Community support for sufferers of an illness
Internal Discussion Communities	Knowledge sharing and development through exchange inside the boundaries of a firm

Collective Action Communities	Support a cause through sharing information and planning activities
Blog community	Exchange information and opinions on a particular topic
Online Policy Deliberation Forums	Exchange information and opinions on a particular topic for the aim of achieving political democratic consensus
Collaborative Organizational Communities	Product support, customer community, and innovation creation by multiple organizations

Another group of scholars highlights the differences between members, whether in the role played or affiliation (Barrett et al. 2016). The success of many online communities led organizations to adopt them into their business models. In some cases, organizations hire members to be in the community full time, like in the case of open source, suggesting that a community can have varying compositions of members (Wang et al. 2020). Other studies have also differentiated between members regarding roles taken or places occupied in the community structure (Daniel et al. 2013; Setia et al. 2012). Moreover, organizations such as SAP, Asana, or Samsung Members build and host online communities to support individual users or even create business customer communities where the prominent members are organizational clients (Erat et al. 2006). Introducing collective members into communities opens a new door of complexity in understanding online communities. Assumptions about the motivation for participation and social influence, for instance, no longer apply to all community members. One way an organization participates in an online community is when an organization encourages employees to participate in inter-organizational communities that pertain to certain consortia or inter-organizational initiatives while employees remain self-representing (Daniel et al. 2018). Organizations can also sponsor certain highly active members to participate in the community full-time, such as in open-source software projects (Spaeth et al., 2015). In these cases, affiliation becomes significant, creating a unique dynamic between the organization and the online community through the participating employees (Daniel et al. 2018; Spaeth et al. 2015).

Another form of indirect engagement with an online community is through technological infrastructure management and secondary activities outside the discussion space. For instance, a university could provide a social platform for students to exchange general information and social support (Huang et al. 2019; Nan and Lu 2014). Moreover, an organization can provide the technological infrastructure for individuals while extracting private value from inter-member discussions. For instance, a company could provide paid services on the same platform that hosts the online community (Oestreicher-Singer and Zalmanson 2013). A firm could also sell extracted medication data from patient discussions and sell it to pharmaceutical companies (Barrett et al. 2016). In addition, a government could sense citizen requirements for new regulations in deliberation forums (Phang et al. 2009). While not participating in the discussion space, all these cases influence individual activity through manipulating communication and participation features or when individuals become aware that their activity is monitored and used by the organization (Levina and Arriaga 2014).

Organizations can also participate as active members in an online community. They can join in the form of knowledge participation or governance and moderation. For instance, an online community can have community managers and moderators appointed by the sponsoring firm to represent it in the online community as a participator or knowledge seeder (Huang et al. 2018; Lu et al. 2015). The online community could be an inter-organizational community with members all representing their employer and able to make organizational-level decisions (Liu et al. 2017). Finally, many organizations that start spin-off open-source projects vary in openness. They invite individual volunteers to participate while staying actively involved in coding and integrating patches into the main code (Di Tullio and Staples 2013; Shah 2006).

In summary, online community literature has studied two forms of agents: individual agents and organizational agents. An individual agent can either be an independent volunteer or be associated with some organization through financial motivation. An organizational agent can either be the provider of infrastructure, an implicit extractor of value, a participant, a sponsor of participants, or a governor of activity.

Furthermore, more recent development in AI applications makes it possible for artificial members to also be part of online communities, either for automating certain moderation functions or completing mundane tasks such as text editing or code testing. For instance, Reddit.com uses bots to monitor users' posts, comments, and actions and respond to them. The availability of non-human members will further add complexity when investigating the nature of interactions between members and the influence these interactions have on internal community dynamics and external community boundaries (Geiger 2014). However, no study to date studies artificial agents and their effect on other agents' participation.

Social and Technological Structural Boundaries

When we look for a definition of a community, we can rarely find a single meaning that is commonly agreed upon (O'Mahony and Lakhani 2011). The focus can either be on a geographical space that brings people together or a common purpose, goal, or interest that drives people to come together (Greer 2017). This difference in perception has also been reflected in the digital sphere with online communities; is it the digital webpages that bring people together, or is it the common interest that joins people within or across digital websites? Conceptually this makes a significant difference in defining the boundaries of a single community. If a hosting platform bounds an online community, then community-relevant interactions would not happen

on external platforms. On the contrary, if the people make up the community, then their bonds could be afforded and supported by features and interactions on multiple, possibly interconnected platforms (Levina and Arriaga 2014a).

While most empirical studies remain primarily reliant on single platforms as data sources, several studies have argued and shown that following traces of digital practices can better define an online community. Faraj et al. (2016) define online communities not as technological nor social entities but as intrinsically technological and social at the same time – one does not exist without the other – because it is the technological affordances that afford interactions between members which create a community structure. This definition suggests that aspects such as systems interdependence in the form of hyperlinks or file compatibility, for example, actively define a community structure and boundaries just as user messages do (Bailey et al. 2010; Negoita et al. 2018b). Members can perform practices over technological features spanning multiple web pages not primarily designed by a single entity but still contribute to building the online community's identity. For instance, open-source communities use several digital spaces, such as version control systems, mailing lists, and online repositories (Shaikh and Vaast 2016). In other cases, an online community could be smaller than the platform's boundaries. For instance, a platform such as Wikipedia hosts multiple sub-communities called WikiProjects that are bounded by interest and knowledge rather than technological features (Kane and Ransbotham 2016b). However, this creates new challenges for researchers aiming to study online communities because this renders boundaries of each online community different from others and creates challenges in data collection and empirical analysis.

In the simplest form, an online community would be bounded by a combination of technology and shared interests or goals. Thus, just having an account on a platform that hosts an online

community does not make one a member. The member needs to also self-identify with the goal of the community. For instance, many peer-to-peer health support groups require one to be diagnosed with an illness or be a patient's caregiver (Yan and Tan 2014). Even in online communities that do not put such explicit restrictions on registration, we assume that individuals that do not share a purpose with other members cannot join an online community. For instance, someone who does not identify with programming in any way will not be able to engage in programming discussions and develop a sense of community with others (Wasko and Faraj 2000).

Affiliation or external activity can also play a part in defining an online community's boundary. Interactions between an individual and an organization, being part of an organization, or being part of two interacting organizations are all external activities and affiliations that may define the boundaries of an online community (Park et al. 2019; Yan et al. 2021). For instance, being part of an online community of practice may require that one is a professional who works in a particular field and necessitate that one shares their real name and occupation (Cao et al. 2018; Wasko and Faraj 2005). In addition, a professional support community may require that members be practitioners who use a particular product at work (Huang and Zhang 2016). Furthermore, external interaction, such as being a company's customer, or a user of a service or product, may be necessary for someone to be part of a user community (Ludwig et al. 2014). For example, Amazon Mechanical Turk communities are created so that Mechanical Turk workers share their experiences, support, and express themselves with each other.

Technologically, we have seen from the literature that an online community can span multiple independently developed technologies. For instance, while an online community's prominent presence would be on the main platform that connects members, the community could also use

other technologies that support its activity and goals. For instance, a Facebook page or an external website can recruit new members, share community news, or publish formalized regulations or finalized work (Oestreicher-Singer and Zalmanson 2013). Another good example would be open-source software projects. While members communicate through mailing lists, multiple technologies are needed to support software production such version control software systems (multiple ones may be used by one project), internet relay chats, code libraries, and the project code itself (Shaikh and Vaast 2016). Finally, an online community can extend to occasional offline encounters (ibid).

In summary, the literature shows that an online community is a socio-technical entity created by social and technological structural components that influence who and how members interact. Both social and technological factors define boundaries. Social factors include identification with the goal, external activity, and affiliation. Technological factors include the connection of members and the facilitation of collective action.

Finally, while it may be easier to define online community boundaries theoretically, these boundaries remain hard to identify because of the fluidity of membership empirically. This situation may explain why few research papers examine activity across technological boundaries (Shaikh and Vaast 2016), while the majority continue to assume that the discussion space completely bounds an online community. We believe that investigating boundaries-in-use rather than designed boundaries sheds light on interesting new processes and dynamics.

Exchange and Flow of Resources

Earlier arguments against online communities doubted the ability of people to form social bonds and build a sense of community through interactions that are purely enacted through technology

(Wasko and Faraj 2000). Places such as discussion forums were argued to provide minimal social cues during communication for people to build strong bonds and a collective sense of belonging (ibid). However, it was perplexing to see strangers spending time and effort sharing quality knowledge, providing social support, and building long-term relationships with others. Scholarship has thus theoretically and empirically supported the idea that online communities are venues for a collective sense of belonging, social support, and even the exchange of tacit knowledge and the production of collective value (Chen et al. 2020; Faraj et al. 2016; Stewart and Gosain 2006).

Most research describes online communities as spaces for rich social interactions that allow for the development of social capital, social norms, and a sense of belonging and obligation towards the community (Faraj et al. 2016; Wasko and Faraj 2000). Most online communities studied in the literature involve members engaging in rich content discussions where they exchange information, personal or professional experience, or support. Discussion spaces host rich-content exchanges that include highly expressive text, multimedia, and files (Faraj et al. 2015a; Ludwig et al. 2014). Because social interaction is entirely afforded by technology, technology could influence the form of communication as well as support connections that do not involve direct communication. For instance, members' activities, such as voting for input, could be pooled and processed by an algorithm with varying degrees of transparency between members (Orlikowski and Scott 2014). Members could also be allowed to comment on webpages on only specific topics or be limited to performing specific activities such as sharing a work artifact or commenting on particular actions (Kyriakou et al. 2017). Pages and threads could also be organized to motivate connection around a specific topic or encourage a particular activity.

However, these features are generally designed to facilitate member activity organization, coordination, or governance.

We identified several actions that members engage in depending on the community's goal and the platform's design. First, members can participate in populating a knowledge repository that is accessible to everyone. In other words, members volunteer to build a public good. This maybe in the form of written knowledge in the discussion space or a peer-to-peer sharing repository for sharing specific artifacts such as code, files, or art. Peer-to-peer health support groups (Huang et al. 2019) and customer-help Q&A forums (Lu et al. 2015) are examples of input through discussions in Thread-comments or Question-Answers formats. Design communities such as Thingiverse or hackaday.io and art communities such as Threadless or Deviantart are examples of artifact-focused sharing in artifact-comments form (Bauer et al. 2016; Stanko 2016).

Second, members can participate in building a collaborative artifact or organizing collective action. This form of participation is more complicated than individual sharing and requires a communication space for coordination and coordination tools, whether in the form of technological solutions or documents (Arazy et al. 2011; Yan et al. 2021). The existence of interdependence requires richer exchanges and tighter bonds between members or more complex algorithmic solutions. However, we note that when a single organization is present along with volunteering individuals, coordination efforts could be taken by the organization and done through a pooling algorithm. For instance, Threadless allows members to rate each other’s designs anonymously, keeping this process closed to members and only announcing voting results (Bauer et al. 2016). Voting comments, topics, and answers are similarly opaque by the platform in many forums.

Finally, members can make collective decisions and enforce joint governance rules (Bauer et al. 2016; Mindel et al. 2018a). Not all members can perform actions such as voting, sponsoring, or moderating, and this may depend on a specific member's status or privileges. For instance, an organization supporting an open-source project may decide to reserve the decision to integrate a user's code into the main software to itself (Spaeth et al. 2015b; Stewart et al. 2006). Similarly, many volunteer-only open-source projects reserve the right to contribute code to some specific high-status members (Setia et al. 2012).

In summary, agents in an online community must be able to build a network of connections and exchange resources through participation. Participation can be in populating a public knowledge repository, coordinating collective action, or taking collective decisions and enforcing norms. We note that an online social network is not necessarily an online community. While one could participate in a knowledge repository without identifying with a community, participating in a collective action or artifact and enforcing norms requires that some collective identity emerges from repeated interactions (Chen et al. 2020; Ren et al. 2012). Thus, many papers investigate "communities" with varying abilities for users to connect and communicate, such as limiting user connections to "following" and viewing shared files (Dewan et al. 2017; Xia et al. 2012). The proliferation of social media platforms and other digital platforms that support social features calls for a clear separation between what public media calls a community on the internet and the theoretical concept of online communities. For instance, YouTube influencers frequently call their followers a community even though communication is restricted to comments on videos which may or may not lead to developing a sense of community between followers. Academics also use the term online community to refer to file sharing, music sharing platforms, or individual social networks, even when no form of rich communication exists, nor is it clear

whether a community engenders a sense of belonging or not (Cao et al. 2018; Dewan et al. 2017; Xia et al. 2012). More research is needed to investigate whether platforms that allow restricted flow between members can afford the emergence of online communities.

Redefining Online Communities

Table 2. summarizes the three aspects of SET as present in online communities and what we find missing from the literature which can motivate future research.

Having looked at how literature uses the different aspects, we now present a comprehensive definition of an online community. We define an online community as *a complex socio-technical network of individual, organizational, and algorithmic agents structured around a combination of social and technological boundaries that allow the network of agents to identify as a group, exchange knowledge, collaborate interdependently, and self-govern.*

We also propose that agents, flow, and boundaries are mutually defining and reinforcing. The identity of agents that come together defines the initial boundaries of an online community by disallowing anyone who does not conform to join. Such boundaries can be set formally or allowed to emerge informally through agent discussions. For instance, an online support group for amateur athletes may not allow companies advertising athletic wear to join. Established boundaries will further reinforce the type of agents that would join. For instance, a Wiki project focusing on medical conditions may not be attractive for someone knowledgeable in forestry.

Proposition 1: *An online community with a specific mix of agents creates boundaries that refuse or discourage non-conforming agents from joining*

Table 2. The Three Aspects of SET Reflected on Online Community Literature

Aspect	In literature	Missing from literature
Agents that bring in resources	Individual – independent or affiliated Organization – Sponsor (infra, financial support, governor) or participant	Algorithmic – participant or moderator
Structural Boundaries	Social boundaries – External activity or affiliation, identification with the goal Technological boundaries – facilitating goal activity, connecting members	Socio-technical boundaries – spanning social activities through technological features
Nature of flow and exchange between agents	Populating public knowledge repository Collaborating on a collective artifact or action Participating in governance	Degree of activity transparency between members that allows a community to emerge from a network

The specific mix of agents also influences the flow of resources and interactions between agents. While interactions between agents are intended to achieve a particular goal, the combination of agents affects what form of interaction occurs. For instance, individual members may exchange camaraderie but expect different reciprocal behavior from an organization. Individual members may expect an organization to reciprocate all individuals in the community as a group, while an individual may feel a sense of giving back to fellow volunteering individuals (Shah 2006). An organization could also be expected to exchange support, financial compensation, or acknowledgment for knowledge, which is different from how an individual would be expected to participate.

Moreover, the type of exchange a community engages in could influence what agents join the community. Faraj et al. (2011) explain how the movement of resources through the community network can create tension that leads some members to leave and others to join. For instance,

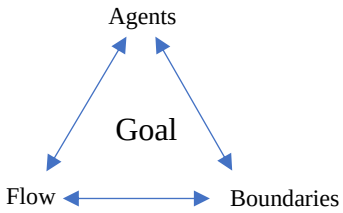
editing wars in Wikipedia may lead to changes in the direction of articles which may cause agents to leave and others to join (Arazy et al. 2011).

Proposition 2: *The specific mix of agents in an online community will create a unique flow of resources that is dynamic and changing, which in turn may influence the joining and leaving of agents*

Furthermore, boundaries mentioned in the literature are either social or technological. Still, we propose that the combination of social and technological boundaries defines the boundaries of an online community. When technology is used in a specific way that reflects the group's social identity, it creates practices that are only relevant and known to that social group. It creates a form of community-specific know-how that defines participation and how to join a specific practice (Levina and Arriaga 2014a; Orlikowski 2000). This, in turn, ties flow and boundaries; only through joining an agreed form of exchange by the community that one becomes part of the community, and only by respecting the rules that govern the maintenance of these exchange forms is one allowed to remain inside the online community. For instance, if a developer in an open-source project cannot follow through with how other developers use version control and discussion technologies together, they may not be able to follow what is going on (Shaikh and Vaast 2016). Moreover, if a member does not respect the intellectual property rights of other members, they may be expelled from the community (Bauer et al. 2016).

Proposition 3: *An online community's boundaries are defined by an agreed form of exchange between community members, which is socio-technical in nature. The boundaries allow only members that learn and respect these socio-technical exchange practices to remain within the community*

Figure 2. The Three Interdependent Aspects of Online Communities



Developing A Typology of Online Communities

A typology is a theoretical activity that identifies multiple ideal types. Ideal types are a combination of theoretically driven attributes (Doty and Glick 1994). A typology is different from a classification or a taxonomy because it is not a set of decision rules that make up categories. Instead, categories are created with a theoretical meaning. When dimensions of a set of attributes are combined in a way that gives a theoretical meaning, they create ideal types (Bailey 1994).

The word "ideal" does not represent a state to strive for, but instead, it represents a "pure" type or "clearest example of the type" (Bailey 1994, pp. 18,19). Therefore, empirical cases are usually studied with the degree of deviation from an ideal type in mind (ibid). Finally, we note that ideal types are not mutually exclusive or exhaustive (Doty and Glick 1994; Negoita et al. 2018a).

We propose six ideal online community types, as presented in Table 3, based on a combination of the three attributes presented earlier: agents, boundaries, and exchange.

By *Agent Mix,* we mean the combination of agents in the community. We identify three agent mixes that can be present in an online community: 1) independent individuals who participate voluntarily and a passive sponsoring organization that provides the technological platform, technical support, and other supporting services. The platform can also be equipped with

algorithmic agents that can participate in automated knowledge sharing, moderating discussions such as checking for offensive or illegal content or facilitating coordination such as performing simple quality checks or work integration. 2) affiliated individuals to organizations who participate voluntarily based on organizational recommendation or participate on behalf of an organization. Algorithmic agents can perform knowledge sharing, moderation, or simple coordination work. 3) a combination of independent individuals and affiliated members of a sponsoring organization, or group of organizations. Algorithmic agents are passive as organizations take a more active role in coordination and moderation.

We identify Governance as an *Agent-dependent exchange* because the form of governance changes based on the change in the agent mix. Table 3 lists the governance forms contingent on each agent mix. *Norm-based governance* develops when the prominent exchanging members are individuals. Governance rules usually emerge with values and norms that define how members should behave in the community and how things should be run collectively (O'mahony and Ferraro 2007; Stewart and Gosain 2006). Examples include implicit rules regarding how a question should be structured (Bergquist and Ljungberg 2001) and how to deal with particular challenges that can affect the whole community, such as disputes or intellectual property matters (Bauer et al. 2016). Even when algorithmic agents are present and act autonomously, human agents usually acknowledge or reject their activities. For instance, when a Reddit bot shares information in a thread, members can acknowledge it by typing “good bot!” or by rejecting it as false. Alternatively, *formal collective governance* develops when the agent mix includes mainly organizational members. Because formalized rules of participation are preferred in this context, a community may establish rules for participation, conflict management, and coordination beforehand. Changes to rules might also go through a formal process and a formal body of

governors (Croteau and Bergeron 2009; Osborn and Baughn 1990; Wang and Wei 2007). Finally, a *partnership governance* is more fitting to an agent mix with independent individuals working with a sponsoring organization. Here, governance practices would be a partnership between the group of individuals and the organization. On one side, the sponsoring organization would define a set of engagement rules and maybe take in hand the management of issues such as conflict resolution and decisions of work integration (Ho and Rai 2017). On the other side, norms and values can also emerge between individuals dictating how the community manages specific situations and how activities should occur (Spaeth et al. 2015b). This means that for an online community to perform, the organization and the group of individuals need to approve of each other's rules and agree to work with each other. For instance, an organization needs to respect the open nature of collectively-produced software and not make profits from directly selling it (Stewart et al. 2006), it also needs to respect the norm of reciprocity in communities (Shah 2006).

Boundary Mix means combinations of social and technological boundaries that allow a member to join and remain in an online community. In all cases, a member becomes part of an online community if they are registered and uniquely identified in the hosting technology and identify socially with the purpose of the community, such as they are willing and can participate in activities. However, the difference is with the complexity of socio-technical exchange practices. *Low complexity of socio-technical exchange practices* means it is relatively easier for a member to learn how members participate in an online community, mainly through observing how others participate (Whelan 2007). Through observations, one could learn how certain features of the platform as used, where files are kept, how emojis are used, and what is acceptable or not acceptable to say (Lampel and Bhalla 2007). However, *high complexity of socio-technical*

exchange practices requires that a member learns the group's working methods and how to join this effort. Such learning involves more complex use of technology, the use of multiple technologies, joining in the correct time for an activity, and the coordination of work such that interdependence problems are correctly solved, and the member's activity is integrated (Lindberg et al. 2016; Shaikh and Vaast 2016).

We identify knowledge sharing and collaborative development as *boundary-dependent exchanges* because of their strong relationship to the level of complexity of socio-technical exchange practices. Knowledge sharing only requires a member to learn how to share knowledge acceptably and thus needs to learn how to use technology is a way acceptable to the community. On the other hand, collaborative development requires learning more complex socio-technical exchange practices as it involves a higher degree of interdependence and coordination of work.

The result of combining these factors gives us six ideal online community types: 1) Connection and Support Communities, 2) Collaborative Development Communities, 3) Organizational Knowledge Communities, 4) Organizational Collaborative Communities, 5) Sponsored Connection and Support Communities, and 6) Sponsored Collaborative Communities. We describe each ideal type in detail and provide some examples.

Connection and Support Communities

These communities bring individuals together, those that share a common interest, perform similar activities, or are related by a common aspect. Individuals join to share knowledge, exchange social support, and build a sense of camaraderie. Examples include open-design communities (Stanko 2016), peer-to-peer health support communities (Huang et al. 2019), blog communities (Silva et al. 2009), online trading communities (Chua et al. 2007), and independent

user communities (Erat et al. 2006). For instance, knowledge exchange can be written advice, art pieces, or designed artifacts. While these communities may host individual innovation creation through the propagation and modification of knowledge, the focus remains on individual goals as no form of interdependence is prevalent in the knowledge-sharing process. This allows an individual to be part of the online community if they are identified as part of the social tribe (e.g., a cancer patient, a cartoonist, a woman who lives in Montreal, etc.) as well as identified by the technology platform as a registered member who can participate in the exchange.

Collaborative Development Communities

These communities connect independent individuals with a shared goal based on a common interest or common goal, who join in developing a public artifact collaboratively, and who develop norm-based collective rules to govern the production process. These communities include open-source software projects (Lindberg et al. 2016), Wikis (Kane and Ransbotham 2016b), and other collective action or development communities. People come together because they have a common problem that is only solvable by the collaborative effort of a large group. What differentiates these communities in terms of goals is that the focus is on collective rather than individual goals (O'Mahony and Lakhani 2011). This nature of goals increases interdependence because individual efforts need to be coordinated and integrated to produce the collective output, resulting in consequences with respect to community boundaries. While one needs to identify with the group socially, a member will also need to join the working practices of the group for their participation to be included (Arazy et al. 2016; Shaikh and Vaast 2016). If one does not join the tide, they cannot have an input into the collective product.

Organizational Knowledge Communities

These communities connect organizational members motivated by their affiliation to join the online community, share a common interest, or are tied by formal relationships. They come together to share knowledge while governing activities through formalized-collective rules. An example includes professional communities of practice facilitated by a coalition of organizations or consortia (Daniel et al. 2018b). Another example includes business customer communities hosted by supplying organizations for exchanging knowledge about a group of business products (Erat et al. 2006). Here, members focus on their different organizational goals as each organization strives to increase the knowledge of its employees and internalize knowledge to solve private problems. Knowledge is exchanged through written advice or shared artifacts through file exchange. An organization is part of the online community if it identifies with the purpose of the community (e.g., member of a coalition, adopter of a certain technology, operating in a certain geographical area, etc.) and has employees who are registered members who can participate in the exchange. Finally, we note that when studying inter-organizational online communities empirically, one could study the community at the organizational level, assuming that an organization is a member, or study the community at the individual level, assuming that organization is made up of its employees.

Organizational Collaborative Communities

These communities connect organizations that share a need to solve a common problem but can only solve it collaboratively due to varying constrains or opportunities. By collaboratively developing a solution, it becomes shared and openly accessible to members of the coalition or the public. These communities develop formalized-collective governance practices to govern

collaboration, development, and use of the artifacts for organizational purposes. Examples include online organizational consortia focusing on collaborative innovation, such as The Open Handset Alliance developing Android. An organizational collaborative community is a solution for the lack of innovation resources within any single organization and a way for a group of organizations to create standardized solutions. Boundaries include membership in the consortium, respect of governance rules, and joining the community's working practices.

Sponsored Connection and Support Communities

These communities connect independent individuals and organization-affiliated individuals, usually affiliated with the sponsoring organization of the community. Here, individuals and the organization may be interested in a common problem or have knowledge interdependence created by an external activity (such as a purchase) and thus can exchange value. These communities are usually governed in partnership by the organization and the group of individuals. While the organization may make decisions and apply them throughout the community, these practices may not work if individual members do not accept them and vice versa (Shah 2006; West and O'mahony 2008). Examples include doctor-patient health support communities hosted by health-care organizations or brand-specific online communities (Guo et al. 2017; Jeppesen and Frederiksen 2006). On the one hand, the organization depends on the knowledge provided by individuals. On the other hand, individuals need the resources provided by the organization in the form of communal digital space. This creates an informal partnership between the group of individuals and the sponsoring organization (West and O'Mahony 2005; West and O'mahony 2008). Like other knowledge-sharing communities, the focus is on private knowledge goals rather than public goals. A community member can either be an organization that supports the group of individuals or an individual who joins to share knowledge with others.

These individuals need to identify with the purpose of the community or is part of the external activity it takes (e.g., patient-hospital relationship in ABC hospital), be registered in the hosting platform, and respect the community governance rules.

Sponsored Collaborative Communities

These communities host independent individuals and organization-affiliated individuals, usually affiliated with the sponsoring organization of the community. Here, individuals and organizations share the need to solve a common problem or have knowledge interdependence created by an external activity, such as purchasing or using a product. This allows individual and organizational members to exchange value by collaborating to solve the problem in exchange for either public access to the solution or financial compensation. Examples include spin-off open-source projects and open innovation contest communities (Bauer et al. 2016; Dissanayake et al. 2021; Spaeth et al. 2015b). Similar to Sponsored connection and support communities, the heterogeneous nature of members creates a partnership governance model as individual groups value norms and organizations value formalized rules (Lee and Cole 2003).

The Relation Between Online Community Type and Its Sustainability

The sustainability of an online community, which is the continued ability of an online community to provide value to all involved stakeholders (Mindel et al. 2018b), should not be studied similarly across all online community types. For one, what constitutes value differs for communities based on knowledge sharing verses those based on collaborative development. While knowledge-sharing communities may focus on the independent sharing of knowledge, building responsiveness, and maintaining supportive relationships, a collaborative development community must also have effective coordination strategies and useful public products for all

(Butler et al. 2014; Daniel et al. 2018a; O'Mahony and Lakhani 2011). Moreover, the complexity of sustainability can also be different for different boundary and agent mixes. For instance, agents that are related outside the hosting platform through business or use relationships may need to maintain the external relationship for the communication inside the discussion space to continue. Moreover, individual and organizational members have different motivations and needs for participation (Bonaccorsi and Rossi 2006). This both influences their participation and how they influence others they participate with. For instance, an organization starting an online community to gain profit from the data it collects needs to respect the individual needs for it to be able to continue attracting participants (Dahlander and Magnusson 2005). This typology provides a framework to study sustainability and other concepts that can depend heavily on the type of agents, structural boundaries, and type of exchange.

Studying Sustainability in This Thesis

We focus on a single type of online community in this thesis, "Sponsored Collaborative Communities." We do so for two reasons. First, we find these types of online communities one of the most used yet least studied types of online communities, and we find an excellent opportunity for us to contribute new knowledge in this area. Second, because these online communities require the collaboration of the sponsor and community users and the production of knowledge work, the complexity of social dynamics is higher and calls for more understanding.

The first essay focuses on demystifying what is meant by online community sustainability and theorizing how the sustainability of a sponsored online community emerges and evolves from sponsor-member interaction. The second essay focuses on sponsor-community tensions and explains how actions to resolve this tension can positively or negatively change the online community's fate. In the subsequent essay, we investigate how different forms of sponsor

interaction can influence the collaboration potential between individual volunteers. These three essays expand our understanding of the sustainability of sponsored collaborative online communities by investigating the phenomenon at the micro and macro levels and the emergence from the micro to the macro levels.

Table 3. A Typology of Online Communities

	Agent-dependent exchange: Governance	Norm-based governance	Formal collective governance	Partnership governance
Boundary-dependent Exchange	Boundary Mix / Agent Mix	Independent individuals + passive sponsoring organization + active algorithmic agents	Affiliated individuals representing organizations + active algorithmic agents	Independent individuals + active sponsoring organization + active algorithmic agents
Knowledge Sharing	identification + registration + Low complexity of socio-technical exchange practices	Connection and Support Communities e.g. Open Design Communities, Peer-to-peer health support communities, blog communities, online trading communities, independent user communities	Organizational Knowledge Communities e.g. professional communities of practice, business customer communities	Sponsored Connection and Support Communities e.g., Doctor-patient health support communities, brand communities, product customization communities
Collaborative Development	identification + registration + High complexity of socio-technical exchange practices	Collaborative Development Communities e.g. Open source software communities, Wikis, collective action communities	Organizational Collaborative Communities e.g. online organizational consortia	Sponsored Collaborative Communities* e.g. Open Innovation Contest Communities, Spin-off open-source communities

*The type of online community studied in this thesis

CHAPTER 3

Finding Simplicity in Complexity – The Emergence of Sponsored Online Community Sustainability

Organizations increasingly acknowledge the importance of building online communities that connect them to their individual stakeholders, whether it being customers, users, patients, or crowdsourcing targets (CMXHub 2022; Reischauer and Mair 2018). Sponsored online communities are complex amalgams of individuals and members of a sponsoring organization who collaborate openly to share knowledge and solve a common problem that any single stakeholder cannot solve. Organizations build social platforms that facilitate building social relations and the exchange of knowledge between individual stakeholders so that the organization can directly and informally communicate and answer public concerns (Bapna et al. 2019a). It also allows the organization to provide better services while reducing costs and increasing social support. For instance, firms can use support communities for crowdsourcing customer support (Lu et al. 2015), and hospitals can crowdsource part of patient support by connecting patients to create peer-support communities (Guo et al. 2017). Customer loyalty and product satisfaction can also enhance when customers connect and form communities (Yan et al. 2021). For instance, Sephora hosts a community of makeup and skincare enthusiasts sharing makeup tips and product recommendations. Furthermore, online communities are increasingly being used as a form of open innovation where users connect and collaborate to collectively find solutions and enhancements to the products they use (Hwang et al. 2019) or collaboratively develop enhancements to a public solution open by the organization (Hyatt 2008).

Yet despite the multiple benefits that an organization-sponsored online community can bring to both the sponsoring organization and participating individuals, it remains tricky to nurture and maintain a sustainable online community (von Briel and Recker 2017). The sustainability of an online community requires that it creates and maintains an ability to attract needed resources and transform them into valuable outcomes for its stakeholders through effective communicative practices (Butler 2001; Curto-Millet and Corsín Jiménez 2022; Mindel et al. 2018b). However, not only are online communities volatile because of their dynamic membership and blurry boundaries but being sponsored also increases the complexity of social dynamics. Volunteering individuals may have divergent goals from those of the sponsoring organization while still being the primary producers of knowledge and creators of value (Bonaccorsi and Rossi 2006). Even when a sponsor actively manages the online community, its limited ability to understand the system and the strategic lens through which it views the online community may make it take management actions that can trigger unintended consequences from the online community (Dahlander and Magnusson 2005). Participating individuals may disagree with how the sponsoring organization participates in governance, controls certain processes, or uses the produced knowledge work (Dahlander and Magnusson 2005). For this reason, it remains crucial to theorize the sustainability of sponsored online communities while taking into consideration the specificities and complexities of this organized collective, those that are not present in autonomous online communities. More specifically, we ask *how sustainability as a capacity of an online community emerges, and how does it adapt as the online community and the sponsoring organization interact.*

Notwithstanding the available insights into the sustainability of online communities and participation, we build on literature by theorizing the unique dynamics between an online

community and a sponsoring organization as both aim to achieve their disparate goals while benefiting from each other's unique resources (West and O'Mahony 2005). We investigate how a sponsored online community can develop sustainability when constantly interacting with a sponsoring organization.

To develop our theoretical explanation, we draw on Complex Adaptive Systems theory to define internal and external tensions that challenge sustainability at different levels of analysis. We then propose four interventions that a sponsor uses to influence the activity of an online community and explain how these interventions create tensions in the online community through resource redistribution. Through resource redistribution, the tension between individual members causes them to adapt, leading to the emergence of tension resolution mechanisms at the macro level. When collective action emerges as a tension resolution mechanism, an online community can influence the sponsor in return. Collective action, however, can only form when generative feedback loops are in action, which we define as information-rich, highly public reactions to experienced changes.

Through this work, we contribute a new understanding of the sponsor-community dynamics and their consequences. We extend theoretical explanations of sustainability to this specific form of online communities and shed light on its unique challenges. We also theorize the emergence of sustainability from lower-level interactions and highlight the role of technology in shaping these interactions. Finally, we provide a new ground for extending theory through future research.

A Systems View of Online Communities

Complex Adaptive Systems

Complex adaptive systems (CAS) theory, which branches from systems theory, defines an entity as an open system of complex and interdependent relationships between constituting agents (Anderson 1999). It is a system because it consists of interconnected components that work together (Anderson 1999). A system is open because it can exchange resources such as energy and information from the surrounding environment and replenish itself, thus allowing it to adapt, thrive, and survive in that environment (Holland 1992).

The agents of a CAS are heterogeneous agents with varying characteristics and properties, partly connected, autonomously acting according to their behavioral rules, and continuously interacting (Merali 2006). Agents are assumed to have a specific goal to achieve through which they can thrive and survive in the system; that is, they focus on their individual optimality (Choi et al. 2001; Marjanovic and Cecez-Kecmanovic 2017). Agents continuously interact with their surroundings and learn the system they are in. Interaction becomes the primary mechanism by which agents can adapt to their surroundings through behavioral change (Dooley 1997). This means that when agents receive information about the favorability or unfavorability of certain behaviors, they adapt by adjusting their behaviors accordingly to strengthen their favourability. This continues in a cyclical process such that feedback loops are created between all agents of a system, leading to behavioral synchronization and a system-level adaptation (Holland 1995; Miller and Page 2009a). At a higher level, synchronization leads the CAS to self-organize such that global patterns of actions emerge (Morel and Ramanujam 1999). Nevertheless, no agent or entity has complete control over the system. They have a bounded rationality, meaning that a CAS can evolve over time in unpredictable ways to any stakeholders (Holland 1995; Marjanovic

and Cecez-Kecmanovic 2017). Even in hierarchical organizations where actions are directed by management, the interaction of components (individuals, groups, departments) along with the flow of resources in and out of the organization can lead to changes that deviate the organization from its planned trajectory of events to survive and achieve its goals, which may themselves change over time (Morel and Ramanujam 1999).

Interaction between system agents, feedback loops that flow between them, as well as their adaptation, leads to the emergence of system-wide outcomes that are unique to the system and cannot be reduced to any single component (Marjanovic and Cecez-Kecmanovic 2017; Stacey et al. 2000). Emergence is non-linear creating an entity that is very different from its constituting components (Klein et al. 2004). For instance, organizational flexibility is a property that does not make sense at the individual level and does not emerge from the simple addition of a similar individual-level property.

Von Bertalanffy (1972) first introduced systems theory to the management field, conceptualizing an organization as an organism with the capacity to learn, grow, and sustain itself in an ecosystem of organizations. CAS has been adopted into organizational sciences to study the adaptation of organizations and their survival in competitive markets as well as to study organizational teams (Anderson 1999; Boal and Schultz 2007; Choi et al. 2001; Dooley 1997; Morel and Ramanujam 1999; Saavedra et al. 1993; Van Der Vegt et al. 2000). It has also been used in the IS field to study the emergence of macro processes from IT-use interactions and to study uninteded consequences of IT implementation (Nan 2011; Nan and Lu 2014; Nan and Tanriverdi 2017).

Conceptualizing an entity as a CAS allows us to recognize and study complex relationships between events and entities, which is impossible in a simple linear view that assumes a direct

cause-and-effect relationship. It is especially suitable when the properties of the system emerge from components with different properties and when a system that seems ordered at the macro level emerges from what seems to be disorder at the micro level. Online communities have also been previously conceptualized as CAS in the IS literature. This conceptualization has proven helpful in investigating the emergence of organized social structures from decentralized interaction (Johnson et al. 2014b; Oh et al. 2016) and the emergence of capabilities such as crisis-management from IT afforded interactions (Nan and Lu 2014).

Defining a Sponsored Online Community as a Complex Adaptive System

We define a sponsored online community as a complex adaptive system of heterogenous agents: independent individuals who join for personal goals (henceforth users), and a sponsoring organization represented by its employees who monitor the community, interact with users when needed, and design and maintain the technological platform that hosts interactions. Each of these agents presents individual optimality in that they seek to achieve their goals yet have a bounded rationality that prevents them from controlling the whole system.

While the sponsoring organization may try to control activity by motivating certain actions and discouraging others, it has two limitations. First, its knowledge about the online community is bounded by how it aggregates information about its membership activity. By deciding what to monitor, it is also deciding what not to monitor. For example, the organization may decide to monitor the trends of new user registration per day or the number of new threads created by day. Both are decisions to record certain activities but not others. Aggregation is also a way to have a width of knowledge, which also sacrifices depth. The large volume of members and interactions is too expensive and impossible to track and take into account when making decisions. Second, even if a social platform is designed to afford control over certain aspects, such as governance

and knowledge work integration, knowledge producers can be afforded actions by the same technology not planned by the designer (Leonardi 2013b; Shah 2006; Zammuto et al. 2007). For instance, users can attribute new meanings to certain symbols or find new ways to organize conversations to respond to a certain need (Nan and Lu 2014). Members are also not under the direct control of the sponsor and may oppose or resist certain organizational decisions or activities (Dahlander and Magnusson 2005). This can either be by directly declaring dissatisfaction with certain sponsor activities or implicitly by refusing to use certain features or moving certain activities to other platforms.

Users bring in resources when they join an online community, and these resources define some of their attributes. These include knowledge, passion, and time (Faraj et al. 2011). These individuals may have varying goals for joining an online community. Still, the literature suggests that overall, users who volunteer to participate in online communities do so to learn and extract valuable knowledge, to connect with similar others and exchange social support, and to find opportunities to contribute some needed piece of information to the community (Jeppesen and Frederiksen 2006; Wasko and Faraj 2000).

On the other hand, employed individuals work to realize the organization's goal by sponsoring the online community, which is strategic. They channel some of the organization's resources into the online community, which includes internal knowledge, finances, and technological platform resources. The sponsor participates in the online community by monitoring activity, designing features, distributing rewards to encourage participation, moderating activity to ensure general rules of participation are followed, and searching for knowledge gaps to fill with internal knowledge. The sponsor also provides technical support and sometimes organizes and

coordinates the production of knowledge (Dahlander et al. 2008; Dahlander and Magnusson 2005; Huang et al. 2018; Shah 2006; Yan et al. 2021).

Resources are exchanged continuously as a way for each agent in the system to achieve goals. As agents interact, they learn about each other and adapt their actions accordingly. For instance, individuals learn which work results in more respect in the online community and what actions are against the rules. The sponsor also learns what topics motivate participation more and may decide to reorganize conversations accordingly. These mutual adaptations will result in emergent social practices that routinize activities. Social practices describe what topics have a higher priority and which activities deserve more respect when conducted. For instance, one would know that developing a 3D model for a piece of work is more important than writing documentation, yet it is also more challenging and rewarding. Social practices also help govern interactions by defining what is acceptable and what is not. They also implicitly encode the protocol by which two new encounters start interacting. In summary, social practices are the emergent result of micro-adaptations between agents. Because these adaptations are continuously in action and in synchronization, social practices tend to move and evolve, presenting a complex and adaptive system. In Table 1, we map the main properties of CAS and how they fit a sponsored online community.

Sustainability as an Emergent Adaptive Capacity

Previous Work Examining the Sustainability of Online Communities

Online communities are a relatively fragile form of organizing that is difficult to establish and sustain (von Briel and Recker 2017). Online communities can be enormous in size, with dispersed individuals who interact and express themselves exclusively through technology (Wasko and Faraj 2005). Because online communities as a system are more open than other

forms of organizing, participation is also voluntary, sporadic, and challenging to control. This fluidity in structure is both a blessing and a curse. It makes online communities vulnerable because of the lack of stability and the inability to control them, yet this also makes them especially capable of self-organizing and continuing knowledge production by adapting to the many changes they face (Faraj et al. 2011).

Table 4. Conceptualizing Online Communities as Complex Adaptive Systems

CAS Concept & Level	Sponsored Online Community as CAS
Bounded rationality [Micro]	Agents include volunteering users and the sponsoring firm. Agents receive information from local interactions. For instance, users create perceptions based on sponsor visible actions, technology affordances, and interactions with other users (Butler et al. 2014; Ma and Agarwal 2007; Stewart et al. 2006). Sponsors also create perceptions based on activity metrics, and technology features interpret actions with the use of algorithms (Barrett et al. 2016).
Individual optimality [Micro]	Users have diverse motivations (Von Krogh et al. 2012b) and try to achieve their goals by navigating connections and content. User goals may be achieved through participation or extraction of benefits from the community (Huang et al. 2019; Meservy et al. 2014). Individual or organizational goals do not always align with the benefits of the whole system (Levina and Arriaga 2014; Mindel et al. 2018a). For instance, technology interacts with users in preprogrammed possibilities regardless of what the community needs, and sponsors' goals sometimes do not best serve the community (Dahlander and Magnusson 2005; Huang et al. 2017).
Adaptation [Micro & Macro]	Users enter the online community with limited information about it. They navigate the online community looking for ways to gain benefits and participate. As engagement continues, users' understanding of the online community changes, changing motivations and the form of their contribution (Kokkodis et al. 2020; Singh et al. 2011b). The online community as a collective can adapt to external changes in its environment, such as other online communities, market shocks, changes in sponsor's strategic directions or operations, or migration to a new platform. Adaptation results are unknown.
Interactions & emergence [Micro & Macro]	Online community interactions are venues for knowledge exchange (Faraj et al. 2016). Continuing interactions between multiple users propagate and augment knowledge and allow users to fit themselves into roles and interaction patterns, creating macro-level order and macro-level properties (Arazy et al. 2016). E.g. community resilience or attractiveness (Butler et al. 2014), Social structures and norms (Faraj and Johnson 2011; Johnson et al. 2014a)
Self-organization [Macro]	Despite the sporadic form of participation, online communities can create coordinated action. Examples include the completion of complex collective work and creating collective norms and values that govern proper forms of participation (Bauer et al. 2016; Lindberg et al. 2016).
Openness [Macro]	Users enter and exist an online community voluntarily (Faraj et al. 2011). The ability of an online community to attract and retain users depends on its internal characteristics (technology and user interactions) and with the way it interacts with its environment, which involves other online communities, organizations, or external stakeholders (Barrett et al. 2016; Butler 2001; Butler et al. 2014; Kim et al. 2018a).

The meaning of online community sustainability is one that emerged as research on online communities progressed. Earlier work viewed the problem as one of volume of participation. Based on critical mass theory, theoretical explanations assumed that the more members there are to participate, the more participation will follow. An online community remains alive if the activity is above a certain threshold (Marwell and Oliver 1993; Oliver et al. 1985). This stream of research thus worked on finding solutions to the problem of lurking community members, as that was seen as harmful free riding over the effort of participators (Oliver and Marwell 2001; Preece 2001; Sproull 2004; Wasko and Faraj 2005).

Yet while individual participation is agreed to be a necessary condition for an online community's sustainability, it soon became apparent that it is insufficient. In his seminal article, Butler (2001) argues that "the concept of an online social structure's critical mass of members is only meaningful when coupled with assumptions about the type and volume of communication activity." (p. 358). He adds that while membership provides resources, it is only through effective communication between community members that these resources transform into something valuable and are prevented from overwhelming the community (Butler 2001; Jones et al. 2004). Sustainability then shifted from being reliant on the external environment of the online community (potential participating members) to being reliant on the internal capabilities of the online community to continuously transform the available resources into value, which would feed back into available resources (Butler 2001).

Further research on online communities generally divides into two major areas. The first area of research focuses on the exchange of the online community with its external environment. This includes studying characteristics and motivations of incoming members (Belenzon and Schankerman 2015; Ke and Zhang 2010; Roberts et al. 2006), the production of public goods in

the form of knowledge or artifacts (Daniel et al. 2018; Ransbotham and Kane 2011b; Singh et al. 2011a), and the effect interactions with other online communities and firms have on a focal online community (Butler and Wang 2012; Kim et al. 2018a). The second area of research focuses on the internal socio-technical interactions between members. This includes studying technological features that afford the formation of social identity (Ma and Agarwal 2007), the integration of individuals into knowledge production practices (Bergquist and Ljungberg 2001; Von Krogh et al. 2012a), and the organizing of internal structures into those capable of coordinating and governing work (Bach and Carroll 2010; Di Tullio and Staples 2013).

Curto-Millet and Corsín Jiménez (2022) recently put forward a clear definition of online community sustainability. While the work specifies open-source communities, the general definition applies to all online communities. Curto-Millet and Corsín Jiménez (2022) present a typology of viewpoints on the sustainability of online communities: First, sustainability can be the capacity of an online community to attract and retain resources. Second, sustainability can be the capacity to entice a certain kind of participation by creating work practices seen as valuable and protected by members. Finally, sustainability can result from the survival and continuance of its key constituting elements that are part of larger systems, such as the ecosystem or the collective of online communities, as a suitable form of creating knowledge and innovation. These three definitions are not mutually exclusive but rather related and intertwined. These meanings can be synergetic, meaning that one enhances the other, or contradictory, in that they share a trade-off relationship.

Defining Sustainability of Online Communities Through Multiple Levels of Analysis

The three definitions of sustainability presented by Curto-Millet and Corsín Jiménez (2022) are the amalgams of the different angles by which earlier research made sense of online community

sustainability. They allow us to look at how sustainability is created from the activities happening at different levels of analysis. We make sense of these three meanings of sustainability through a CAS lens, which will also help us explain the relationships between meanings.

Table 5. Sustainability at Different Levels of Analysis

Meaning of sustainability	Level of analysis	Focal Actor
Sustainability as the capacity to entice a certain kind of participation through the creation of work practices seen as valuable and protected by members	Within an online community	Agents inside an online community
Sustainability as the capacity of an online community to attract and retain resources	Between an online community and its external environment of competing online communities	The online community
Sustainability is the result of the survival and continuance of its key constituting elements that are larger than itself	Outside an online community - Within the system of online communities and other systems of knowledge and innovation creation	The paradigm of online communities

Between Online Community Agents

At the agent level, users join an online community with specific goals and motivation and a perception of how the online community would allow them to achieve their goals (Wasko and Faraj 2000; Wasko and Faraj 2005). Users bring varied resources into the online community such as specific knowledge, passion, and time, which they believe would allow them to achieve their specific goals. Yet goal achievement depends on an agent's ability to exchange resources, creating an interdependence with others (Cook et al. 2013; Cook and Whitmeyer 1992). Interdependence, combined with the different levels of resources flowing between members and the different goals each aims to achieve, creates tensions between agents, especially since some goals may be contradictory to each other (Faraj et al. 2011). To resolve such micro-tensions, agents adapt their behavior to accommodate each other better and achieve their goals (Saavedra et al. 1993). However, not all agents can maintain their position in the online community. Some

will not be able to adapt to the system successfully and will leave the online community, while others will move their connections changing the social structure and, with it, the distribution of resources (Faraj et al. 2011). As members adapt and readapt their behavior while focusing on their individual optimality, a synchronization of behavior is created between members, with only members that are successful in their adaptation efforts remaining (Miller and Page 2009b). What emerges is a social practice, an agreed way of doing things (Nicolini 2012), that also entices a certain way of participation. Social practice is the result of multiple adaptations and readaptations to information passed between agents through feedback loops of what activities compromise the goals of others and what activities are permissible and efficient. The collective value of an online community is thus the result of micro goals that are adapted to each other. For instance, the software is the result of micro goals achieved by open-source developers as they learn to adapt to each other's activities. Social practices created from mutual adaptations ensure the creation of both private value to individual members and public value to the whole community and the external public (Hippel and Krogh 2003).

As mentioned earlier, the structure of the online community is the result of a continued process of tension resolution and creation between adapting agents that aim to navigate connections to achieve their goals. As the online community creates collective value, it also attracts new agents that perceive some value from joining (Butler et al. 2014). The newly joined agents, however, bring in new tensions that need to be resolved with another wave of adaptations. New online community members are usually socialized into the existing social practices as the existing system works to ensure integration (Bourhis et al. 2005; Holland 2006). However, these new members also bring in a variation that works to continuously change the online community's order to a certain degree, creating further tension that requires more adaptation. Micro

adaptations are an important mechanism for allowing online communities to survive the changing pool of users coming and leaving while also converging into a collective social practice of creating value.

Between an Online Community and its External Environment

At the collective level, an online community competes with other online communities for the time and effort of potential members. A focal online community is itself an agent in a larger system of online communities that needs to achieve its goal. While an online community might not have a consciously defined collective goal, its emergent social practice for value creation translates into a goal to maintain such a social practice (Curto-Millet and Corsín Jiménez 2022; Von Krogh et al. 2012b). While members internally work to maintain such effective social practices for value creation, maintenance is not possible without the replenishment of lost resources. For instance, maintaining the social practices of software production in open-source communities requires that new developers join to replace existing ones. It also requires that new ideas enter to maintain a degree of innovation (Boudreau et al. 2011; Levine and Prietula 2014). Therefore, while an internal social practice is crucial for translating the efforts of members into private and collective values (Hippel and Krogh 2003), it needs to be continuously fuelled by resources that replenish those that leave and meet changing goals (Mindel et al. 2018a).

However, while increased membership brings in extra resources, new members focus on individual optimality, and what they bring may not serve the online community. New membership can also overwhelm the online community with noise (Butler 2001). Such large change in the pool of resources creates tension between the online community and the external environment, which begs for adaptation mechanisms that resolve such tension. As a collective, an online community can adapt to protect its ability to maintain its social order. This adaptation

can be in the form of making the boundaries of the online community less open to new members, thus allowing existing members enough room to adapt to new information and maintain the integrity of their common practices (Ridings and Wasko 2010). The closing of boundaries may be contradictory to the earlier claim that an online community competes for more resources. However, only by protecting the online community from being overwhelmed at a given time does it become capable of sustaining its competitiveness for needed resources when it needs them most. Tension resolution between the online community and its environment is them performed through boundary adaptation to control the amount of resources introduced to the online community and social practice adaptation to assimilate entering members and replace old members.

Within the Paradigm of Online Communities and Other Paradigms of Knowledge Creation

The cascading nature of the complex adaptive system allows us to zoom in and out of systems. Just as an online community can be considered an entity in a larger system of online communities, so can the online community paradigm be considered part of a larger system of paradigms for knowledge and innovation creation. When viewed this way, we consider that paradigms compete for legitimacy. For instance, there was a time when open-source software production was not as popular and adopted by firms as now (Ljungberg 2000), and firms did not see the social connection of product users and customers as a profitable activity (Porter et al. 2011). The more people and organizations see the value in such collective arrangements, the more they are willing to invest resources and time and consider online communities viable solutions to knowledge problems.

While an online community would not be directly affected by paradigm shifts unless overall interest in joining online communities reduces, it could be directly affected if it also receives

resources from non-user entities such as organizations. Online communities may be directly reliant on resources offered by a sponsoring organization, such as the hosting technological platform or funding for certain members. Here, the sustainability of the online community would be compromised if the online community does not prove to be valuable for the organization against other methods of knowledge and innovation creation (Dahlander et al. 2008). Approaches such as open source business models, open innovation, and social crowdsourcing are all forms of organizational adoption of online communities for organizational value creation, all having other alternatives for achieving similar goals such as proprietary software, R&D innovation, and insourced activities (Fitzgerald 2006; Giannopoulou et al. 2011).

An organization invests in an online community for specific strategic goals and with different motivations than those of individual users (Bonaccorsi and Rossi 2006). The divergence of organizational and membership goals creates tension. The divergence in knowledge creation mechanisms also creates tension between the organization and the online community (Lee and Cole 2003). This calls for a wave of adaptation from both sides. An organization may resort to implicit control mechanisms such as sponsoring users to work full-time, changing the technological features of the platform, or engaging in marketing initiatives to attract a particular type of users (Dahlander and Magnusson 2005). Alternatively, as the online community adapts to protect its social practice, users at the individual level also find themselves adapting to both environmental changes caused by the sponsor as well as other users. This creates a stronger wave of adaptations as the movement of resources by the sponsor creates an even stronger wave of resource movement (Faraj et al. 2011).

We thus argue that by being managed by an actively engaged sponsoring organization, tension is created for an online community at both the individual and collective levels. Because of its

control over the technological platform, which affords connection, communication, and the exchange of resources between members, a sponsor can influence micro-tensions. Members can also adapt their behavior by shifting the pool of resources they use to achieve their goals (Von Krogh et al. 2012b), adapting to rely more or less on sponsor resources.

At the community level, the social practices must also adapt to maintain a collective ability for users to achieve their goals. To balance communal goals and sponsor goals, we infer that an online community would either change its social practices or change its scope of activity. For instance, the online community may surrender certain activities, such as the integration of knowledge work to the sponsoring organization, adapting its social practices around this new structure (West and O'Mahony 2008). Such a change, however, can lead many users to lose their reason for remaining in the community and create a large movement out of the community (Shah 2006). For instance, many developers that take pride in managing open-source software kernels and communities may not accept being pushed back by a governing organization to only contributing patches (Shah 2006; Von Krogh et al. 2012b). However, the online community may still maintain sustainability through other social practices that allow it to both gain new membership as well as resolve internal and external tensions.

Summary

By revisiting the views on sustainability previously studied in the literature (Curto-Millet and Corsín Jiménez 2022), identifying them at different levels of analysis, and using CAS logic to detangle the relationships between the different levels of analysis, we were able to uncover the different types of tensions that occur between entities and that require adaptation, as well as identify tension resolution as an important mechanism by which adaptation occurs. Table 3 summarizes the types of tensions and resolutions at different levels of analysis.

In what follows, we dig deeper into how a sponsoring organization can influence tensions and adaptation for an online community at individual and collective levels.

Table 6. Types and Sources of Tension for Online Communities

Type of Tension	Tension Source	Tension Resolution*
Micro-tension between users of an online community	Resource interdependence and goal divergence	Mutual behavioral adaptation and synchronization toward a social practice
Tension between the online community and the external environment	Divergence between the resources an online community needs and what the internal environment offers while still needing to assimilate resources	Boundary adaptation and social practice adaptation
Tension between an online community and its sponsoring organization	Divergence in mechanisms for knowledge and innovation creation and goals while relying on each other's resources	behavioral adaptation, social practice adaptation

*Of the online community

The Role of Sponsoring Organizations in Creating Online Community Tensions

As discussed earlier, an online community is formed from the continuous resolution of tensions at different levels. Tensions are, therefore, characteristic of online communities. However, the resolution of tension can lead to either positive or negative consequences with respect to sustainability (Faraj et al. 2011). Thus, what differentiates a sustainable online community from a non-sustainable one is its ability to have "generative responses" that are able to "harness" these tensions in a way that stimulates knowledge sharing and collaboration (Faraj et al. 2011, p. 1230).

When a sponsoring organization becomes involved with an online community, the pool of resources available to members changes, creating even stronger waves of resource fluctuation and tensions (Faraj et al. 2011). We argue that this is the case because of the sponsor's interaction with the online community at both the individual and collective levels, either directly or indirectly. This leads to the creation of new tensions between the organization and the online

community, as well as the influence of micro-tensions between members and tension between the online community and its environment.

To examine what tensions are created, how they are resolved, and how tension resolution influences sustainability, we focus on four salient ways by which a sponsoring organization interacts with an online community. First, the organization can hire or financially compensate individuals for participating as members, thus channeling the organization's goals into member participation. This strategy is used to hire developers in open-source software communities as well as moderators in knowledge-sharing communities (Alexy and Leitner 2011; Reischauer and Mair 2018). Second, a sponsor can modify the technological features of the platform hosting the online community. By changing the pool of possible actions members can make, the sponsoring organization can algorithmically attempt to control activity (Kellogg et al. 2020). Third, the organization can directly interact with the online community through employed community managers who work to motivate members, communicate rules of engagement, or speak in the name of the organization (Huang et al. 2017; Yan et al. 2021). Finally, the sponsor can run marketing initiatives to attract new members by investing in advertisements on other social platforms (Bapna et al. 2019b).

Hiring knowledge contributors

The sponsoring organization can hire or financially sponsor certain individuals to be participants in knowledge work or moderators (Reischauer and Mair 2018). As online communities may actively resist direct control or just ignore demands (O'Mahony and Bechky 2008), it becomes more effective to respect the communal work process by hiring individual participants who can work on what the organization needs (Alexy and Leitner 2011). While sponsored participants are directly controlled by the sponsoring organization, they only represent themselves in the online

community. That is, they are treated as individuals by other members of the online community (Medappa and Srivastava 2020). Sponsoring participants is a strategy followed by many organizations who wish to join development in open-source projects, influence the information on Wikipedia articles, or seed-in knowledge in discussion forums about a specific product (Huang et al. 2017; Zhu et al. 2020).

Whether sponsored participants are hired to join the online community or hired after being active members, their activity becomes directly controlled and closely evaluated by the sponsor. This has a direct effect not only on their goals but also on their behavioral patterns and interactions with other members of the community (Medappa and Srivastava 2019). By inserting financial resources into the online community, the sponsor changes the mix of available resources in the community, shifting the goals of hired participants. The sponsoring organization may also provide employed participants with internal information not available to others. Having different information and goals by which to act will then influence such participants to change their behavioral patterns to accommodate the employer's goals (Leonardi 2013a). Because other volunteering members have varying and different goals than sponsored members, it is more likely that micro-tensions occur, requiring all sides to adapt their behavior to better accommodate each other (Saavedra et al. 1993). Here, the organization-community tension manifests as micro-tensions between participants who work towards the organization's goals and others who work towards individual goals. However, we suggest that adaptation at the micro level works differently when a sponsor in present. First, unlike volunteering members who join during free time, being sponsored and evaluated for performance allows members to give knowledge and time more than other members in the community, which can lead a sponsored member to gain status and more privileges in the community, leading them to be more influential (Fleming and

Waguespack 2007; O'Mahony and Ferraro 2007). Nevertheless, employed members may be well known as such by other members, causing volunteers to challenge sponsored members as their influences grow in the community in an effort to protect the community from direct organizational control (Shaikh and Levina 2019). This is especially true for mature online communities with governance practices that members can invoke to resist such change (O'Mahony and Ferraro 2007).

Tension resolution occurs when members adapt and re-adapt to each other such that social practices and structures change to accommodate the different goals. The tension resolution process can take the shape of active conflict and discussions leading to internal wars (Faraj et al. 2011). Members may voice their disagreement, concerns, or desire for change. Others may resign from their positions and leave the online community (Raymond 1999), while others will take up neutral roles to attempt to find solutions (Faraj et al. 2011; O'Mahony and Ferraro 2007). Tension is resolved generatively when the online community adapts to protect the activities of its members, and social practices evolve to integrate the different resources and goals the comprise it. For instance, a voting system for decision-making regardless of member status may be adopted by the online community to avoid falling into organizational control (O'Mahony and Ferraro 2007; Spaeth et al. 2015). Sponsored members may also be considered by their contribution efforts to the community rather than affiliation (Dahlander and O'Mahony 2011). Such mechanisms tend to protect communal goals from being compromised over organizational goals (SL Daniel et al. 2018). This also ensures that the organization respects reciprocal exchange; the place and privileges it gets in the online community become contingent to the knowledge it provides through its sponsored members (Shah 2006).

Nevertheless, tension can also be resolved in a way that compromises the sustainability of the online community. This happens when one side “wins over” the other side without the emergence of some governing practices that ensure the accommodation of diverse goals. For instance, if sponsored participants rise to become the majority of the community core, the online community may seem in harmony from the surface, but other participants may be driven to leave as their goals become compromised (O'Mahony and Karp 2022). Here, the organization will find itself pumping in more resources, increasing the cost of knowledge creation and gaining minimal external innovation. Participation can also reduce if the conflict persists and no collective method of governing participation emerges. Even if the sponsor decides to adapt by reducing its influence, a lack of leadership or order can induce confusion among members of the community or create sporadic, uncoordinated activity (O'Mahony and Karp 2022).

Modifying technological features

As the sponsoring organization is usually the provider of the technological platform on which the online community is built, it holds in hand the ability to alter the technological features through which members represent themselves, communicate, and create content. While the platform is designed by the sponsor with specific usage scenarios in mind, technology is rarely faithfully appropriated (DeSanctis and Poole 1994; Kang et al. 2012). Instead, members perceive their own technology affordances (Zammuto et al. 2007). The affordances that become available to users define the type and the flow of information that is exchanged, creating unique exchange patterns and social structures (Hallerbach et al. 2013). The difference between what a sponsor assumes as successful platform use and how members of the online community collectively use the platform creates tension. As the sponsor aims to resolve this tension and improve the performance of the

online community to better fit its goals, technology can be changed in an effort to modify the participation behaviors of members (Leonardi 2011).

The sponsor performs modification of technological features by restricting information flow in some channels while boosting it in other channels (Barrett et al. 2016). Technological components afford the sponsor control by allowing the organization to encode rules for participation, provide structure for communication by organizing messages, manipulate the audience of content by increasing the visibility of some content over others, define which actions are public and which are private such as commenting vs. voting, and aggregate community activity either through crowdsourcing or automatically summarizing content. An organization will review and modify technological components as they see them performing in the online community, but users will also see new affordances and constraints from these components to perform actions that may or may not be anticipated by the organization (Zammuto et al. 2007). For instance, it has been shown that when a sponsor shifts member identification from anonymous usernames to real names in order to increase connection and legitimacy, users change the quantity and quality of knowledge sharing (Pu et al. 2020). Because their self-image becomes at stake, users adapt by putting more effort into sharing higher quality content but with a lower frequency (ibid).

A change in the technological features and capabilities for information presentation, evaluation, and transmission changes the set of affordances that are available to members (Faraj and Azad 2012; Fayard and Weeks 2007; Leonardi 2011). Members may no longer find themselves able to perform routine activities while facing new affordances and constraints for action (Leonardi 2011). Shared affordances among members that allow the online community to perform collective-level practices would then be disrupted, creating a wave of micro-tensions between

members as each tries to readapt to its new environment (Leonardi 2013a). Tension rises when members of the online community suddenly have access to new information and are restricted access to other information. This will lead members to shift their communication partners and patterns (Leonardi 2013a). People will change their connections as they seek others who are more relevant to them or change the topics they talk about. For instance, when a new private messaging feature becomes available, members may engage in more direct and deep conversations with each other that they would not have shared publicly otherwise.

Tension is resolved when members adapt to technology change by adopting new shared affordances or constraints that can afford some form of collective action. When technology changes, some members may leave as they find themselves no longer able to achieve their goals, yet as long as a significant number of members change their behaviors in a similar way, some form of agreed-upon social change is achieved (Monge et al. 2003). The tension resolution process can take the shape of feature experimentation, discussions and questions about how best to use a new feature and discoveries of benefits and shortcomings of the new or modified features (Nan and Lu 2014). As members do so, they not only communicate with each other about their shared experience, but they also communicate with the sponsor about their new user experience. For instance, members may develop a collective agreement regarding their dissatisfaction with the new platform colors or may inform each other about bugs and inefficiencies in the new release and suggest workarounds. Both are information that allows the sponsor to readapt to future technological changes that better fit communal requirements. When members are able to exchange information openly as they adapt their behavior to the few technological affordances that become available to them, they are better able to develop shared

affordances and synchronize collective activity. They are also better able to communicate with the sponsor, allowing the later also to adapt its relationship with the online community.

Nevertheless, tension resolution can also occur while compromising the sustainability of the online community. This would occur when technological changes create affordances for more constricted information flows between members such that collective exploration of the new features is compromised (Wang et al. 2016; Wen et al. 2016). For instance, if the sponsor limits file sharing due to security issues, members may find alternative ways to share files through external channels to the platform without communicating about their shifts on the platform to avoid questioning. Similarly, if the sponsor introduces a feature that pools users' input, members may be less likely to open discussions about their content creation as they would no longer face the challenges of content integration. Consequently, shared affordances may never emerge, nor the coherence of collective practices that follows (Leonardi 2013a). Moreover, the lack of clear insights about why the online community no longer performs as expected would lead the sponsor to modify technology, only increasing tensions and making collective positive adaptation harder further.

Directly interacting with the online community

The sponsoring organization may engage with the online community directly through community managers. Those are employees that are hired to oversee the community's activity, monitor activity trends, motivate engagement, and communicate rules for participation and membership. By doing so, the sponsor establishes an active presence in the online community. Community managers, unlike sponsored participants, represent the sponsor and speak in its name. They can enforce rules or reward members as they are given access to the organization's resources. Direct engagement with the online community can improve an organization's

reputation (Park et al. 2019), motivate user participation (Bapna et al. 2019b), and improve user trust in the organization (Oestreicher-Singer and Zalmanson 2013; Porter et al. 2013).

Employees who hold formal roles in the online community are known as keepers of specific internal knowledge and the spokes persons on behalf of the sponsor; when they actively interact with members and become embedded in the social mesh, they gain status and become perceived as community leaders, especially as they control sponsor resources (Johnson et al. 2015; Mehra et al. 2006; Ramirez 2015). Their roles of authority also provide a visibility advantage, increasing their influence (Engelbrecht et al. 2019). Community managers move around the social mesh and redistribute resources around members, creating micro-tension waves. They redistribute resources when they provide awards to certain members and not others, highlight the achievement of a few members over others, and penalize or negatively flag other members (Wilson et al. 2010). Community managers also have access to certain technological features that are not available to members. For instance, a community manager can have the option to list certain members as "featured" on the main community page or be able to pin some content on the top for increased visibility. This would influence some members to actively pursue leader relationships (Magee and Galinsky 2008; Nembhard and Edmondson 2006; Oh et al. 2016).

Community managers act to redistribute resources such that activities that support the sponsor's goals are favored. Yet these activities may not be in the interest of many community members. For example, in a product innovation community, the sponsor may favor user designs that are easier to integrate into products and channeled to the market over designs that are experimental, challenging, and serve for fun and learning. Members who join for fun may not appreciate those other members who submit simpler designer getting the most rewards. This creates tension as members find themselves obliged to readapt to better serve their goal from the community.

Tension resolution occurs when members adapt to the redistribution of resources and the movement of other members in the social structure. The tension resolution process can take the shape of members voicing their concerns to the sponsor, asking for a change in sponsor governance practices, or finding ways to gain the community's attention and asking for a collective change (Detert and Treviño 2010; Miles and Mangold 2014). Tension resolution actions can also include conflicts between members who are favored in resources and others who are not. By experiencing such conflict, the sponsor can decide to act to reduce such conflict by changing the strategy that community managers use to interact with members and redistribute resources (Burris et al. 2013). This may further create movement in resources creating another wave of tensions and tension resolution attempts by the online community (Faraj et al. 2011). However, as online community members communicate their positive or negative experiences, they rally efforts to reorganize the online community. Individual tension resolution attempts through readaptation emerge as collective governance mechanisms for protecting communal order (O'Mahony and Ferraro 2007).

Nevertheless, tension resolution can also take a path that compromises the sustainability of the online community. As resources get redistributed between members, those who find it increasingly harder to achieve their goals may leave the online community. Because of its high openness, the online community may not be able to build enough pressure to bring tension resolution to the surface (Fleming and Spicer 2014). Instead, members may find other venues to satisfy their participation needs (Butler and Wang 2012). Moreover, by increasingly being moved down the social hierarchy, micro-tensions can be suppressed from surfacing, leading members to resolve to more silent tension resolution mechanisms such as finding workarounds to gain more resources, splitting the online community, or migrating to a different hosting platform

where they can voice their concerns (Bagozzi and Dholakia 2006; Detert and Treviño 2010; Fiesler and Dym 2020). Because tension that is built with the sponsoring organization is a macro-level tension, when members are unable to move micro-tension resolution to the collective level, it becomes more difficult to resolve the tension while protecting the online community's sustainability.

Attracting new membership

The sponsor can use marketing campaigns to recruit more members into the online community. The sponsor has financial and social resources that can allow it to access costly yet high-reach channels for advertising the online community. By doing so, the sponsor may reach other related online communities and distant channels such as social media platforms and private communities of practice and interest groups.

Sponsoring organizations decide to boost an online community with new membership when they perceive activity is not high enough or not productive enough. Nevertheless, the sponsor has a bounded view of the online community. Information about the community activity is usually gathered using algorithmic aggregation tools, statistical results, and partial experience collected by community managers who are actively involved with the community. By acting on this information, the sponsor may decide that an increased membership is the solution for increased activity. Nevertheless, by influencing the influx of new resources to the community, the sponsor also increases the tension between the online community and the external environment (Butler and Wang 2012). Tension increases as new members navigate and experiment with participation, flooding the online community with new information that is costly to process (Jones et al. 2004).

When the sponsor acts to open the boundaries of the online community, tension increases between the existing community members and the new incoming members. Tension resolution occurs when members react to the increasing volume of activity by adapting their behavior. For instance, members may seek to look for quality content by relying on the social cues of contributors instead of carefully examining the content (Meservy et al. 2014). They could also revert to shortening their contributions to spend less time on each requirement and avoid overload (Jones et al. 2004). Members may also decide to ignore newcomers unless those newcomers put in more noticeable effort (Arguello et al. 2006; Lasfer and Vaast 2018). With less knowledge about how to navigate content and how to socialize oneself in the online community, increased membership can also reduce the retention of new members (Butler and Wang 2012). Members who have fewer connections that help them navigate the high flow of information may find themselves coping by leaving the community (Dahlander and Frederiksen 2012; Kim et al. 2018b), while those that are closer to the core work towards protecting the social practice, thus restricting access to their conversations, and reducing the openness of the community (Gibbs et al. 2013; Ridings and Wasko 2010). By reducing their activities' openness, members can protect their practice and repel unwanted new membership (Shaikh and Vaast 2016). Only those that put more effort than the rest can win their place in the online community (Arguello et al. 2006). By adapting to a reduced boundary openness, an online community can maintain itself against dismantling.

Nevertheless, tension resolution can also take a less successful trajectory. If no core of members can collectively protect their activities and reduce openness to their conversations, the social structure in the online community can become more chaotic as members individually work to navigate the high tides of change. As conversations continue changing, the memory of the online

community can be lost despite the digital persistence of content. This is because how content is organized, retrieved, and recombined knowledge is encoded in practices that become lost in disorder (Majchrzak et al. 2013b). Moreover, members can resort to conflict as norms become unclear and continuously change (Butler et al. 2007; Ransbotham and Kane 2011a), a situation which demands even more effort from members to find order, giving more members a reason to leave (Majchrzak et al. 2013a). Moreover, the high outflux of new members who failed to be retained may form a perception for others that everyone is leaving, reducing the perceived benefits of staying (Majchrzak et al. 2013a).

Sponsor-Community Emergent Tension Resolution for Sustainability

In what preceded, we have discussed how a sponsoring organization can intervene in an online community to get its activity more aligned with the sponsor's goal. Each of such interventions has the possibility of increasing internal tensions leading the online community to readapt. Adaptation starts at the micro level as members readapt to changing conditions and emerge into a readapted online community. The new emergent form of the online community manifests the tension resolution efforts that members have gone through. Tension resolution, however, can either take a positive turn with respect to sustainability or a negative turn leading to disorder and dismantling. In what follows, we describe how sustainability as a capacity is developed by an online community as the sponsoring organization and the online community readapt and influence each other.

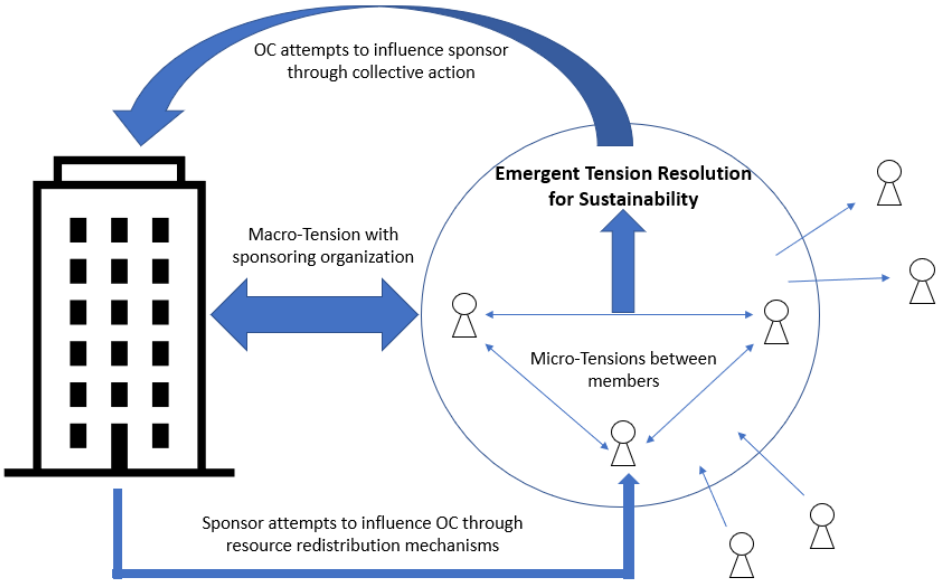
The Sponsor-Community Tension

A formal organization establishes the ground for an online community for strategic reasons and with planned objectives. By opening knowledge and innovation creation to the crowds, they gain benefits of cost reduction and external knowledge integration (Dahlander et al. 2008). However,

the group of online community members who join poses a challenge for the organization. First, individuals do not join an online community with the same organizational reason in mind (Bonaccorsi and Rossi 2006). Individuals join an online community to find a place to learn, connect with similar others, gain social support, show off their skills, enjoy their time, or achieve a sense of purpose from helping others (Von Krogh et al. 2012b). Second, as community members are not employees, direct control mechanisms would not work to align and coordinate their activities (Dahlander and Magnusson 2005; Ho and Rai 2017; Jeppesen and Frederiksen 2006). Instead, individuals would continue to populate the online community as long as the sponsoring organization supports them to maintain a reliable place to be socially, intellectually, or financially rewarded (West and O'Mahony 2005). Third, as an online community develops, free extraction of knowledge work by the sponsor may no longer be accepted, calling the sponsor to reciprocate by answering to the online community's needs (O'Mahony and Bechky 2008; O'Mahony and Karp 2022; Shah 2006).

These differences create tension between the sponsor and the online community, which each side continuously works to resolve by readapting how they interact. We propose that the sponsoring organization adapts to the information it receives about online community activity by attempting to influence the resource distribution between community members such that activities align with the sponsor's goals. Alternatively, an online community attempts to influence the sponsor through emergent collective action to protect its integrity and the goals of its members. The external arrows in Figure 1 demonstrate how tension is created and resolved between the sponsoring organization and the online community as they adapt their interactions.

Figure 3. Tension Creation and Resolution Between a Sponsor and an Online Community



*OC = online community

Mechanisms for Tension Creation and Resolution in an Online Community

We have identified earlier that an online community experiences tension at different levels through which it can create and maintain its sustainability. These terrains of tension are within the online community, between the online community and the external environment of potential members, and between the online community and its sponsor as two different paradigms of knowledge creation. We argue that as the sponsor attempts to influence internal and external interactions of an online community, it can intensify tensions that an online community experiences in all terrains, thus making sustainability more challenging for sponsored online communities than others.

Because a sponsor's interventions create resource imbalances through redistribution, an online community's adaptation reaction starts at the micro level and emerges as a collective tension resolution mechanism. When a sponsor hires knowledge contributors, micro-tension is created

within the online community between members who are employed and those that volunteer their work (O'Mahony and Karp 2022). When the sponsor modifies the technological tools by which community members receive and transmit information about the community, micro-tensions are created within the online community between members as they start experiencing new affordances and constrains for action, including changes in information about their connections and the available knowledge (Leonardi 2013a). Additionally, when the sponsor directly interacts with the online community, the sponsor-community tension manifests as micro-tensions between members who become unequally compensated by the sponsor's governance decisions (O'Mahony and Ferraro 2007; Oh et al. 2016). Finally. The sponsor can also intensify the tension between the online community and its external environment when attempting to drive increased membership. Such tension would first manifest at the micro level as tension is created between existing and new members (Butler 2001; Butler et al. 2014; Butler and Wang 2012).

Micro-tension resolution at the individual level occurs when community members adapt their behavioral rules for interacting with other community members based on the new information the becomes available (Holland 2006; Nan 2011). As members adapt and readapt based on feedback loops, an emergent community-level adaptation occurs (Nan 2011). We argue that an online community can either resolve tensions in a generative way that develops and strengthens its capacity to sustain itself or resolve tensions in a degenerative way that compromises its continuity as a collective entity. Table 3 provides a summary of generative and degenerative tension resolution mechanisms. We propose that this difference in trajectory is due to the presence or absence of *generative feedback loops*, which we define as information-rich, highly public reactions to experienced changes.

Table 4. The Emergence of Generative and Degenerative Tension Resolution Mechanisms

Sponsor Intervention Mechanism	Influenced Terrain of Tension by the sponsor	How tension manifests at the micro level	Generative emergent tension resolution	Degenerative emergent tension resolution
Hiring knowledge contributors	Within an online community	Micro-tensions between employed members and volunteers	Governance system develops to manage 'richness' of employed members – protection from sponsor dominance	Sponsored employees "win over" the online community/conflict / confusion
Modifying technological features	Within an online community	Micro-tensions between members caused by new afforded or constrained information flow	Shared affordances for collective action	Individualized affordances / affordances for constricted information flow
Directly interacting with the online community	Between an Online Community and the sponsor (between paradigms)	Micro-tensions between unequally resource compensated members	Voicing concerns for collective change and reconfiguration	Silent tension resolution / leaving
Attracting new membership	Between an Online Community and its External Environment	Micro-tensions between existing members and new members	Modified practices for closing boundaries and protecting existing order	Chaotic participation, influx, and outflux of members

When members voice their concerns, emotions, and rejection of certain changes, they transmit information about how they are adapting to changes. While a negative air may surface, these responses can inform the rest of the community about a problem that needs to be solved. They can become a generative ground for common norms to form about what is and is not accepted (Carton and Tewfik 2016; Janssen et al. 1999). For instance, unless several community members voice out their rejection of specific acts such as copying ideas and other members react to support them that a common agreement for rejecting the act of copying and copiers is established (Bauer et al. 2016).

When the sponsor intervenes to redistribute resources, members will react to change their behaviors and interactions (O'Mahony and Karp 2022). When micro-tension develops between volunteering and employed members, the online community can develop a governance process

to protect the online community from the sponsor's dominance, but only when they openly voice their dissatisfaction and attempt to resolve conflicts openly. The visibility of tensions allows capable members to take the role of problem solvers and attempt to find a middle ground (Majchrzak et al. 2013a). Those passionate about the community would be responsible for helping coordinate processes such that new governance mechanisms are put in place (O'Mahony and Ferraro 2007; Shaikh and Henfridsson 2017). Similarly, when the sponsor redistributes resources through community managers, members are pushed to readapt to the new changes they face. When facing incapability for expressing their concerns openly and publicly, they will resolve to other less public approaches that would impede other members from connecting and establishing a collective voice. On the other hand, being able to publicly communicate provides the required information that supports collective action and sponsor adaptation that considers those concerns.

Technology also affords generative feedback loops. When technology allows for information-rich communication, it allows members to perceive shared affordances, creating harmony in activities and creating common practices (Leonardi 2013a). Common practices help in creating order and respective stability of activity (Arazy et al. 2016). The establishment of practices allows for the creation of a collective value, as well as motivates members to protect it (Von Krogh et al. 2012b). Protecting social practices also manifests when new resources are brought by new members. As the sponsor pumps in new members, a coherent group of well-communicating members can help maintain order by folding their activity to close-of boundaries and drive out unneeded resources (Ridings and Wasko 2010; Shaikh and Vaast 2016).

All in all, generative feedback loops are essential for the sustainability of a sponsored online community as they allow micro-tension resolution mechanisms to converge into macro-tension

resolution mechanisms, which protect the online community from the internal disorder as well as external pressure from both the sponsor and the external user environment.

Implications for Research

Our goal in this paper was to investigate how a sponsored online community can develop sustainability when constantly interacting with a sponsoring organization. We first revisited how scholarship defined sustainability as a concept and, using complex adaptive systems theory, defined how sustainability can be challenged by internal and external tensions at different levels of analysis. We then listed four interventions that a sponsor uses to influence the activity of an online community and explained how these interventions create tensions in the online community. We proposed that a sponsor's interventions influence the online community through resource distribution and that an online community influences the sponsor through collective action. We also suggested that collective action is an emergent tension resolution mechanism that acts to maintain the online community's sustainability. Collective action, however, can only form when generative feedback loops are in action, which we define as information-rich, highly public reactions to experienced changes.

This study contributes to a better understanding of how online communities can survive and flourish. We build on previous works that aim to create a holistic understanding of the phenomenon (Arguello et al. 2006; Butler 2001; Butler et al. 2014; Butler and Wang 2012; Curto-Millet and Corsín Jiménez 2022; Mindel et al. 2018a). Given the complexity of online communities, the capacity to self-maintain as a form of organizing cannot be reduced to participation alone (Kamboj and Rahman 2017; Lee et al. 2006; Zhang et al. 2013), nor can individual action be ignored when high-level activity is observed (Arazy et al. 2016). This study theorizes how sustainability emerges from individual activity and examines the conditions by

which it emerges. We also provide a holistic and integrative view of how different entities within and outside the online community influence changes in sustainability. By taking a complex adaptive approach, we explain the emergence of sustainabily and how an online community adapts to change. This highlights the dynamic nature of an online community and the continued need to manage and maintain it.

While our study does provide improved clarity and a more parsimonious explanation of online community sustainability, it also creates opportunities for future research. For example, there is still much to learn about conflict in online communities and when it leads to improvement or deterioration. Conflict can take many forms and requires that it is managed for a constructive resolution to develop (Jehn and Mannix 2001; Likert and Likert 1976). Yet conflict in online communities can take different forms than in formal organizations. More needs to be known about when communal conflict helps the community and when it hurts it (Chua and Jin 2020). The role of online community leadership needs also be clarified, especially when a formal leader such as a sponsor is present. Earlier research indicated that emergent community leaders could be identified while others hold formal positions (Johnson et al. 2015). Understanding the role of emergent leaders in aiding the generative emergence of tension resolutions would better clarify their role in sustainability.

This work contributes to the literature on sponsored online communities and can bring insights into related topics such as open innovation, digital platforms, and crowdsourcing. First, we clarify how a formal organization creates and increases tension for an online community on different terrains. We also examine the opportunities and challenges that different sponsor management interventions can have on communal activity. While we do not claim that this list of interventions is comprehensive, we find they efficiently summarize the major sponsor-

community interactions studied in the literature on online communities, open-source communities, and social crowdsourcing. Future research can examine the multiple ways an organization can interact with an open technology-bound communal group of knowledge workers. This research also highlights the importance of sponsor vigilance to the reactions and interactions of the crowd as different interventions are administered and the importance of adapting management practices accordingly. Future work can investigate the most effective strategies for implicitly controlling or interacting with online community workers. While several studies investigate the effect of sponsor control on member motivation and activity (Dahlander and Magnusson 2005; Dahlander and Wallin 2006; O'Mahony and Karp 2022; West and O'Mahony 2005; West and O'Mahony 2008; West et al. 2014), more research opportunities remain for understanding how a sponsoring organization can actively balance between control and openness as it adapts to the reaction of the online communities. In addition, more needs to be understood with respect to algorithmic control through technology and how that influence the shape of the online community, its members' activities, and the online community's well-being.

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Bridging Between Chapter 3 and Chapter 4

In chapter 3, we presented a theoretical explanation of what sustainability means for a sponsored online community and how the interventions of the sponsoring organization influence it. A sponsoring organization attempts to realign the online community's activity to its goals. We argued that an intervention by the sponsor would lead to the movement and redistribution of resources, leading community members to readapt to their new environment. How the members engage in tension resolution and readaptation defines whether there is an emergence of generative or degenerative mechanisms at the collective level. Consequently, the changes that emerge from the online community influence how the sponsor readapts its community management practices. The activity of the online community at the collective level serves as information to the sponsor. Future attempts for a sponsor to control, support, or realign the online community towards its goals would then be subject to the information it receives from the online community as we as its interpretations based on its bounded rationality. Further interventions administered to an online community unable to adapt generatively would only increase tensions and weaken the community. Chapter 4 investigates such a case and digs deeper into understanding how a sponsor and its online community negotiate their legitimacy for resources as they manage their relational tensions. Using an empirical case, we can study how the sponsor and the online community attempt to resolve their tensions and how tension resolution influences the fate of both entities over time.

CHAPTER 4

A Tug-of-War between Allies: How a Sponsor and its Online Community Manage Their Relational Tensions

Introduction

Online communities (henceforth OCs) have expanded people's ability to organize into knowledge-creating collectives beyond formally established firms (Faraj et al. 2016; Kane and Ransbotham 2016). An online community, as a form of open collaboration, is "a system of innovation or production that relies on goal-oriented yet loosely coordinated participants who interact to create a product (or service) of economic value, which is made available to contributors and noncontributors alike" (Levine and Prietula 2014, p.1416) (p. 1416) (p. 1416) (p. 1416) (p. 1416) (p. 1416) (p. 1416) (p. 1416). OCs have become particularly important for organizing because of their ability to attract large numbers of people and of the key role technology plays in facilitating and enabling interactions (Barrett et al. 2016).

Projects such as Linux and Wikipedia have presented successful examples of OCs that produce knowledge and maintain members' engagement without the formal control of contractual relationships (Fang and Neufeld 2009; Greenstein and Zhu 2016; Kane and Ransbotham 2016; Von Krogh and Von Hippel 2006). This has motivated firms to rely on OCs for commercial goals to extend their knowledge base and increase their ability to innovate with minimum supervision, control, and hiring costs (Armstrong and Hagel 2000; Kannan et al. 2000; Lu et al. 2015; Reischauer and Mair 2018). OCs have been involved in, for example, customer support (Lu et al. 2015), software development (Dahlander and Frederiksen 2012; Dahlander and Magnusson 2005; Shah 2006), and health support and data collection (Barrett et al. 2016; Frost

and Massagli 2008). With the further proliferation of digital technologies, it has also become easier for firms to build communal platforms and shift to digital strategies that tap into the distributed wisdom of OCs.

Firms may focus on building efficient digital platforms and motivational strategies as they sponsor OCs and expect that these communities will follow the performance trajectory of successful autonomous ones. However, being sponsored puts an OC in a different situation than its autonomous counterparts. When a for-profit sponsor interacts actively with an OC, social dynamics change to reflect this new relationship (West and O'Mahony 2005). The relation between a sponsoring firm and an OC poses new organizing questions not answered by scholarship on autonomous OCs (Dahlander and Magnusson 2005; O'Mahony and Lakhani 2011). For instance, OC members' motivation and participation may differ, and the assumptions of emergence of social processes and autonomy may no longer hold (Dahlander and Magnusson 2005; Shah 2006; Spaeth et al. 2015).

It is of critical importance to understand the dynamics between a firm and its sponsored OC. For one, this is an emerging phenomenon associated with social technologies and online distributed work that brings new opportunities but also challenges for firms. It is also the instance of a hybrid organization in which two collectives, one hierarchical and the other communal, need to adjust to connect past their differences and co-create value (Lee and Cole 2003; O'Mahony and Lakhani 2011). Understanding the ongoing relationships between a firm and an OC thus holds theoretical implications for understanding how different forms of organizing create relationships, coexist, and co-create value. It can also have crucial practical implications for building OC engagement strategies (O'Mahony and Lakhani 2011).

OCs and formal organizations diverge in many regards (O'Mahony and Lakhani 2011). For one, firms and OCs have differing motivations for engaging in open initiatives (Bonaccorsi and Rossi 2006). While the firm's end goal is performance and profit, it is challenging to control unpaid and non-contracted online volunteers whose main goal may be enjoyment and social engagement (Dahlander and Magnusson 2005; Shah 2006). In addition, the two collectives diverge on the organizing process for creating knowledge. A firm relies on formal hierarchy, control, and the protection of intellectual property, while an OC relies on an emergent and flexible core-periphery structure, norms of criticism and selection, and open intellectual property rights (Lee and Cole 2003). Of note, the firm's hierarchy is not necessarily in opposition with the core-periphery structure of an OC. Rather, the processes by which a firm's and an OC's structures are created are dissimilar. The formal hierarchy of the firm relies on contracts and top-down control to orchestrate and coordinate diverse specialized knowledge (Grant 1996; Thompson 1967). In contrast, an OC relies on bottom-up social distinction among its members and a resulting differentiated social structure (Lee and Cole 2003). The social structure of an OC is thus not only emergent, but also highly dynamic as it changes with changing social differences among members with respect to resources, knowledge, and activity. More resourceful members gain higher status and reputation (Johnson et al. 2014; Levina and Arriaga 2014). The dynamic form of social differentiation through peer evaluations enables flexible membership in the OC and dynamic movement of resources with the maintenance of continuous activity (Arazy et al. 2016; Faraj et al. 2011). A firm and an OC are therefore both structured with some form of hierarchical order of members, but a firm's working process is based on a more stable top-down order and clear lines of direction (Durkheim 2014; Magee and Galinsky 2008), while the OC works in the

absence of such rigidity as members collectively redistribute resources among themselves (Faraj et al. 2011).

Communal-commercial tensions in the sponsor–OC relationship appear because the sponsor relies on the activities of the OC to realize its goals yet diverges from the OC in goals and organizing processes (West and O'Mahony 2005; West and O'Mahony 2008). The way tensions build up and get resolved through interactions between the sponsor and the OC needs to be understood. We therefore ask: how do a sponsor and OC continuously manage tensions in their relationship?

To answer this research question, we analyze the case of a sponsored OC that went through a rise and fall in a period of three years. Using Bourdieu's practice theory of social distinction, we conceptualize the interactions between the sponsor and the OC as negotiations of legitimacy through status differentiation. By qualitatively analyzing public discussions and interviews, we identify three status negotiation processes that explain how a sponsor and an OC continuously manage their relational tensions: sponsor-to-community status negotiation, community-to-sponsor status negotiation, and within-community status negotiation. These processes reveal a continuous negotiation for status, legitimate power, and resources between the sponsoring organization and the OC. When the status of one party increases over the other, its resources become legitimate sources of power that can be used to drive goals and influence the other party into changing its social practices. Negotiation creates tension. Tension is created when actors value resources that lead to contradictory goals and is resolved when social practices shift to reflect the new status and power differences between the sponsor and the OC and among OC members. The new situation then iteratively triggers changes in goals and new status negotiations, as well as new tensions and resolutions. A tension resolution that gives too much

power to one party over the other one risks causing the sponsor–OC relationship to fail as the other party becomes jeopardized.

This work adds to the understanding of sponsor–OC relationships at a time when firms look for new sources of innovation in the digital sphere. Technology has made these two forms of organizing closer than ever. Our study contributes an original theorizing of how partnerships of different forms of organizing are maintained. This study reveals that the management of commercial–communal tensions between a sponsor and its OC comes from the negotiation that each side of the relationship enacts to legitimize its control over resource exchange. Tensions are thus critical for maintaining the relationship as they signify the ability of both parties to negotiate for their goals. Tensions also tell us that a sponsor can only control an OC indirectly by negotiating its way into legitimacy. Overpowering a partner, however, can bring an end to the tension and to the relationship.

Our theoretical contribution further offers a new angle for looking at how an OC reacts to a sponsor as an external actor. We explain how a sponsor's attempt to control an OC's activity is initiated through bringing in resources and negotiating their values with the OC. This suggests a new community-level explanation of motivational strategies and their influences on OCs. This perspective challenges a deterministic view of incentives and instead suggests that the effect of external gifts depends on how the OC's social practices adapt to the sponsor's status negotiation, which carries with it an understanding of the relative value of these incentives.

Tensions and Negotiations Between a Sponsor and Its Online Community

Sources of Tension in Sponsored Online Communities

Sponsored OCs are fundamentally different from autonomous ones. A sponsored OC is one where a corporate initiates and intervenes with the OC's activities (West and O'Mahony 2008). Open-source communities involving for-profit firms releasing code to the public and attracting volunteers to take on the task of software development are examples of sponsored OCs (West and O'Mahony 2005). The partnership between a sponsor and an OC involves mutual benefits. For the sponsor, the OC presents a source of knowledge and innovation that requires minimal coordination efforts and no hiring costs (Lu et al. 2015; Reischauer and Mair 2018). The sponsor in turn relieves the OC from tasks that require resource allocation such as furnishing the digital platform, securing sponsorship, and marketing the OC's product. This allows the OC to focus on knowledge work (West and O'Mahony 2005).

Having an external corporation as an active partner is a major difference between a sponsored and an autonomous OC (Reischauer and Mair 2018; West and O'Mahony 2008) and a source of challenges for sponsored OCs and their sponsors (Bonaccorsi and Rossi 2006). We detail two such challenges: (1) divergence in goals and motivations, and (2) divergence in organizing processes.

Divergence in Goals and Motivations

Scholarship on open-source communities has found that both OC members and firms have economic, social, and technological motivations (Bonaccorsi and Rossi 2006). However, while OC members' motivations may be both intrinsic and extrinsic, firms' motivations are mostly extrinsic and for profit (Bonaccorsi and Rossi 2006). With this heterogeneity, an agreement

becomes necessary for both sides to co-exist. For instance, a sponsor is expected to respect the norm of reciprocity (Shah 2006). Bonaccorsi and Rossi (2006, p. 61) explain that "the organization of Open Source production is robust to a variety of motivations and business motivations are likely to be able to harmonize with the community's ones as the phenomenon evolves from a social to an economic dimension." However, differing goals can jeopardize the sponsor–OC partnership (Spaeth et al. 2015).

A sponsor is faced with control choices along the continuum from pure bureaucratic control to complete freedom of the OC. Finding a middle ground can be a delicate matter. Too much control may risk the stagnation of communal activity and the exit of volunteers (Spaeth et al. 2015). Being too loose might risk having OC operations drift away from the sponsor's goal making the OC unproductive or even counterproductive (Dahlander and Magnusson 2005).

While bureaucratic control is not an option, firms can indirectly influence an OC's activity by creating additional motivations that aim to steer its activity toward the sponsor's goals (Shah 2006). OC participants are motivated by a mix of intrinsic and extrinsic motivations (Von Krogh et al. 2012; Wasko and Faraj 2000), with intrinsic motivation inducing long-term commitment (Spaeth et al. 2015). Intervening as an external party changes the mix of motivations for participating members. It crowds in certain motivations and crowds out others (Ostrom 1990). When external interventions are perceived by OC members as being controlling, intrinsic motivation is crowded out, which reduces knowledge production. However, when external interventions are perceived as being supportive, intrinsic motivation is crowded in (Ostrom 1990; Shah 2006).

Sponsors can intervene with incentives such as awarding status, seeding knowledge, providing career opportunities, or offering financial incentives. Evidence suggests that reputation and status

have a positive influence on participation (Lampel and Bhalla 2007). In many cases, the sponsor encodes status rewards into the design of the digital platform through badges or points, for example. It thus indirectly controls status and reputation (Levina and Arriaga 2014). We do not know, however, how a direct influence of status, through visible actions by the sponsor, affects an OC.

Scholarly work has also discussed financial rewards as an intervention. According to motivation crowding theory, increasing monetary incentives reduces intrinsic motivation and the supply of work (Frey and Jegen 2001). However, results in existing scholarship remain inconclusive about the effect of this type of intervention. For instance, several studies have shown that a large portion of the development done in open-source communities is the work of paid individuals (Hars and Ou 2002; Hertel et al. 2003). Other online sharing communities also have paid "ambassadors" whose job is to span boundaries and mediate the relationship between the sponsor and the OC (Reischauer and Mair 2018). This suggests that financial gifts can indeed crowd out some motivations and crowd in others (Frey and Jegen 2001). Alexy and Leitner (2011 attempt to resolve this discrepancy by suggesting that OC norms on payment determine the impact of financial rewards on motivation. Some communities reject financial incentives because they hold the view that monetizing code is unethical (Stallman 1999; Von Krogh et al. 2012).

Divergence in Organizing Processes

Divergent goals between a sponsor and an OC lead to different knowledge-creation models, which lead to another source of tension (Lee and Cole 2003). The firm-based model is founded on protecting intellectual property through the restriction of knowledge sharing, whereas the community-based model thrives on sharing and keeping knowledge public. Moreover, in a firm-

based model, membership is restricted and based on merit selection whereas membership in the community-based model is open with no constraint on scale. In addition, the firm-based model relies on hierarchies to coordinate work, whereas the community-based model relies on criticism and critical evaluation facilitated by a loose core-periphery structure. The two knowledge-creation models thus differ in terms of control, hierarchy, and intellectual property (Lee and Cole 2003).

A key point of difference between firms and communities is that firms rely on fixed hierarchical social structures that ensure coordination and the protection of intellectual property (Lee and Cole 2003). Formal hierarchy helps collections of people who share a common goal avoid uncertainty and chaos by providing social order through clear lines of direction and deference (Durkheim 2014; Magee and Galinsky 2008). An OC follows a different social structuring and knowledge integration process that relies on a dynamically changing core-periphery structure (Johnson et al. 2014; Lee and Cole 2003) created from peers criticizing each other's work and continuously modifying their status accordingly (Lee and Cole 2003). A core-periphery structure is also continually changing as a result of the active movement of resources among members, and this is what allows the OC to afford temporary and flexible memberships while still maintaining activity (Faraj et al. 2011). Thus, while some form of hierarchical structure exists in firms and OCs (being formal or emergent), it is the process by which this social structure is created and maintained that is different. A firm's structure has comparatively low flexibility as it is formalized through contracts. On the other hand, a community's structure is more continuously adaptive to meritocratic peer evaluations (O'Mahony and Ferraro 2007; Seidel and Stewart 2011). The flexibility and adaptability of an OC's social structure make it reactive to

external sponsor triggers. This makes investigating changes in social practices an ideal way to study the sponsor's interactions with the OC and the resulting external influences on the OC.

A social practice corresponds to "the recurrent structured activities that people perform to get their work done" (Levina and Orlikowski 2009, p. 673) . Looking at the sponsor–OC relationship through a social practice lens shows that a sponsor's intervention involves complex social changes that go beyond inciting psychological changes in individual OC members' motivations. Creating and maintaining a community involves the production of shared beliefs and a shared system of work. Therefore, individual motivations do not directly produce community-level output, but indicate the willingness of individuals to engage in the OC's social practices of knowledge production (Von Krogh et al. 2012). It is thus the social practice that makes the OC and aggregates individual participation into collective communal goals (Von Krogh et al. 2012). Consequently, when the sponsor attempts to alter OC members' motivations, its actions influence the overall community's social practices. Because top-down control contradicts an OC's organizing process (Lee and Cole 2003), tensions arise as the OC is likely to resist changing its practices to reflect the sponsor's goals. Nevertheless, a social practice perspective allows us to challenge the assumption that certain extrinsic incentives have deterministic consequences for an OC. It opens a door to examining how their influence depends on the social context in which they develop.

Distinction and Status Production as a Framework for Studying Sponsor–Community Tensions

Studying the social practices of sponsors and OCs allows us to examine the changes that both entities go through as they manage their relationship. A practice perspective is relational and

explains how agency and structure are mutually constitutive (Emirbayer 1997; Nicolini 2012). The practices that the sponsor enacts in the OC as well as those that the OC enacts influence the creation and recreation of the OC's social structure. By *social structure*, we mean the order that results from status differences among members (Levina and Arriaga 2014). Status is key to defining social structure because unevenly distributed resources become translated into a symbolic worth when a community accepts them as being valuable (Bourdieu 1993). Taking this approach, we adopt Bourdieu's practice theory for status distinction, as adapted by Levina and Arriaga (2014 to online user-generated content platforms. This theory provides us with a framework to make sense of sponsor–OC tensions and of their management.

Bourdieu's theory posits that when a group of agents takes on an agreed upon set of practices, a bounded social space is created that unifies them in terms of interests and power relations, i.e., a *field of practice* (Bourdieu and Wacquant 1992). Differences in practices thus create *boundaries* between social groups, although fields of practice can overlap (Bourdieu and Wacquant 1992). One becomes part of a field of practice when one shares with a group a social understanding of what resources are at stake and what goals are worth pursuing (Emirbayer and Johnson 2008). Within the boundaries of a field of practice, there are unique social agreements about which resources, or *capital* in Bourdieu's terminology, is valuable. This agreement is reflected in practices (Emirbayer and Johnson 2008). Capital can be *economic*, such as money or access to technology or tools *intellectual*, such as education, *social*, in the form of interpersonal relations, or *symbolic*, referring to the ability of an agent to classify other resources as valuable (Bourdieu 1993). Status differences arise because agents accumulate resources variably. This divides a social group into "haves" and "have-nots" (Levina and Vaast 2008, p. 308). "There is thus a sort of hermeneutic circle: in order to construct the field, one must identify the forms of specific

capital that operate within it, and to construct the forms of specific capital one must know the specific logic of the field." (Bourdieu and Wacquant 1992, p. 108).

Agents use status to gain positions of power. Power is the "asymmetric control over valued resources in social relations" (Magee and Galinsky 2008, p. 361) and it is gained when controlled resources are accepted within the field of practice as legitimate capital (Bourdieu 1989). High-status agents use capital to retain high positions of power for themselves, and power can aid agents in controlling more resources, thus increasing their status in return. In sum, status begets power and power begets status (Bourdieu and Wacquant 1992; Levina and Vaast 2008). Capital is both a "weapon" and a "stake" in the struggle to maintain and change the social structure (Emirbayer and Johnson 2008, p. 11).

OCs, as online fields of practice, rely on digital platforms to connect agents who enact practices of content production and consumption (Levina and Arriaga 2014). Producers present their resources through content production and strive for the recognition of consumers. Consumers, in turn, constantly evaluate content and give symbolic capital to the producers they value most (Levina and Arriaga 2014). Moreover, the platform design affects what resources agents import and export into or from the field of practice (e.g., what details an individual can portray), influences the form in which content is created (e.g., 250 words maximum in microblogging sites), and affords certain forms of content evaluation (e.g., number of views, liking, or down voting). This role that the digital platform plays reflects some ability on the part of platform designers to promote or demote content (Levina and Arriaga 2014).

In the context of sponsored OCs, we conceptualize the sponsor and the OC as two overlapping fields of practice with each field having its unique set of valuable resources and set of practices in action (Emirbayer and Johnson 2008). The overlap of the fields allows for common

understanding and facilitates collaboration between the sponsor and the OC (Cramton 2001; Levina and Vaast 2006). Nevertheless, differences can also be used as status makers that hinder collaboration by prioritizing some actors over others (Metiu 2006). These commonalities and differences are what we suggest cause tension between the sponsor and the OC. With this early theoretical perspective in place, we examine sponsor–OC interactions, tension creation and resolution, and the influence tension and resolution have on subsequent sponsor and OC activities.

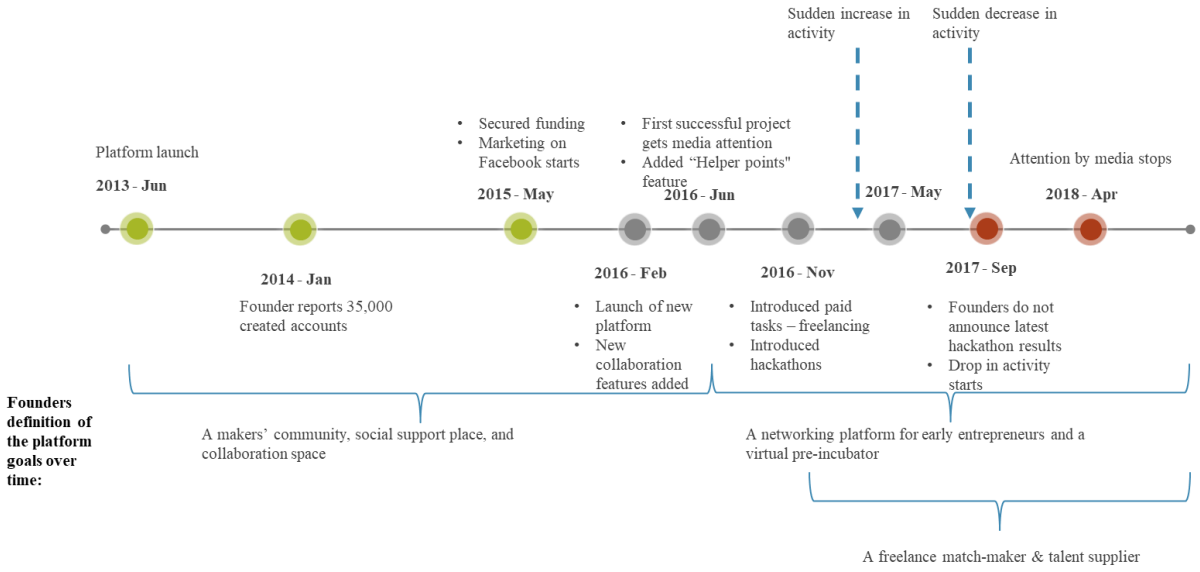
Research Methods

Research Context

Our empirical context is InnovStart, a sponsored online community designed as a virtual makerspace. InnovStart debuted in 2013 and became a place where engineers and technologists got social and knowledge support and collaborated with others on projects. When the number of registered members reached 35,000 in early 2014, the founders raised venture capital and registered it as an enterprise. This was followed with the launch of the second version of the platform, which included enhanced social features such as teams, peer rewards, private messaging, and project crowdfunding. The sponsor was active on the platform from the beginning, playing both moderator and technical hacker roles. By June 2016, the first successful project reached fruition. This project gained media attention and its owner, a volunteering member, raised more than US$10,000 to take it to market. The media attention InnovStart gained through this project was only the beginning. More newspaper articles, blog posts, and partnerships followed. In the wake of this success, the sponsor redefined the purpose of the OC as a collaborative environment for early entrepreneurs to form teams and generate prototypes.

In September 2016, with the number of experienced OC members growing, the sponsor decided to start extracting financial value from the OC by bringing in freelance jobs. Other than being a source of revenue, this move was intended to motivate members to compete for eligibility for freelance work by showing increased activity. The sponsor hosted hackathons and offered monetary prizes to winning OC members. Hackathons triggered more team formation and collaboration among competing teams, and many projects continued after the hackathons ended. The sponsor was satisfied with the financial revenue the pool of "power users" (InnovStart founder, interview) created for them. However, between April and September 2017, the OC experienced a steep surge in the number of members, followed by a permanent decline in activity. Figure 1 presents a timeline of events.

Figure 4. Chronological Overview of InnovStart Online Community



Data Collection

We observed this OC for some time in 2017 and started noticing that the total monthly activity was continuously dropping. This pushed us toward questioning why a sponsored OC that boasted a pool of super users, had moved toward breaking even as a business, and enjoyed media attention, would suddenly start losing members. In July 2019, we contacted the sponsor and negotiated access to the platform's backup. This included all public discussions on all projects and user profiles for the period from February 2016 to July 2019. We agreed to a confidentiality agreement with the sponsor and thus employ pseudonyms for all individuals and projects.

Having shadowed online discussions since 2017, we had become familiar with the functioning of the OC, with its active and occasional members, and with some of the challenges that the sponsor and members had voiced. In addition, we had conversations with two of the three co-founders and had informal discussions and interviews with several of the active members in 2017 and 2018. We had discussions over the platform's, Facebook's, and LinkedIn's private chat venues. We also conducted 22 semi-structured interviews averaging 70 minutes over the phone. We started with a list of all active members during the latest year but also considered other members who were active before and then decreased their activity or completely left the OC. Additionally, to build a more thorough understanding of the case, we collected all press articles that featured the OC between March 2013 and November 2018. We also followed the founders' postings and podcasts on entrepreneurial websites, blogs, and YouTube, and reviewed OC website pages such as introduction to users, frequently asked questions, and documents aimed at clients. All these data helped us craft the OC's story, understand its sponsor's goals, its platform's strategic and technological changes, and its members' actions and interactions. Table 1 summarizes our data.

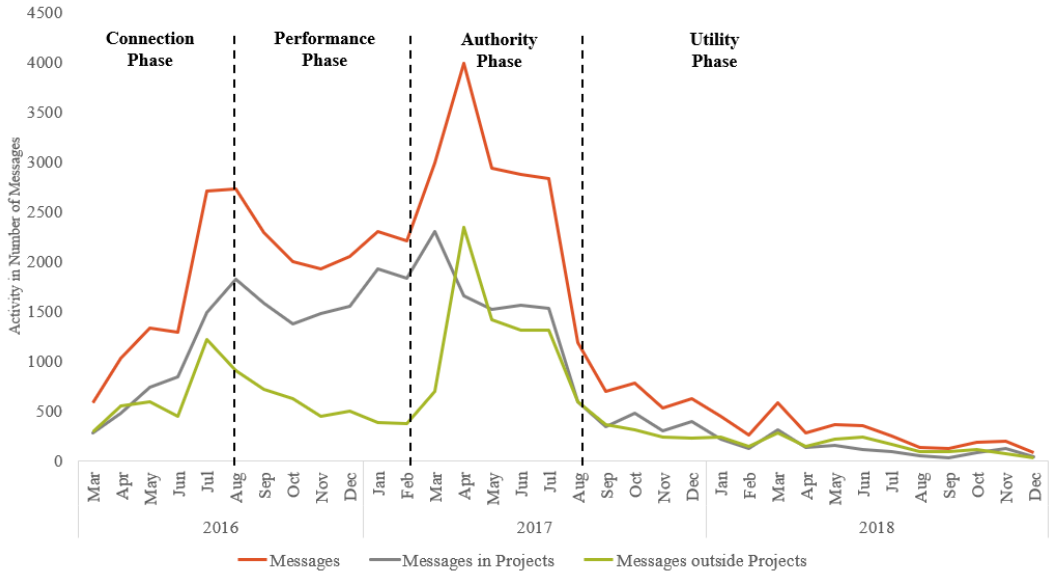
Table 7. Collected Data

Data Access Point	Data features	Use in Analysis
Main Data Source		
Projects and User profiles public discussions	27,878 project discussion messages and 17,897 messages on user profiles adding to 45,774 total messages. Mar 2016 – Jul 2019	Identification of community leaders, analysis of interactions and identification of practices
Secondary Data Sources		
Semi-structured interviews	2 interviews with founders and 20 interviews with active and non-active members. A total of 1551 mins and an average of 70 mins	Triangulation with discussion data
Press articles	19 articles from Mar 2013 to November 2018, a total of 40 pages single space	Identify major events in the community, highlighted projects and members, as well as the designed goal of the community by the founders
Community website	Intro page, FAQ, community blog, documents for clients	Better understand the platform "infrastructure" from the founders' (designers') point of view, as well as the designed goal of the community
Other web content	1-hour podcast interview with founder, website usability testing report	Have a better understanding of the chronology of events from the founders' point of view

Data Analysis

We analyze our data as an in-depth, qualitative, archival, longitudinal study (Hoegl et al. 2004; Shaikh and Vaast 2016). While we relied on Bourdieu's theoretical foundations of social distinction as essential concepts and relationships to make sense of the data and illuminate new trends and patterns (Charmaz 2014), the theorizing process relied closely on our data and data analyses (Kanika 2015; Shepherd and Sutcliffe 2011). We adopted temporal bracketing and grounded theory approaches (Langley 1999). To start, we divided our data into phases, basing the temporal cuts on significant changes in data trends and major events as illustrated in Figure 2. We analyzed data within each phase, and then comparatively across phases.

Figure 5. Phases Through the Life of InnovStart Online Community



Phase	Key Happenings
Connection [Feb 2016 – Aug 2016]	The community migrates to a new platform, new members enter, activity increases, and social structure emerges.
Performance [Sep 2016 – Mar 2017]	A group of very active members emerges that are referred to as "super users" by the sponsor. Platform develops to include more communication channels, new status marker, and monetary resources. Activity in project pages increase and gradually decreases in discussions outside projects.
Authority [Apr 2017 – Sep 2017]	InnovStart management runs an advertising campaign to get members for the new hackathon, adding many new members to the community. Sponsor focuses on the community's ability to produce entrepreneurs and start distributing funds for projects that demonstrate activity.
Utility [Oct 2017 – Jun 2019] *	Many members leave the community. Activity leaders continue to work on their projects but gradually lose audience.

The second step involved sampling the data for analysis. With respect to the sponsor, the CEO and CTO contributed 88% of activity volume, so we focused our analyses on their messages. As for the OC, we could not simply select the members with the largest number of messages because members engaged in different forms of activities, from creating and populating their own projects, participating in others' projects and off-project discussions, participating in hackathons, and serving as freelancers. Relying on the number of messages as a single sampling criterion would thus have been inaccurate for sampling the OC's core members. A member may have been very active on a single project, for example, adding many messages, but less active in other types of activities.

We relied on cluster analysis to deal with this issue. Cluster analysis is an analytical technique that groups objects into groups based on their most similar traits (Romesburg 2004). Cluster analysis thus helped us classify members in terms of their "profiles of activity" and select the members belonging to the profile that showed the highest volume and variety of activities as the core of the OC. The appendix includes details of the cluster analysis. Results from cluster analysis matched OC members' and founders' accounts of who "super users" were. They were the most active in terms of generating project ideas, keeping projects active, and joining discussions in others' projects. They were regarded as high-status members and were known as active knowledge experts. These were also members who won hackathons, gained status titles, and won freelance challenges. We sampled our data to include only the messages of the OC core according to our cluster analysis. Our theoretical sampling activity resulted in a total of 27,193 messages from the original 45,499 (60% of original data).

Moving to qualitative analysis, we followed the guidelines outlined by Corbin and Strauss (2014 for developing grounded theorizing. We conducted a within-temporal phase analysis first, and then a cross-temporal phase analysis. The goal of the analysis was to identify patterns of action that make up social practices. Our unit of analysis was therefore a single discursive action (i.e., a message). We first divided our actors into two groups: (1) sponsoring organization members, and (2) OC members. Both types of actors engaged in status negotiation actions that we identified through coding.

For each temporal phase, we divided the data into three sets based on the type of actor and the type of receiver of actions, as illustrated in Table 2. We then engaged in open coding of messages to identify how the sponsor used status negotiation to influence the OC, how OC

members interacted with the sponsor and with each other, and how the dynamics between the sponsor and the OC influenced status changes in the OC.

Table 8. Division of Data for Analysis Based on Actor and Receiver of Action

Actor of Action	Receiver of Action	
	Sponsor member	OC member
Sponsor member	X [not of interest]	Action set 1
OC member	Action set 2	Action set 3

While coding, we reviewed the threads that the individual messages were part of to understand the context, modified and combined open codes as needed, and then examined illustrative data extracts from each open code and grouped codes into abstract categories. Our analysis followed a detailed memo-writing exercise in which we reflected on how each code, representing a set of actions, served status negotiation processes. This exercise moved up in abstraction as we combined codes into categories. We further combined categories into thematic groups based on an analytical logic that relates categories to one another. We went back to scholarship several times during this abstraction process to identify theoretical concepts and dimensions emerging from the data. Theoretical insights included, for instance, the relationship between status and power, resources and power, and the relational aspect of status. We kept our research question in mind as we developed the memos, investigating how status was negotiated among different actors and how the different status negotiation practices interacted with each other and created tension (Suddaby 2006). The first author stayed "native" as they remained close to the collected data and actively observed the OC during its days of activity. This allowed the second author to view the codes developed by the first author with a critical eye. After every section of coding and memo-writing by the field researcher, the two authors would come together for a critical discussion of the emergent concepts and theoretical ideas (Glaser and Strauss 1967). These

discussions resulted in revised coding and theoretical arguments and directed our subsequent analysis.

Once we had identified the major practices that made up each of the three status negotiation processes, we compared these processes in order to identify contradicting practices that created tension. Next, we engaged in cross-temporal phase analysis in which we compared the goals of the sponsor and the OC as well as digital platform feature changes and practices in order to understand how tensions were resolved through changes in social practices. We compared thematic groups across phases, which involved writing memos, going back to categories that make up the thematic groups, and reviewing literature. This helped us elaborate our understanding of the results at the theoretical level, leading to the findings, which we present next.

Findings

We take a social distinction approach to make sense of the social dynamics between a sponsor and its OC. By chronologically detailing the four phases that the sponsor and OC went through, we highlight three status negotiation processes that created communal-commercial tensions. We analyze how tension resolution led to subsequent process changes and influenced the goals and activities of the sponsor and the OC. We label the three processes as: sponsor-to-community status negotiation, community-to-sponsor status negotiation, and within-community status negotiation. *Sponsor-to-community status negotiation* refers to the group of practices that the sponsor enacts in interactions with the OC to influence status differences among OC members, thus negotiating the sponsor's status with respect to the OC. *Community-to-sponsor status negotiation* refers to the group of practices that the OC enacts in interactions with the sponsor to negotiate resource acceptance and rejection from the sponsor, thus defining the OC's status with

respect to the sponsor. Finally, *within-community status negotiation* designates practices that are enacted among OC members and that continuously structure and restructure the OC according to internal status differences. Here we detail how these three processes worked in each phase, how they interacted, caused tension, and influenced the ability of the sponsor and the OC to remain in partnership and maintain activity. Tables 3, 4, and 5 provide additional evidence of the three status negotiation processes.

Phase 1: Connection (February 2016 – August 2016)

Sponsor-to-Community Status Negotiation

The sponsor's ambition for InnovStart was for it to be a social platform and virtual makerspace that nurtured open collaboration and innovation. This idea inspired the initial design of the OC platform. The goal of the sponsor was to trigger collaborative user activity and enrich the platform with members and content. This goal would be realized when users created projects, contributed to the development of projects by initiating and joining discussions on multiple projects and engaging in socializing and leadership activities that attracted collaborating teammates. Statements by a co-founder and the CEO illustrate this vision:

> [InnovStart] is a way to initially connect people so that we can progress together.
>
> CEO-founder, interview

> One of the greatest pleasures we have here at [InnovStart] is seeing the extraordinary projects submitted by our users from the far corners of the globe. Some of the ideas are so visionary they make some of Elon Musk's ideas look tame, but they all share one common aspect: a passionate, highly skilled thinker who seeks feedback and help from peers to advance their concept.
>
> CEO, May 22, 2016

The sponsor was working to gain legitimacy with the OC by taking a supportive role in moderating and managing activity, actively contributing knowledge, and collaborating. The founders presented themselves as a sponsoring organization with a clear division of roles and

with titles such as CEO, CTO, and Lead Designer. This highlighted their ownership of the digital platform and control over it. The founders promoted their continuous support of the OC through platform maintenance, technical mentorship, and leadership guidance. They also moderated the platform as they guided members and ensured correct usage and proper conduct. They further presented themselves as fellow hackers by highlighting their mechanical engineering and software skills and engaging in technical discussions, as well as by starting projects or joining member projects. By being part of the OC, the founders had the ambition of developing strong relationships with OC members:

[S.S.] 2016-07-01	Hello @[CEO] There is a robot developed by Boston Dynamics called RHex. I have heard the design involves only motor control and not much complex programming. It's a very sturdy design suited for rough terrain. Is it possible that we can build it from scratch? I do not know much of mechanical design. Can you help me with this?
CEO	@[S.S.] I can certainly help with Mechanical Design. Do you want to post a Project that I can join? If you do this, we can lay out the steps we need to get it moving forward, and I can contribute on the mechanical design end. Let me know.

The sponsor used its position and resources to influence the status of select members in the OC. By acting to raise the status of members whose actions aligned with the sponsor's goal, the sponsor was also acting to steer the OC toward its goal, which was to trigger activity in the platform and to populate it with content. The sponsor engaged in two practices to achieve this: *granting members access to increased resources* and *highlighting the value of members' resources.* The practice of granting members access to increased resources, in the form of knowledge and social capital, publicly enhanced the status of specific members over the rest of the OC. Members who showed desired activity received privileged titles such as "community mentor" or "star member." The sponsor, as the owner of the digital platform, created discussions on community-wide matters and called for feedback from specific members only through tagging, using the "@" character. While discussions were public and direct tagging did not stop

other OC members from participating, these actions made visible the direct connection and trust the sponsor had for some members. Some members were even allowed access to platform code files when their knowledge helped solve technical issues. All of this was done publicly, allowing the OC to witness the privilege some members received through their alignment with the sponsor:

CIO 2016-07-14	@[N.T.] we are currently using Fabric but might switch to Firebase as we already use Firebase Cloud Messaging and any opportunity to remove a dependency we'll take. The hard part is reproducing the issues users are having, I can't reproduce on any virtual devices, even going back to really old OS versions.
[N.T.]	Do you have any relevant crash report for that, I may be able to help…
CIO	Invited you as a teammate to your @live.com email. Any help would be awesome!

Similarly, the practice of *highlighting the value of members' resources* drew the OC's attention toward specific members who displayed favorable characteristics according to the sponsor. In doing so, the sponsor not only attempted to increase the status of certain members, but also motivated the rest of the OC to work toward such recognition. The sponsor dedicated "Hall of fame" threads to highlighting the progress and achievements of selected members and selectively invited members to give technical opinions or join projects. The sponsor also chose to act on specific projects over others. The founders were very active with the OC and their public activity received attention. This made the members they interacted with gain attention as well:

> What you can see from perusing this project is that [S.T.] has taken his role as project leader quite seriously, for which we commend him. By regularly providing direction to his teammates as to what he needs and wants from them, and by acknowledging people who have helped him (both teammates and [InnovStart] community members who have weighed in with questions and suggestions), he is ensuring that his project remains vibrant. […]
> Remember, you don't need to start a project to participate in the [InnovStart] community; you don't even need to join one. You can provide mentorship, ask questions or inspire other people, and in the process gain respect from other users—which are formally recognized as upvotes, which contributes to your [InnovStart] credentials, and online reputation. Check it out; you have nothing to lose, a lot to gain, and you are guaranteed to make some highly motivated and interesting new contacts :)
>
> CEO, May 22, 2016

These practices acted to influence the status differences among OC members. They served to raise the legitimacy of the sponsor as a judge of value and a provider of valuable resources. The resources that the sponsor brought into the OC, such as technical knowledge and ownership of the platform's code, gave it status once the OC accepted them as legitimately important resources. Legitimacy then aided the sponsor in steering the OC toward achieving the sponsor's goals by unequally distributing the resources it had among OC members. While the OC enacted internal practices that created and modified its status structure, the sponsor-to-community status negotiation process allowed the sponsor to maintain some control over the OC. It was crucial for the sponsor to maintain the OC's reliance on its resources to encourage the OC to enact practices that were consistent with the sponsor's needs.

Community-to-Sponsor Status Negotiation

Members joined the OC for a variety of reasons, including social support, networking, learning, career development, helping others, and spreading knowledge. While different members had diverse intrinsic and extrinsic motivations, social practices pointed toward a process of status negotiation on the part of the OC toward the sponsor. Our analysis uncovered three practices whereby OC members negotiated status with the sponsor: negotiating control and influence over the platform, accepting sponsor legitimacy, and connecting with the sponsor and presenting resources.

The OC engaged in *negotiating control and influence over the platform* with the sponsor. While the sponsor owned the digital platform's source code and controlled its development, the OC populated it and could use or reject its features. The power that the OC exerted over the sponsor reduced the sponsor's control and helped the OC ask for the resources it needed. For instance, OC members freely shared platform-enhancement suggestions, expressed their willingness to be

involved in platform work and lead initiatives, reported bugs and shortcomings, and, at times, expressed their frustration. We also noted that some OC members indirectly threatened to replace the discussion space with alternative channels such as Facebook groups because the platform's live chat and private messaging system lacked certain features. The sponsor was thus actively developing the platform to secure its user base:

CEO 2016-09-28	please let us know what you think we need to add to keep up with the FB [Facebook] function
Member [A.L]	I think that FB is so easy to navigate because everyone is used to using it now. i.e. Notifications take you directly to the post/comment rather than having to scroll through etc. I have a question though, why do I go through all those pages of setting up an account on here even though it's complete? The only part not filled in is the 'About Me' section which it won't let my type anything into. I'm signed on here using my FB account.

The OC also enacted practices of *accepting sponsor legitimacy* through actions such as welcoming sponsor's advice, thanking sponsors for providing the platform, following suggested sponsor regulations, and respecting the founders as leaders. As it accepted the sponsor's legitimacy, the OC tapped into the sponsor's knowledge, as well as its economic benefits and opportunities. This facilitated the second practice, of *connecting with the sponsor and presenting resources*. Accepting the importance of the sponsor's resources, members attempted to increase their status by interacting more with the sponsor. They did so through active involvement in sponsor-owned or sponsor-joined projects. Members joined these projects, took leader and coordinator roles in them, and engaged in knowledge discussions and work. Through such actions, OC members demonstrated to the sponsor their skills, passion, and ability to take initiatives, as seen in the following message:

Hye [Hey], just read you[r] project, I really wanna be a part of this project, I am more experienced in Android Application development but can surely help out in Arduino with ease.
For the current posted code, I believe you are not receiving the expected data from you BT chip, print it console on console to see what you are receiving. For hardware, check the pin output using some DMM perhaps.

Member in sponsor project, March 3, 2016

We repeatedly witnessed members promising activity with a suggested time deadline or requesting tasks with a sense of urgency, which suggested a competition for connection with and attention from the sponsor:

Let me design reel mechanism only which can be integrated on this. I will upload it asap.

Member on sponsor project, August 2, 2016

Claiming status from the sponsor increased the status of the sponsor, which shaped the sponsor-to-community status negotiation process. Moreover, founders and employees were a minority (5 people) compared to the number of members in the OC. This created a scarcity of attention and connection possibilities that further triggered competition among OC members for connections with and resources from the sponsor.

Within-Community Status Negotiation

The OC also enacted internal practices that distributed status among its members. We identified three such practices: maintaining order, creating and maintaining connections, and exchanging resources. The practice of maintaining order included the actions of governing and leading the OC, resolving conflict, guiding members, and encouraging activity, as well as providing expert

advice to members in different projects, questioning and triggering activity, and offering to help as mentors and guides. Members actively encouraged other members:

> Please guys not only join this project but also contribute to it. If you want to teach something or just wanna learn new things, you have to be active participant.
>
> Member guiding others into appropriate action, July 28, 2016

[H.M.] 2016-07-30	Hello, it is my first contribution, I am English to Arabic technical translator and would like to take the most benefit from this wonderful site and learn the new techniques in engineering and automotive industry to deliver accurate translation.
[K.B.] Guiding fellow members	@[H.M.] welcome to [InnovStart], yes, you can learn a lot of things on this site, you look at something thing that is interesting to you, take it and start digging into it in any possible way till you have got the full concept and understood the whole thing. Also see to it that there is some benefit for the society in general and make life more meaningful. All the best to you!!!

By taking a leadership role to ensure the well-being of the OC, these members claimed respect and were acknowledged and thanked. Some members even addressed others as "*sir*":

> ok thank you sir. I will try my level best to help you.
>
> Response to a member's advice, July 22, 2016

Practices of creating and maintaining connections as well as exchanging resources were linked, as members exchanged resources through the connections that they established with one another. The digital platform offered no features for members to materialize their connections except by continuously participating in projects and discussions. Members acted on attracting audiences and collaborators to their projects by presenting the resources they claimed to have, such as knowledge, professional affiliation, and external connections, and by sharing details about their projects. Moreover, as activity in projects took on a power-law distribution, members targeted projects that were considered "resource hubs." Status followed the direction of higher resources. For instance, when a project team owned a project of high activity, joining the project was guarded. A message sent by a project leader suggests that members had to prove their usefulness before being accepted as team members:

> Hello [R.A.], Many thank[s] for your interest shown in our project of Solid waste management.
> I would like to know what makes you interested to join our project?
> How would you be able to contribute in the development of the project?"
>
> Project leader asking member what is brought into the project, July 29, 2016

Alternatively, when a project owner led a low-traffic project, other members were invited and requested to join and advise. We saw indications of such status-knowledge exchange when a member expressed gratefulness for being accepted into a project or invited others to join a project or become leaders in it:

> My idea simply is to generate hydrogen and oxygen from water and make them as fuel other than gasoline the problem is that I have no experience in engineering and I need to gather a team to share my vision, can you help?
>
> Project leader inviting a member to join, July 5, 2016

For a project team, losing members reduced the value of the project and the status of its team members. Our data reveal that members sometimes acted to maintain connection even if they had to go beyond the sponsor's platform. Members shifted their communication to WhatsApp or Facebook when they deemed that platform features constrained communication:

[B.S.] 2016-08-10	please someone create a page on Facebook for this project… This site is not working properly
[F.A.]	I will make group on fb [Facebook]. but still we will be in contact here.
[B.S.]	Ok make it now and we will discuss over project on Facebook

These three practices, in sum, raised the status of OC members who maintained order, connections, and facilitated resource exchange.

Phase 2: Performance (September 2016 – March 2017)

Sponsor-to-Community Status Negotiation

This phase saw an influx in the number of new members and a continuous increase in activity. One project emerged as a success story, with the project creator getting media coverage and

funding to scale up his invention. Seeing this success, the sponsor looked for ways to gain further from the pool of experts that the OC hosted and to push collaborators to a higher performance level in terms of project development and completion. Gaining financial income and improving collaboration on and completion of projects thus became the sponsor's new goals:

> [InnovStart], a new online workspace for Engineers & Entrepreneurs – is now rapidly growing […] – [It] has taken on the "learn and earn" motto by enabling top users to tackle freelance work on the platform, after users show off their abilities in passion projects as they collaboratively contribute to everything from […] robots to android apps on the platform.
>
> CEO: January 26, 2017

The sponsor used the status that it gained in the first phase to enhance its ability to influence the OC towards its goals. This was realized by adding more resources for members' status differentiation. These resources included financial funds, new features such as the "contribution meter," and recommendation letters written from the sponsor's CEO to members. The sponsor continued enacting the two practices of *highlighting the value of members' resources* and of *granting members access to increased resources,* but it also engaged in a third practice, that of *actively directing members toward the sponsor's goals.*

The sponsor continued to increase the publicity and resources of selected members. It also introduced "gifts" in the form of "contribution" points or money. While the sponsor and OC members could give gifts, only the sponsor could gift money. Also, only the sponsor and select OC members knew how to award contribution points. Apart from the shifts in psychological motivations members might have experienced, these motivational resources aimed at influencing community-level output. Money in this phase was used in three forms. In the first form, the sponsor pushed members to work on selected projects by initiating paid tasks. These paid tasks were called "gigs." The sponsor as well as the project leader were responsible for selecting a

skilled enough member to take a gig. The second form of payment was freelance jobs that the sponsor received from external clients or created internally. Here, again, chosen members were either directly contacted or were asked to apply for a chance to be selected. The third form of payment was given to promising projects as sponsorship for hardware parts. Paid tasks became a measure of the quality of a member's knowledge and experience, as a privilege for the members with the best knowledge or highest-value projects. Only top members achieved the official objective of the platform, which was "coupling passion-based and commercially based collaboration" (CEO, December 5, 2016). The financial payments were relatively low, but paid tasks had a large symbolic value. As the sponsor's CTO told us,

> "I think the competition and the fact that you're showcasing what you do in public makes us get a 10x return on the dollar investment. Whereas these private freelance jobs are probably, and this is just me guessing, you need 10 times the amount of money to get people to do a similar amount of work. […] I definitely think that the combination has a multiplier on the productivity output.
>
> CTO – interview

Finally, the sponsor practiced *actively directing members toward the sponsor's goals* by increasing its commercializing mentorship of top projects and increasing control over their activities. For instance, the sponsor encouraged members to write business plans:

> # Mentoring - @[J.R.] if you really want to be successful with this and get some funding, we need to drill down some of the business elements of this Project. [link] - Fill this out. You can submit it back to me here or in chat.
>
> CEO on a member's project: November 16, 2016

This was the first step in the sponsor's shift from hacking, collaboration, and learning into entrepreneurship as an overall purpose. Discussion threads were also modified so that "tasks" could be created and assigned to specific members. Further, the sponsor at times went above project leaders' authority and took the initiative to coordinate work with gigs, and asked members to do certain activities in return for sponsoring electronic parts and tools:

As the official Mentor for this project, I will invest $20 in one new CAD design. I would like to see a CAD model that can actually animate the wheels and band on the Wall E.

CEO taking the lead on a member's project, November 7, 2016

Community-to-Sponsor Status Negotiation

In the performance phase, OC members maintained their practices of status negotiation, namely, negotiating control and influence over the platform, connecting with the sponsor and presenting resources, and accepting sponsor legitimacy. A fourth practice also emerged: accepting the superiority of the sponsor. This practice was enacted in the actions of members that were related to gift-paid knowledge work and commercialization of projects. For the knowledge work that involved gifts (in money, points, or other material rewards), OC members followed the sponsor's guidelines and work structure and the relationship moved toward greater sponsor control. The sponsor decided who took the lead in paid tasks and how tasks were divided. Moreover, since payment was set at the beginning of a task, teams were unable to divide and rearrange tasks after they were assigned. This removed the power of coordination from the OC. Projects also moved in status from being either sponsored or unsponsored. Other than giving the sponsor a superior position with gifts, the OC also moved to an inferior position with regard to some forms of knowledge. As most members were technologists, moving from hacking to entrepreneurship meant the sponsor had superior knowledge. Members accepted the sponsor's managerial tone to teach them about entrepreneurship, as seen here:

For [project1] I was thinking we could sell it like a DIY kit for people so that then can buy it and easily assemble at home. We can provide them all the parts required with a instruction manual and an app to control the bot. Will be useful for learning raspberry, delivering stuff in workplace and in-home surveillance but have to focus more in [project2] for now.
Currently working redesigning the body. The previous one was made with old CD drive casing; it can not be used now. @[CEO] @[CTO] what do you guys think? let me know

Project leader, February 11, 2017

In this phase, the practices that aimed to raise "top members" over others also reduced the status of those members with respect to the sponsor. Accepting the higher value of the sponsor's resources shifted the sponsor–OC relationship into a unidirectional awarder-awardee relationship. An increase in the status of founders over OC members also legitimated the sponsor's increased control and power.

Within-Community Status Negotiation

The OC continued to enact the three practices of maintaining order, creating and maintaining connections, and exchanging resources—but also went through changes. For instance, members started posting threads requested by the sponsor. These posts included showcasing completed work, success stories, guidelines for the OC on how to succeed in the platform, and technical or business tutorials. Project owners also changed how they coordinated projects. With the sponsor's introduction of gifts, members started "hiring" fellow members to complete tasks and either paid collaborators with contribution points or with the sponsor's funds:

> I need to find a freelancer to build this application. We are being aided by the [InnovStart] Innovator Fund, and my own modest investment. This gig will focus on setting out a project plan. The freelancer will work with me to determine next steps. The deliverable will be an official public posting on this page (as a milestone) as what the project (gig) plan will be.
>
> Project leader: March 13, 2017

Finally, as the platform design started to include multiple interaction options (e.g., private chats, team private chats, and co-leadership), new acts of reinforcing connection emerged, such as when members paid tribute to each other or established co-leadership on projects.

Furthermore, a fourth practice emerged that did not seem to conform with the relational logic of status differentiation, that of *protecting resources.* This practice was enacted when members restricted the reuse, modification, or combination of knowledge work. When some members

moved their projects in a commercial direction, sharing of knowledge moved from sharing artifacts to only answering questions and providing lessons learned, as this message indicates:

> Sorry @[J.S.] this project is commercial; I'll not be able to provide complete code. but can help you with different steps or control codes.
>
> Response to fellow member requesting code, March 2, 2017

In other cases, artifacts were shared, but project boundaries for collaborators became stricter. Finally, artifacts were sometimes shared for the OC's use, but members refused to alter the final product:

> @[J.R.] @[A.V.] You may use @[R.D.]'s and my package from PyPI, as is. But if you're going to reverse engineer it, we request you to cease doing that and stop using our library.
>
> Member, March 23, 2017

It is possible that high status allowed some members to continue receiving resources from the OC while refraining from reciprocating to the same degree. It is also possible that some members did not see within-community status as valuable, especially compared to status gained from the sponsor. In any case, the practice of protecting resources did not involve negotiating for OC status or community goals.

Phase 3: Authority (April 2017 – September 2017)

Sponsor-to-Community Status Negotiation

Witnessing the OC's acceptance of the changes the sponsor introduced in terms of incentives and working conditions, the sponsor secured a constant flow of freelance work and saw multiple projects move through task completion. This motivated the sponsor to move further toward increasing its income through freelance work, increasing the movement of projects into ventures, and growing the OC user base that it could tap into:

Here are some fields we are most interested in: #Drones #RaspberryPi #Arduino #Entrepreneurship #IoT

CEO, May 5, 2017

We are developing a new program that will incentivize our most important/active users to help recruit new, high quality, users, to the [InnovStart] Community.

CEO, July 19, 2017

In the authority phase, the sponsor's priorities changed. The sponsor insisted on growing the OC over strengthening the ties of existing members. It also focused on project completion and project leaders over nurturing active collaborations and project teams. The sponsor further emphasized the successful completion of freelance jobs that required individual rather than communal effort. In other words, the authority the sponsor claimed was aimed at "employing" OC members to realize its goals. The sponsor continued to enact the practices of *highlighting the value of members' resources* and *granting members access to increased resources.* It also enacted the practice of *claiming authority over community activity.*

While the practice of highlighting the value of members' resources remained the same, the practice of granting members access to increased resources now involved rewarding members for actions that did not require collaboration. Project leaders were awarded funds whether project discussion spaces presented collaboration or individuals reported completed work, as in this example of a challenge that did not require collaboration:

This Challenge is simple—submit the single most impressive thing you've ever done in the field of Mechanical Engineering and Mechatronics. And make sure it's listed properly in the experience section of your [InnovStart] Profile.

CEO, June 28, 2017

Moreover, to grow the OC, the sponsor created a member recruitment competition giving winners access to a "secret chat group with only top users." Members were also rewarded for publishing personal stories and showing off their skills. Furthermore, this phase was marked by the practice of *claiming authority over community activity*. The sponsor actively guided members

into engagement rules and managed members appointed to gigs as hires by directing their work on projects. The sponsor's claim of authority was evident in the use of expressions such as "I need to see …," "you need to …," and "this thread must be respected …" The sponsor engaged with the OC as a superior actor and used a managerial tone with members. The sponsor guided OC members into the "proper" way of using the platform and put in place strict rules for being awarded with resources such as funds, recommendation letters, contribution points, or connections:

> Do you have any new updates to your deck. You NEED this @[N.A.]. Can we get an updated deck? Let's get some improvements so we can give feedback this week even if it's only a few updates. Please post link to pdf.
>
> CEO guiding member in project, July 11, 2017

Community-to-Sponsor Status Negotiation

In the authority phase, OC members continued to claim status through connecting with the sponsor and presenting their resources, accepting sponsor legitimacy, and negotiating control and influence over the platform. Moreover, two new contradictory practices emerged: accepting sponsor authority and creating distance from the sponsor. This hinted at the beginning of a divergence within the OC around the social understanding of which resources were important. Leaning toward accepting the sponsor's authority, OC members acted in line with the sponsor's directives to gain resources. We identified actions such as following sponsor's commercialization strategies for projects, providing required project details for funding, updating the sponsor with project progress, and starting discussion threads of topics chosen by the sponsor. For instance, members posted many messages with the hashtags "#Hello" and "#Fail" in compliance with similarly named sponsor initiatives to recruit new members and share

personal failure and success stories. Moreover, members expressed thankfulness to the sponsor for providing InnovStart, which suggested the sponsor's ownership of the community:

Thanks for giving us this wonderful community, [CEO].

Member, May 26, 2017

Nevertheless, during this phase, the OC also started *creating distance from the sponsor.* This practice was another form of negotiating status. We saw this practice as a rejection of the superior status of the sponsor enacted through a weakening of the sponsor–OC relationship. For instance, some members mentioned that they were busy with other commitments when the sponsor requested work or updates on projects:

[Lead Designer] 2017-05-15	Could we please get a specification of all current components? I think it would be helpful for everyone if we could all get on the same page on what parts are currently being used so people can make suggestions on components which might produce better results. Also, I'm not sure if you have a scale, but you're going to need one for this project for sure. It would be helpful if the components list had associated weights, and total quad weight. This way you could start getting an idea of weight vs thrust and how that impacts noise
[A.K.]	thanks for time to time guidance but many of us [are] having exams too so busy in that also.@[Lead Designer]

Within-Community Status Negotiation

While members continued enacting practices of maintaining order, creating and maintaining connection, and exchanging resources in the authority phase, these practices were not enacted by all members harmoniously. Instead, we saw fewer actions that constituted the three initial practices and more actions that enacted the fourth practice of protecting resources, which defied the OC's activities of sharing, collaboration, openness, and the maintenance of connection.

Individual work started replacing collaborative work and hierarchical coordination replacing team coordination. The commercialization of projects hindered members from contributing, as intellectual property issues started appearing. Moreover, members started separating work from

discursive action when they used discussion boards to report completed work instead of engaging in active knowledge work with others. Members could have turned to individual work because there were not enough collaborators available, or they could have tried to gain status while being protective of their knowledge:

I'm sorry for the delay in updating. I'll soon post a tutorial about the complete project. The code of this project with the published progress has already been made freely available to those who wish to replicate this project.

Member, April 21, 2017

Hierarchical coordination also replaced team coordination in many projects. Although the sponsor built the platform with a crowdfunding functionality open to all, the sponsor was the only active funder. Thus, when members expected payment in exchange for their collaboration on a project, it was the sponsor who made the decision about whether the work went forward or not. Consequently, the sponsor turned into a decision maker:

[R.M.]	If @[CEO] funds and markets, I can provide more solution and can work as an official gig. An idea combined with an implementation makes a viable product 😀
[J.R.]	@[C.M.] @[H.A.] What do you guys think of this?
[J.R.]	Yes, that sounds great. I'll talk to @[CEO] about it

Members also externalized modular tasks into the OC, rewarded task takers, and then integrated that part of the work into the overall project away from the OC. In this, they also acted as an employer of talent and engaged in transaction rather than collaboration.

[S.M] 2017-08-07	You are already assigned to the task. Please make sure it gets completed in a month.

Finally, we witnessed members discussing opportunities in other platforms or expressing their unavailability when prompted about their projects. Some, for instance, stated that their projects were already completed or had been taken care of outside of the OC. A project easily left the OC when its resources were not embedded in the social mesh of the community. Projects no longer

represented “resource hubs” but became repositories of individual members’ codified knowledge.

Phase 4: Utility (October 2017 – June 2019)

Sponsor-to-Community Status Negotiation

Funds that were put in transforming projects into possible ventures helped InnovStart market itself as an online pre-incubator. This attracted organizations interested in tapping into these entrepreneurial seeds. The sponsor’s goals in this phase shifted toward providing entrepreneurial services to clients, maturing projects into ventures, and completing freelance jobs.

> Our priority in [InnovStart] is to help Entrepreneurs build their products in a more affordable and intelligent fashion. [InnovStart] believes growing a healthy community of Entrepreneurs who can help one another in a public environment is critical to this mission. We can help grow our community by connecting all the dots together. Every time you make a valuable contribution to someone in the Community, it will earn you credit hiring Verified Freelance Talent on [InnovStart].
>
> CEO, March 12, 2018

In this phase, practices that aimed at modifying the status of members with the OC were no longer enacted. Instead, two other practices emerged: *claiming authority over community activity* and *focusing on individuals.* The sponsor addressed clients instead of OC members in the public discussion pages while referring to the OC as a “*talent pool*.” The sponsor claimed superiority while degrading the OC from a partner to a group of isolated members who were either potential clients or employees. Since most OC members had a technical background, they were left with inferior entrepreneurial knowledge and faced difficulties when the sponsor stopped the flow of resources, such as funds, titles, and connections:

> Yea but and please let me state again—my tone—because it helps entrepreneurs the fastest— is to take the Don’t F Up Your Startup mentality...and I am not saying I am a genius however you are basically proposing to string a bunch of WIFI routers/modems

together in a certain structure and feed low-cost data to people in African villages. You would buy that data "wholesale from an ISV." […]
Explain to me how this is not just a cool hustle, but a scalable business? […]
You need competitive advantage to have an investable business... where is that competitive advantage? […]
(*I am not discouraging you* either I just want to hear your answers first before I give guidance on how to find funding and push this forward.)"

CEO to a project owner, August 1, 2018 (emphasis added)

Community-to-Sponsor Status Negotiation

This process halted in this phase. The sponsor claimed a superior status over the OC and stopped influencing status changes within the OC. In turn, the OC stopped claiming status from the sponsor. This also suggests a rejection of the sponsor's claimed "ownership" of the OC. This announced the dissolution of the sponsor–community relationship.

Within-Community Status Negotiation

The OC dismantled its social structure in this phase. First, maintaining order was no longer practiced. Second, we found evidence of a mix of members who looked for collaboration and others who exported resources from the OC for no return, as seen in these two examples:

Looking for skilled teammates: So, my initial team is no longer seems active on this project, I am looking for teammates with skills of mechanical hardware design and electronics design. It's an open source project, so I'll not be choosy in picking up teammates, feel free to contribute.

Project leader looking for collaborators, October 12, 2017

[J.R.] 2018-04-29	Enclosure design: Hi [R.A.], Have you thought of a enclosure design for this?
[R.A.]	Not yet [J.R.]. Will need one. Any suggestions on how we should fit this in?
[J.R.]	yeah, I could design something for you
[R.A.]	[J.R.], send me your email ID.

(Project leader asking for work to be done in private.)

Members continued to offer their knowledge publicly. They shared opinions or provided access to their open-source work but were reserved with regard to working collaboratively. Casual

discussions remained within a very tight network consisting solely of active core members. Work completed by OC members was therefore done mostly through transactions. Eventually, many members left the OC.

Discussion

This study offers important contributions associated with the relational dynamics between sponsors and OCs. Previous work noted the challenge of managing and maintaining sponsored OCs (O'Mahony and Lakhani 2011). However, existing scholarship has so far not delved into the causes and dynamics of this unique organizational partnership that has become increasingly important as work moves to digital platforms and beyond the boundaries of formal organizations. Tackling this issue, we relied on a practice-based social distinction framework to illuminate the processes through which tensions associated with the sponsor–OC relationship appear and shift.

Our study explains how these tensions arise, how they get resolved, and how the fate of the sponsor and the OC changes as the tensions are resolved in different ways. In doing this, we provide a new theoretical understanding of the dynamics of sponsor–OC relationships.

Our study also adds a critical understanding of how OCs react to external pressures. While studying OCs in isolation is useful for understanding their internal processes, it is also crucial to acknowledge that, like all organizations, OCs do not exist in isolation. OCs affect and are affected by other collectives around them (O'Mahony and Lakhani 2011). By employing a social distinction lens, we demonstrate how OCs react and adapt to, as well as resist, external interventions by adjusting their social practices. We present within-community status negotiation practices as a maintenance mechanism of the OC's internal order, and community-to-sponsor status negotiation practices as a mechanism to maintain a connection with the sponsor for

Table 9. Data Supporting Analyses of Sponsor-to-community Status Negotiation practices

Phase	Granting members access to increased resources	Highlighting the value of members' resources
Connection	"@[S.B.] – awarding you community mentor status. Hoping you can help support other Project Leaders like @[M.A.]." [CEO: 2016-07-27] "So today, I'm inviting everybody who learns about this story, everybody who reads this blog, to contribute their support, whether its sharing through social media, opening up contacts in humanitarian organizations who can become buyers of this product as part of their missions, or simply going to IndieGoGo and donating what they can. Help out on @[M.D.]'s campaign everyone -- we've got it up to 710 dollars so far!" [CEO: 2016-08-10] "If we can improve [InnovStart] Discussions, and add new tools, or new capabilities to discussions, e.g., file uploads, new formatting capabilities, -- if we could do anything -- what would you be looking for? @[R.B.] @[K.R.] @[M.M.] @[G.K.] @[A.H.]" [CEO: 2016-05-25]	"@Team – finally back on this Project, sorry for the wait – but I am motivated to continue putting this together. I will contribution shoutout and review all team members who participate :) So for our next Task --> Let's assume we have our h-bridge and Bluetooth circuitry working properly. It seems with this new code uploaded by @[J.P.] everything should work cleanly." [CEO: 2016-05-18] "[S.Y.] is a strong Project Leader. He not only inspires his teammates, but he also makes sure everyone understands what his objective […] Moreover, he formally thanks new teammates for joining his project and offering to help him. [S.Y.], well done. We commend [S.Y.] for being motivated to design an improved wheelchair which will give people that need them much greater independence and greatly improve the user experience." [CEO: 2016-06-14]
Performance	CEO 2016-11-07: Completed Signal Filtering and PID Tuning Team -- I want to speed up this process, as this Project is important to keep moving. So I am going to use a super power here, and invest $25 into this task for who ever can complete it. "You are now officially an [InnovStart] Builder, you will play an integral role in Collaborative Revolution :). Please consistently stream your organized feedback to [InnovStart] Feedback as comments or new posts!" CEO: 2016-09-29	"@[S.S], extraordinary work. That is why you are listed as a top freelancer on [InnovStart]-- I hope this will bring you great opportunities in the near future. Please let me know if you are still stuck in this issue, or the commentary here was able to get you past it." (CEO: 2017-02-02) "User of the Week Awarded to @[A.A.] This week's User of the Week is @[A.A.]. Let me tell you [A.A] is a legit #creative #beast. He has single handedly help grow the [InnovStart] Community and is a legitimate growth #hacker in his own right. However, A.A.'s real passions focus on #web #design and #application #development. When you check out his #design work online you are usually blown away by the professionalism of his work. We appreciate your #creative #energy buddy and keep on #collaborating!" (CEO: 2017-03-16)
Authority	"[InnovStart] Super User Referral Program: We are developing a new program that will incentivize our most important/active users to help recruit new, high quality, users, to the [InnovStart] Community. The Rewards: Access to a secret chat group where only our top users will be allowed. This group will provide exclusive networking connections and resources to the users in this chat. Angel investors, direct access to our in-house team, university connections, and more. @[E.E.] has signed up 5 people in the past 48 hours :). He is in the lead." (CEO: 2017-07-19) "This is a starting investment by The [InnovStart] Innovator Fund. Excellent leadership, and progress with this Project. We want to help it come to fruition." (CEO: 2017-04-07)	"Using @[H.A.]'s [link to code developed by H.A.] we were able to shave 61kb off of our JavaScript bundle, our bundle is down from 551 kb to 490 kb." (CEO: 2017-04-20) "We are honored to have been featured in The New York Times today alongside a bunch of our top users. Radical to see [J.R.] [N.A.] [M.A.] featured. Power [InnovStart] Leaders showing the world they are the very real deal of a new generation of creators, entrepreneurs, and builders from around the world." (CEO: 2017-07-27)
Utility	"We have selected winners -- however -- there have been complications with the timeline of the awards. We will send out awards, but it is going to take a few more weeks if not months. But we want to be loyal to our users and ensure the prizes are awarded -- it will just take a bit more time." (CEO: 2018-08-03)	N/A

Table 3 – Data Supporting Analyses of Sponsor-to-community Status Negotiation practices (Cont'd)

Phase	Actively directing members towards sponsor goals	Claiming authority over community activity	Focusing on individuals
Connection			
Performance	"I want to see some progress this weekend!!!! Start to assign tasks" (CEO: 2016-11-17) "Which of your projects are you most interested in commercializing?" (CEO: 2017-02-08) "I think once hackathon is over we should discuss how this fits into the overall @[Project R.] strategy. Two very different robots – however – could be a great business opportunity." (CEO: 2017-02-11)	N/A	N/A
Authority	N/A	"[Apply Here to Get Verified] ## What's Needed (Read Before Applying) (Rules) 1) You must have at least one active project on [InnovStart] ([…] 2) You must have your entire [InnovStart] Profile filled out […] […] _Non-Verified Freelancers_ You will not get much work at this point in time. We are focused on quality, not quantity. Over time, as more jobs enter the system, our marketplace dynamics will change." (CEO: 2017-09-05)	N/A
Utility	N/A	"Do you have a diagram of how the underlying financial mechanics work? I am having trouble following, and this is not good. #DontF***Up" (CEO: 2018-03-04) "We Helped [IV] Develop Their Version 1.0 [InnovStart] Technical Guide, @[J.J.] created a game plan to efficiently synchronize [IV]'s artificial intelligence framework with their backend application while meeting an extremely tight timeline. A 3-developer team was formed from the [InnovStart] Talent Pool consisting of 3 full stack node.js developers who possessed AI experience. [IV]'s CEO was able to do robust product testing without raising a finger. UX Specialists and the global community came in and tested multiple onboarding workflows, all for a modest budget." (CEO: 2018-03-18)	"Refugee Crowd Funding Skill Challenge > The work you submit will be shared with various organizations who actively work with refugees. **DO NOT MAKE YOUR WORK PUBLIC!** Chat me with your submission." (CTO: 2018-04-02) "Junior AutoCAD position is needed by [InnovStart] Customer. ## Job Overview You will basically be working with Google Maps and AutoCAD to help outline new site locations for [S.F.] in the United States. **Position**: Remote, 20 hours per week" (CTO: 2017-12-01)

Table 10. Data Supporting Analyses of Community-to-Sponsor Status Negotiation practices

<table>
<tr><th>Phase</th><th>Negotiating control and influence over platform</th><th>Connecting with sponsor and presenting resources</th><th>Accepting sponsor legitimacy</th></tr>
<tr><td>Connection</td><td>
<table>
<tr><td>CTO
2016-07-27</td><td>Anyone who experienced issues with the Android app crashing, please try this build. [link] You might need to uninstall the existing app before installing it.</td></tr>
<tr><td>Member
2016-07-28</td><td>Great to hear...
Although you guys should consider shifting to native components as soon as feasible cuz it will drastically improve [InnovStart] user experience.</td></tr>
<tr><td>Member
2016-07-28</td><td>I would rather prioritise them wrt most user engagement...
Like for example right now in [InnovStart] I spend most of my time in discussion threads then chats and then exploring new projects....
So the first component to improve would be the discussions thread and then others</td></tr>
</table>
</td><td>
<table>
<tr><td>Member
[F.A.]
2016-06-28</td><td>Hi, its great project u guys have started I would love to be a part of it. Let me know if you need any help and how can I offer mine. Thank you</td></tr>
<tr><td>Member
[I.E.]
2016-06-28</td><td>I really really want to help in this project cause I want to learn from it and from everyone. But I don’t know how I could help. Please tell me if there’s anything I can do to help. I’m an electronics engineering student from the Philippines.</td></tr>
</table>
“Great share @[Sponsor advisor] I have applied for the challenge and have a vision for 2050. I soon will be creating an [InnovStart] project based on my idea and hoping to make it even better and actually building a concept that will be future proof.” Member: 2016-08-25
</td><td>“+[CTO] Thanks for giving [My Project] a great headstart, looking forward to build a great tool together.
#MVP #learner” (Member thanking sponsor contribution: 2016-08-17)

“thanks @[CEO],
I am very thankful for creating such an innovative website.
it will be useful for many people who want to get more support online and making online projects.
I again thank you for creating such an innovative mind space for lot of engineering students like me.
thank you” Member: 2016-04-27</td></tr>
<tr><td>Performance</td><td>
<table>
<tr><td>CEO
2016-09-28</td><td>I would love to see you update your @[3D Game] project to see what the updates are […]</td></tr>
<tr><td>Member
[A.L.]</td><td>Yes, I really should update what I've been doing on the project on here. We tend to use the Facebook Group all the time and forget to update here :)</td></tr>
<tr><td>CEO</td><td>please let us know what you think we need to add to keep up with the FB function</td></tr>
<tr><td>Member
[A.L.]</td><td>I think that FB is so easy to navigate because everyone is used to using it now. Notifications take you directly to the post/comment rather than having to scroll through etc. I have a question though, why do I go through all those pages of setting up an account on here even though it's complete? The only part not filled in is the 'About Me' section which it won't let me type anything into.</td></tr>
</table>
</td><td>“Hello guys! Hope everyone is doing well
I have a started a new blog called “Design to Express to help you guys get started with design with CAD click here to read my first article [link] or just type [link]

Thank you [CEO]
for letting me share it here” Member on CEO page: 2016-10-02

“SHOW & TELL
Excited to share the [InnovStart] Algolia Search Hack. I am going to create a project :)
Guys, The underlying search bar results are based on Algolia search. I was able to get into the system and search for projects and discussions.
Tiny Snippet…
[code]” Member on sponsor page: 2017-01-28</td><td>“I have successfully completed the Coffee gripper task assigned to me by @[CEO]. Started from @[T.O.] concept design to making an actual mechanical design and getting it 3D printed. We could collaborate well here on [InnovStart] and finally make a prototype
[…] Thank you @[CEO] for assigning me this task. It was a awesome making it.
Getting the design 3D printed as inspired me make a mini 3D printer here on [InnovStart] working on it” (Member: 2016-12-23)

“Thanks @[Sponsor advisor] for your most valuable contributions award :) I really mean it.

@[CEO], I hope the info I have provided will be useful for any beginners. Probably one can implement the same.” Member: 2017-01-24</td></tr>
<tr><td>Authority</td><td>“@[CTO] Can we make the discussion alert icon more informative? Now when I click on it when it says 3 or 4 discussion alerts (Likes or mentions) Its not clear what was the alert about unless I scroll through all discussions and find out what was the alert about. Can we provide more info or menu type option like the Notification/Bell symbol has. Just an idea. :)” (Member: 2017-04-16)</td><td>“Hey, @[CEO]. I am enveloped in my agriculture-based Startup of delivering fresh fruits and vegetables in 90 mins service. […] Plus, I keep on researching on the internet and learn new keeping product innovation, service usability, functional solution, digital marketing and web development as my forte.” (Member presenting capabilities: 2017-04-03)</td><td>“@[CTO] Thank you to the Team [InnovStart]. You people are helping me :)” (Member: 2017-05-31)

“Thank you very much @[CEO] for the recognition and appreciation. This will help me a great deal in progressing the project. :)” (Member: 2017-04-13)</td></tr>
<tr><td>Utility</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
</table>

Table 4 – Data Supporting Analyses of Community-to-Sponsor Status Negotiation Practices (Cont'd)

<table>
<tr><th>Phase</th><th>accepting sponsor superiority</th><th>accepting sponsor authority</th><th>creating distance from sponsor</th></tr>
<tr><td>Connection</td><td></td><td></td><td></td></tr>
<tr><td>Performance</td><td>
<table>
<tr><td>Member
[H.A.]
2017-03-22</td><td>Application for funding.
I'd like funds to improve my project [N.B].
I'll be starting another similar project RC FPV Bot using the same hardware.
The N.B. project is complete.
Current features of N.B:
Remote control over WIFI.
WIFI video feed.
4WD system.
Turning-in-place. (With lots of vibration, due to cheap motors and wobbly wheels).</td></tr>
<tr><td>CEO</td><td>You must provide cost breakdowns so we can assess this properly.</td></tr>
</table>
"@[CEO] Should I post a breakdown of parts? Also, we want to give a list of additional features (enhancements) that the user could choose!" (Member: 2017-03-03)</td><td>N/A</td><td>N/A</td></tr>
<tr><td>Authority</td><td>N/A</td><td>
<table>
<tr><td>CEO
2017-
04-06</td><td>General Project Strategy/Business Strategy Discussion
@[N.A.] first answer me where you want this app/project to be in 1 year? In 5 years?</td></tr>
<tr><td>[N.A.]</td><td>@[CEO] I plan to enter School students' space. I guess I will still be sticking on with developing the science contents on the 3d environment. However gradually I want to introduce robotics, Virtual environment simulation, By Year two I want to scale it up entire Tire 1 and Tire 2 cities in India Plus move to Singapore or USA.
[…]</td></tr>
<tr><td>CEO</td><td>Deck is a solid beginning start.
One thing I need to see is more of a structured PRODUCT PLAN. We need this plan. We don't want to have scattered ideas on how this can work and go to market.
We launch officially precisely with what?
Then 3 months later our goals are what?</td></tr>
</table>
</td><td>
<table>
<tr><td>CEO
2017-
04-24</td><td>@[D.S.] can you upload/create your draft on the google doc. @[A.V.] please let me know if you are also going to remain involved.</td></tr>
<tr><td>[A.V]</td><td>I would like to. But I'm going through job change and have a really busy phase ahead. However, I would like to help in every possible way.</td></tr>
</table>
</td></tr>
<tr><td>Utility</td><td>N/A</td><td>N/A</td><td>N/A</td></tr>
</table>

Table 11. Data Supporting Analyses of Within-Community Status Negotiation practices

<table>
<tr><th>Phase</th><th>Maintaining order</th><th>Creating and maintaining connections</th></tr>
<tr><td>Connection</td><td>“Hey guys, it’s alright if you prefer to use WhatsApp for chatting and discussing stuff but will be good practise to post conclusion here so everything is organized, and every team member can track things effectively.” (Member: 2016-07-24)

“its better to avoid personal attack… doesn’t go along with collaboration ethics… we are here to Create and Innovate… indulging in personal ego attacks wont help anyone… #Suggestion” (Member: 2016-07-20)

“Hi. @[S.S.].. please have a look at @[Algorithm Generator] Project... maybe u can help the Project Push Forward. thanks.” (Member: 2016-08-05)

“Hey, I came across your project idea and I would like to say this sounds like a really cool effort. As someone who is also into gaming I like seeing when others follow their own passions to develop their own product. Let me know if I can be of any assistance and I hope to see more from you” (Member: 2016-03-03)</td><td>“Hello everyone, please give your WhatsApp contact for better communication and the project progress is very well and now we are doing some research on machine learning and artificial intelligence.
So from now I need everyone in our group to be interactive about project. Machine learning and Artificial intelligence. So please do give your WhatsApp contacts for better communication. Thank you” (Project leader: 2016-08-14)

“Please have a look at my Bio (CV) in my Profile. I like all kinds of Innovation and new ideas, whether be it Technology or Art or anything. I’m basically an innovator... interested in any field: […] Alternate Energy, Clean, Green, Sustainable Energy is my focus too. I'll install WhatsApp in my IOS and forward to you. In the meantime, we can discuss in your Project page. its better there, everything will remain at the same place. [It] will be easy to collaborate. Also, in coming future [InnovStart] will also support Instant Chat, so we can interact through it too.” (Member: 2016-07-09)</td></tr>
<tr><td>Performance</td><td>“Well we are developing new devices here with the well-known technologies. So, it's not a secret here. It's all about learning new things and teaching others.
If you are talking about something private, then you shouldn't be disclosing here.” Member: 2016-11-29

“Welcome @[S.D.]
First off, you should find projects that you like or those you can connect with. Then contribute to tasks. Then the project owner gives you contributions for work done by you.
You can find paid tasks in the activity feed. Apply to those tasks for which you have the required skill set.” Member: 2017-01-18

“Hey [J.J.] anytime. Always glad to help young innovators like you. You are doing a great job with the research, hope you get good results out of it
[InnovStart] has done a lot to me I'm sure it will help you too
All the best” (Member: 2017-03-15)</td><td><table><tr><td>Member
[J.R.]
2016-12-17</td><td>Yeah, the research on room navigation is going on we need time
If any ideas, please comment in the discussion
However, for the submission I was thinking of prototyping the scheduling of [R.B.] from the app using #Kandy cloud</td></tr><tr><td>Member
[J.R.]</td><td>@[T.H.]
@[A.K.]
@[T.O.]</td></tr></table><table><tr><td>Member
[N.A.]
2016-09-30</td><td>@[A.K.]
Can you please share your WhatsApp number? I have a WhatsApp group.
We can discuss over there as well to get a instant response.</td></tr><tr><td>Member
[N.A.]</td><td>Added everyone...!! If anyone interested, please drop your WhatsApp numbers here...</td></tr></table></td></tr>
<tr><td>Authority</td><td>“@[A.C.] Hi, you can find people with skills you want here, just send them a message about the phase where you are stuck at and the thing you need help in along with a link to your project. Find skills here [link to page]” (Member: 2017-05-25)
<table><tr><td>[A.A.]
2017-05-11</td><td>Why is it quite
Hello everyone, what seems to be the problem?</td></tr><tr><td>[A.L.]</td><td>Things seemed to have slowed down here, is there anything we can do to help?</td></tr></table></td><td>“[S.A.], are you interested in being appointed co leader?” (Member: 2017-05-16)

“@[M.T.] I can give you the whole code you want. contact with me in private for more discussion :)” (Member: 2017-06-01)</td></tr>
<tr><td>Utility</td><td>N/A</td><td>“@[P.T.] check out @[Project] project.” (Member: 2017-12-07)

“@[S.F.] Everything is open source now at the [Project] project page, and the contest is live too. Just wanted to let you know!” (Member: 2017-10-11)</td></tr>
</table>

Table 5 – Data Supporting Analyses of Within-Community Status Negotiation practices (Cont'd)

<table>
<tr><th>Phase</th><th>Exchanging resources</th><th>Protecting resources</th></tr>
<tr><td>Connection</td><td>"Hey, you are Amazing man, now I'm studying my 3 B.E still I have 1 year more to finish my Engineering. for my final year I want to start my final year project from now itself, but I don't know which area to select so would you please help me to choose my project and it must be something different from others. but my project might be an IOE based. would you please Help me?" Member: 2016-04-26

<table><tr><td>[X.Y.] 2016-07-28</td><td>hi @[A.V] I want you to be the project leader and guide us thank you</td></tr><tr><td>[A.V.]</td><td>Sure… it'll be my pleasure.</td></tr><tr><td>[X.Y.]</td><td>How do I change it here and can you prepare the schedule what to do next or shall we first discuss on Skype??</td></tr><tr><td>[A.V.]</td><td>First of all discuss the features and design you want. Then we'll talk about required material. After that you have to assemble it and test.</td></tr></table></td><td>N/A</td></tr>
<tr><td>Performance</td><td>"Hello guys. Our team is not only about making robot and participate in hackathon it's about learning from each other. If you do not understand anything in project let me know. I will personally make tutorial for you and I am sure other will too. Just participate in discussion, share your ideas and support the team." (Member: 2016-11-07)

"Can you send codes? I was also working on such a project for making libraries for open source.....@[A.V.]" (Member: 2017-01-21)</td><td>"I am done with the NHypercat library and currently working on building a Hypercat server. There are couple of things I need to integrate before I officially release it to public :)" (Member: 2016-12-13)
"I would love to help, haven't thought of earning from it, yet it really depends on what kind help you guys require from me, I mean if it's something I am gonna have to code then definitely it'll be great to get some revenue out. About the $20 price tag, I might take it as my first work on [InnovStart], yet I normally charge $20 for an hour but that is for something really big like a full app or something complex." (Member: 2016-11-10)</td></tr>
<tr><td>Authority</td><td>"I can design this machine for you and provide you the CAD files along with the rendering Give me some time I'll go through the sketches and diagrams and design it for you and make it mechanically functional" (Member: 2017-06-29)

"Nice @[S.F.] welcome on board you can consult me if you want to learn new things. And I'll disturb you when I need something thank you." (Member: 2017-04-04)</td><td>"Let's say a "Project Leader" comes up with a great idea to implement something in an innovative way and goes with the "Gig" approach - Assigning a dedicated resource with a specific fee, then the Source Code, Intellectual property etc. belongs to the owner of the project and not the developer(s)." (Member: 2017-04-20)

<table><tr><td>[J.R.] 2017-06-12</td><td>I want to write a rich project story for [Project] It needs to keep the reader engaged @[A.S.] @[A.L.] can you guys help me?</td></tr><tr><td>[A.L.]</td><td>I may be able to help [J.R.] but it won't be for a little bit, I have a few stories to write :)</td></tr></table></td></tr>
<tr><td>Utility</td><td>"@[S.P.] The platform is open-source, so you can use it for design work if you'd like. If you have an idea for what you'd like to do, feel free to share it with me or the [Project] project team and we can help with it. For example, the next iteration of the board should have Internet of Things capabilities, Bluetooth and a better display. If you wanted to get a jump on those items, it would be amazing. See this thread for some more details on IoT: [link]" (Member: 2017-11-04)

"I have a few things I'd like to get started on with my project, and I have team members who have joined […] but I don't know much about the team members and what they are interested in doing. I also don't know their skills strengths or what they have time to do. I'd love the community's input - could you let me know the best, most effective way to get team members to take ownership of action items or deliverables and get them completed?" (Member: 2017-10-09)</td><td>"Hi [J.R.]! A local student here in Philadelphia has offered to do this as part of a larger semester-long project. I will let you know if anything further might be needed on it. Thanks for checking back!" (Member: 2018-02-22)

"Serious research on navigation is going on offline. Meanwhile I'm working on the hardware. Will be buying parts soon and will make this concept come to life" (Member: 2017-11-14)

"IP [Intellectual Property] question
[R.A.], do you think I need to think of applying for the provisional patent for [Project]?
I can't patent the concept, but I can patent the future development work, what are your thoughts? Or should I focus on development?" (Member: 2017-12-06)</td></tr>
</table>

resource exchange. The tensions between these processes explain why and how the OC restructures itself to maintain its relationship with the sponsor while aiming to achieve its goal. We identify three processes that explain how a sponsor and an OC continuously manage their relational tensions. These processes reveal an ongoing negotiation for status, legitimate power, and resources.

Process 1: Sponsor-to-Community Status Negotiation

Process 1 comprises a set of practices enacted by the sponsor toward the OC to propose a higher status for the sponsor in the sponsor–OC relationship. Higher relative status increases the sponsor's legitimate power. This is because the OC gives a higher symbolic value to the resources the sponsor brings in (Bourdieu 1989). Because the sponsor has control over the resources it brings into the OC, these resources become at stake and provide higher status when they are accepted as important by the OC. This allows the sponsor to control the OC's activity through resource distribution among members. OC members who accomplish the sponsor's goals are awarded more resources and higher status. The sponsor uses indirect power to influence the OC members' understanding of which activities are important or relevant (Fleming and Spicer 2014). While the sponsor acts in a way that influences the distribution of resources in the OC, the relational nature of status and power between the sponsor and the OC requires that it be negotiated and accepted by both parties. This negotiation creates a tension, and its resolution manifests in changes in the sponsor's and the OC's practices. Thus, the sponsor's control is relative to the degree of its acceptance by the OC and its resultant practice changes.

Process 2: Community-to-Sponsor Status Negotiation

Process 2 includes practices that the OC enacts toward the sponsor to negotiate its relative status. A higher relative status gives the OC power to demand specific resources from the sponsor and accept or reject sponsor interventions. For instance, members can demand feature changes when they have the freedom to switch platforms. The OC gains higher status when the sponsor gives higher symbolic value to the resources that OC members bring in. Having a higher status allows the OC to claim resources that matter for achieving its goals of continuity of activity. Alternatively, the OC can accept a relatively lower status in exchange for resources from the sponsor. Therefore, status dictates who has the power to select which resources are exchanged. When the OC has a lower status, its ability to gain resources that serve its goal from the sponsor becomes conditional on the alignment of the sponsor's and the OC's goals.

Tension 1: Between Process 1 and Process 2

When two fields of practice overlap, status negotiation becomes an attempt from each field to extend itself by changing the meaning of valuable resources for the other field (Levina and Vaast 2008). The sponsor's employees can actively participate as OC members and present themselves as fellow innovators to create shared meaning with the OC. In this overlapping site, attempts to negotiate which types of capital are valuable and at stake take place. The OC's resources serve divergent needs: internal OC resources serve the collective through the long-term goal of maintaining knowledge creation; external resources motivate individuals and are exportable by them (Von Krogh et al. 2012). The sponsor also faces the choice of either accepting OC negotiation and maintaining the OC for its long-term benefit or taking control over it and gaining short-term benefits and clarity in strategic direction. Negotiation creates tension as actors

interact. Tension is only resolved when the practices of both parties reflect a new social understanding of which resources are more important and how they are redistributed, thus creating a shift in status and power. Self-depreciation is an act that one side of the relationship performs to retain a relationship by accepting a lower status (Blau 1989). With every resolution comes a new buildup of tension as the actor with higher status attempts to increase further its status and power and maintain the status quo, while the actor with lower status attempts to shift the relationship (Emirbayer and Johnson 2008). When the weaker actor can no longer negotiate a higher status and rejects the legitimacy of the other actor, its power is used to break the relationship (Blau 1989).

In our case, the sponsor brought in formal positions, financial gifts, and platform enhancements to motivate OC members to perform certain activities. OC practices also put pressure on the sponsor's practices by negotiating ownership and changes to the digital platform. Members complained about problems, requested to help with code, and took their communications to Facebook or WhatsApp when they saw the platform as being restrictive. This pushed the sponsor to give access to certain members, add improved functionalities, and release an API for members to create their own enhancements. Nevertheless, the OC reconfigured its social practices to continue gaining resources and support from the sponsor while raising the sponsor's status. Consequently, the sponsor used its higher relative position to bring in additional resources and gain even more status in subsequent phases, thus triggering new tensions. The OC eventually rejected the sponsor's claims of superiority and ownership. As the weaker side of the relationship, the OC rejected its newly defined relationship with the sponsor by stopping the negotiation process.

Process 3: Within-Community Status Negotiation

The OC is a bottom-up collective whose organizing is emergent. The OC organizes around a goal that is emergent as well and that is identified through the social practices that the collective agrees to share. Internal status negotiation revolves around creating, maintaining, and organizing connections. Status negotiation within the OC raises the status of members who are resourceful, able to develop connections, and maintain the OC's order. The direction toward which status negotiation moves allows us to identify the OC's goal. As a collective, the OC's practices keep it a community: they create, maintain, and organize connections through which resources continuously flow to sustain knowledge work. Practices of status negotiation within the OC are, however, affected by how members interact with the sponsor. When the OC changes its practices to reflect new status negotiation with the sponsor, its internal status negotiation practices also change as both community-to-sponsor status negotiation and within-community status negotiation are enacted by the same actors who belong to the same field of practice.

Tension 2: Between Process 2 and Process 3

Process 2 links the sponsor and the OC fields of practice. Process 3 does not involve the sponsor and is internal to the OC. The sponsor attempts to redistribute resources to influence status differences among OC members. When the OC accepts this attempt to shift its internal social structure, a tension is created between the resources at stake that are imported from the sponsor and those that are produced within the OC. For instance, when the OC accepts the higher status of the sponsor, it also accepts the higher value of imported sponsor resources, such as financial gifts, over internal community resources, such as knowledge. In this case, the OC's status relative to the sponsor is reduced, which shifts the OC's internal practices accordingly. On the

other hand, when the OC negotiates a higher status relative to the sponsor, it gains the legitimacy to import from the sponsor the resources that serve its internal practices. Therefore, tension between community-to-sponsor status negotiation and within-community status negotiation arises when the status of the OC becomes lower than that of the sponsor. This is because while both processes are enacted by the same actors who belong to the same field of practice (community members), Process 2 reflects the sponsor's goal in this case while Process 3 reflects the OC's goal. The tension is resolved through the modification of social practices such that both processes remain in action. However, as the social practices go through modification, one of the divergent goals is compromised, that of the party with the lower status.

In our case, as the status and power of the sponsor increased, the community-to-sponsor process incorporated practices of accepting the sponsor's superiority and authority, which included following the sponsor's directions even if they did not nurture sharing and collaboration. Because the OC accepted the higher status of the sponsor and the legitimacy of its resources, the OC's practices shifted such that core members worked toward the sponsor's goals even if they did not align with the OC's goal of maintaining collective knowledge work. We see this in the weakening of initial practices and the emergence of a non-communal practice. This was not evident to the sponsor who saw that its "motivational activities" were allowing it to control the OC, which led it to aim for even more ambitious goals. Table 6 visually summarizes the three processes and their tensions at InnovStart and its OC.

Table 12. – Tension and Resolution Between Status Negotiation Processes at InnovStart and its OC

Field of Practice	*Intersection of Sponsor & OC fields of practice*		*Intersection of Sponsor & OC fields of practice*		*OC field of practice*
Phase	**Sponsor-to-Community Status Negotiation Process**		**Community-to-Sponsor Status Negotiation Process**		**Within-Community Status Negotiation Process**
Connection [Feb 2016 – Aug 2016]	> Granting members access to increased resources > Highlighting the value of members' resources	**Tension** **Resolution** **Social practices modified** **Status & power shift**	> Negotiating control and influence over platform > Accepting sponsor legitimacy > Connecting with sponsor and presenting resources	**Tension** **Resolution** **Social practices modified** **Status & priority shift**	> Maintaining order > Creating and maintaining connections > Exchanging resources
Performance [Sep 2016 – Mar 2017]	**(+)** Actively directing members towards sponsor goals	**Tension** **Resolution** **Social practices modified** **Status & power shift**	(+) Accepting sponsor superiority	**Tension** **Resolution** **Social practices modified** **Status & priority shift**	(+) Protecting resources
Authority [Apr 2017 – Sep 2017]	**(-)** Actively directing members towards sponsor goals (+) Claiming authority over community activity	**Tension** **Resolution** **Social practices modified** **Power used to terminate**	(+) Accepting sponsor authority (+) Creating distance from sponsor		Same practices with more activities enacting Protecting resources
Utility [Oct 2017 – Jun 2019]	**(-)** Granting members access to increased resources **(-)** Highlighting the value of members' resources (+) Claiming authority over community activity (+) Focusing on individuals		Process stops		Process weakens **(-)** Maintaining order Further weakening of Creating and maintaining connections & Exchanging resource

>: First emergent practice

(+): New practice emerges

(-): Practice dissolves

Implications

Survival of the Sponsor–Online Community Relationship

The increasing reliance of organizations on social platforms as external sources of innovation calls for a deeper understanding of how OCs can be sponsored and managed successfully. Not only does this have important implications for sponsoring organizations, but it also raises the issue of how partnerships of different forms of organizing are maintained. As forms of work expand beyond formal organizations, it has become increasingly critical for scholars to theorize such relationships. Our study adds to this important and emerging domain.

Scholars have highlighted the divergent goals and motivations of sponsors and OCs (Bonaccorsi and Rossi 2006) and the importance of unveiling the tensions between them to understand how these partnerships can be sustained (Reischauer and Mair 2018). This study sheds light on this issue by revealing how the commercial–communal tension between a sponsor and its OC comes from the negotiation of status that each side of the relationship enacts to legitimize its control over resource exchange. Tension thus has an important role as it signifies the ability of both parties to act toward achieving their goals. Tension from negotiating status is resolved through changes in social practices, which in turn further trigger tension as each side continues aiming for increased status. Tension also tells us that a sponsor has no direct control over an OC, and that its influence can only be achieved through a negotiation of legitimacy of the resources it brings to the relationship. This can involve, for example, respecting the norm of reciprocity (Shah 2006). The sponsor may attempt to raise its status by offering its resources to the OC in exchange for specific actions. Accepting this exchange puts the sponsor and the OC in partnership. Nevertheless, this resource exchange is not equally controlled by both parties.

Tension emerges because each side of the relationship attempts to control resource exchange so that it serves its goals while still respecting the other side to avoid breaking the relationship. This, in turn, leads to changes in social practices that adapt to status and power shifts.

Changes in the relationship between the sponsor and the OC also create an internal tension for the OC when it takes an inferior position with respect to the sponsor. The OC faces contradicting pathways as it attempts to change its social practices to respect status differences with the sponsor: the OC can change its practices to reflect the higher value of the sponsor's resources or the higher value of its internal resources. This tension is relieved when social practices shift to reflect the resources at stake that create status differences among OC members, even if these practices contradict the OC's goal. The new situation, then, triggers changes in goals, new status negotiations, and new tensions and resolutions. The sponsor–OC partnership is therefore an ongoing negotiation process.

A positive tension resolution leads the two negotiating parties to balance each other's power so that both parties' goals and needs are respected. On the other hand, when tension is resolved negatively, one party gives up status for other resources, which increases the legitimacy of the other party. The higher status party then pushes for its own goals, potentially compromising the goals and needs of the other.

Our case revealed a positive tension resolution in the first phase and progressively negative tension resolutions in subsequent phases. The sponsor took control and turned OC members into employees by imposing hierarchical work processes and reducing collaboration (Lee and Cole 2003). The weakened OC eventually rejected the sponsor's status, ending the relationship. West and O'Mahony (2008 provide another example, that of Mozilla Firefox, in which the sponsor completely lost control over its OC, turning the OC into a fully autonomous community, with the

sponsor being one of the "members." In this case, the sponsored OC, as a unique organizational entity, did not survive and was replaced by an autonomous OC.

Our study brings together previously scattered scholarship on sponsored OC goals (Bonaccorsi and Rossi 2006), tensions (Dahlander and Magnusson 2005), as well as control and exchange (Shah 2006). It also provides details on the survival of the sponsor–OC relationship. Josefy et al. (2017 defined organizational survival as the continued existence of a firm through the continuation of its operations, ownership of assets, and solvency. Expanding on this, we articulate the conditions for the survival of a sponsored OC as: *the continued existence of a sponsored OC through: (1) sustainability of OC activity, (2) the maintenance of the sponsor–OC relationship, and (3) the ability of the sponsor to continuously obtain a strategic benefit from the OC*. This means that if tension resolution leads to the loss of any of these three survival conditions, the sponsor–OC partnership is jeopardized.

Online Communities' Adaptation to External Incentives

By investigating the sponsor–OC relationship, this study provides important new insights into an OC's reaction to external incentives. We add a relational view to the literature on OC motivation (Von Krogh et al. 2012), highlighting the importance of acknowledging the relationship of OCs to external entities such as its sponsor, and the importance of looking at incentives at a macro level. Existing explanations often focus on individual-level motivations, with perceptions of control or support influencing the crowding out or crowding in of motivations (Ostrom 2000). These explanations, however, do not address the inconsistency in conclusions with regard to financial incentives in sponsored OCs (Alexy and Leitner 2011). The social distinction practice perspective that we offer presents a collective-level explanation of a phenomenon previously

explained with individual-level theory. It also challenges the view that financial incentives are deterministic in increasing or decreasing activity. Instead, we propose that the effect of financial incentives, as well as of other sponsor gifts, depends on how much legitimacy the OC gives the sponsor, which carries with it an understanding of the relative value of these incentives. So, OC practices are only compromised when external resources become more important than internal ones and external resources are used for a goal that diverges from the goal of the OC.

Within-community practices of maintaining order, connection, and resource exchange tell us how an OC maintains knowledge work despite external pressures. An OC enacts practices of status negotiation to self-organize so that the most capable members for maintaining activity and operations rise to the core. Within-community status distinction thus functions as the OC's "survival mechanism." When an OC loses status to the sponsor, its goals become inferior and the OC loses its ability to continue working toward them.

While the crowding out of motivation might occur at the individual level, it is social change that compromises the OC's internal practices of maintaining order, connection, and resource exchange. External incentives thus have a deeper social consequence than changes in individual motivation. In our case, being chosen for a paid task or a fund was regarded as a measure of knowledge and experience. These gifts represented a privilege for select members. Even though the payment was low, competition among members increased its symbolic value. Had the OC rejected their value, these payments would not have had a significant effect. We also argue that it is not the financial nature of the gifts that had a detrimental effect on the OC, but how they were gifted. In InnovStart's case, the sponsor awarded individual work (freelance jobs, recruitment of members, updating of project information, etc.) more than it awarded collaborative work (such as active team work on project pages). This was the case for financial and non-financial gifts alike.

This reveals that when the sponsor motivates OC members by attempting to influence their status, the choice of which activities to reward has crucial consequences on the OC and on the sponsor–OC relationship. When the sponsor awards members based on activities that create or maintain connection and teamwork, then these awards align with the OC's goal and can trigger competitive collaboration and help "stitch" the OC together. Rewarding individual activities, however, triggers individualism or mere member competition and thus weakens the OC's social connections.

Limitations and Future Research

This study has limitations that could be addressed in future work. First, our theoretical development relies on a single case. Our primary goal was to understand how a sponsor and an OC develop and resolve tensions over time. We thus made a trade-off between depth and breadth. This case is also based on an OC in which both software and hardware were developed collaboratively through projects. The division of work into projects and the requirement that some work be done offline might have influenced the collaborative ties among OC members. Studies on sponsored OCs with different structures and designs need to be examined to deepen and bound our findings. This would also help eliminate alternative explanations for the trajectory of events in our data, such as a loss of collaboration associated with the difficulty in collaborating on hardware projects, financial incentives, or the OC's natural trajectory toward saturation of activity over time. Finally, this case ended with a breakdown of the sponsor–OC relationship. Further research could be done on successfully maintained sponsored OCs.

Implications for Practice

OCs provide new opportunities for firms with respect to innovation, knowledge, and online distributed work. Achieving a better understanding of how to manage OCs can help open innovation initiatives to succeed. A sponsor needs to take into consideration that the strategic benefits it aspires to gain from an OC may not be aligned with the goal of the OC, which is to maintain its activities. Maintaining an OC requires bringing in resources and nurturing connections among members, which could result in innovation in the long run. However, gaining benefits may involve taking resources out of the OC and controlling actions to gain short-term results, which can break connections or hinder them from developing. A sponsor should thus allocate resources and personnel for both short-term and long-term goals. Moreover, a sponsor needs to differentiate between activities to be performed publicly and others to be done less transparently. Public action engenders social consequences in the OC, especially if these actions turn into status markers. For instance, a sponsor could dedicate the OC to collaborative activities while creating a separate section for members to complete individual work privately. As for external interventions and incentives, they should be directed toward relationship building rather than toward individuals.

Conclusion

More possibilities for organizing have emerged with new technologies that connect distributed individuals. Sponsored OCs enable firms and communities to partner for innovation. In this study, we have uncovered the relational tensions that a sponsor and an online community experience and the processes through which these tensions are provisionally negotiated, solved, or exacerbated. We revealed theoretical implications on how a sponsor–OC relationship is

negotiated. We also identified tension as a necessary condition for a partnership of two organizing forms that diverge in goals and organizing processes. We also provided important practical implications for managing these initiatives. As distributed work through social platforms will only increase in the future, so will our need to comprehend the processes and dynamics of sponsored online communities. This study constitutes one step forward in this important effort.

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Appendix

Cluster Analysis

Cluster analysis is an analytical technique that puts objects into groups such that objects in one group are more similar to each other than objects in other groups (Romesburg 2004). Cluster analysis helped us classify members in terms of their "profiles of activity" with similarly behaving members being grouped together. We then selected the members belonging to the profile that showed highest volume and variety of activities.

We identified the characteristics of top members from interviews and messages of the sponsor and most active members. This resulted in 10 activity items, listed in Table A1. Second, we gave each member a score for each of the activity items. Inclusion criteria were also set to identify whether a member is active or not with respect to each assessment item. According to these inclusion criteria (for instance, number of posted messages >= 15), members were either included or excluded from the data sample to be passed to the clustering algorithm. To be as inclusive as possible, we made any of the 10 assessment items enough for inclusion in the sample of members to be clustered.

Third, we used cluster analysis to classify members based on the different combination of activity items, each cluster was defined as a *member activity profile*. We ran cluster analysis separately for each of the four temporal phases, then used the results to further refine our sample to only include *activity leaders*. Following previous studies (Vaast et al. 2017), we used the density-based spatial clustering of application with noise (DBSCAN) as a clustering algorithm (Ester et al. 1996). DBSCAN is more suitable than other K-core and hierarchical clustering algorithms for exploratory analysis because no previous specification of the required clusters is

required. It also provides more accurate results for non-linear datasets and is robust to outliers and non-conforming points. We only had to set the minimum number of individuals per cluster. We set this number of 5 members after testing with multiple options.

After few iterations and adjustments, the cluster analysis resulted in 7, 9, 9, and 6 profiles for the four phases respectively. We define profiles by their *level of complexity*, which is the number of activity items that make up the profile. Thus, a profile that is defined by one activity has a lower level of complexity than a profile that is defined by a combination of three activities. One profile, the "Activity Leaders", stood out as being the profile with highest level of complexity. This means that those members were not only highly active but were widely active as well. Other

Table 13. Items for Assessing Member Profiles Based on Type and Level of Activity

Assessment Item	Qualification Criteria	Qualifying Members			
		Phase 1	**Phase 2**	**Phase 3**	**Phase 4**
Overall Active Member	Posted at least 15 messages in total time period	74 (50% of vol)	101 (74% of vol)	69 (60% of vol)	30 (72% of vol)
Long-term Active Member**	Has been active in the community for 4 months (above average tenure)	79	146	132	98
Projects Idea Generator**	Created at least 2 projects	21 (22% of vol)	42 (36% of vol)	46 (46% of vol)	30 (58% of vol)
Owner of Most Active Projects	Total activity of owned projects is at least 15 messages within time period	83 (85% of vol)	101 (92% of vol)	69 (90% of vol)	33 (87% of vol)
Collaborator in Others' Projects	Total activity in others' projects is at least 15 messages within time period	25 (42% of vol)	58 (75% of vol)	30 (77% of vol)	15 (75% of vol)
High Status – From Helper Points**	Accumulated at least 2 Helper points	0	45	87	67
Helper Points Donor**	Awarded at least 2 Helper points	0	61	53	44
Freelancer**	Hired as a freelancer	4	10	13	42
Hackathon Participant**	Participated in at least 1 hackathon	0	23	27	19
Fund or Sponsorship Receiver**	Received a monetary reward from the community founders	0	0	24	15

**Cumulative measure as long as an individual remains a member in the community

members, such as “Focused Project Owners”, for example, despite being active, were only focused on their own projects and thus developed less connection with the rest of the community. The different profiles in each phase are listed in Table A2 and the description of each profile is included in Appendix Table A3.

Our theoretical sample of messages to be later analyzed qualitatively included messages of only members belonging to the “Activity leaders” profile.

Table 14. Cluster Analysis Results: Member Profile by Type of Activity

	Profile Level of complexity	Connection Phase	Performance Phase	Shock Phase	Apathy Phase
Identified Profiles		7	9	9	6
Activity leaders	4 to 8	13	26	25	12
Low-activity multi-project creators	1	6	10	11	7
Low-profile long-timers	1	32	68	46	25
Focused project owners	2 or 3	32	37	26	7
Popular project owners	1 or 2	38	37	18	
Rewarded Collaborators	3	12	12	5	
Socializers	1 or 2	17	23	10	
Low Activity, Reward Receivers	1		5	23	48
Reward Seekers	1		5	9	27
Outliers	1 or 2			5	12

Results of Cluster Analysis

While profiles were identified through cluster analysis, profile names and descriptions were set after sampling few members from each profile and qualitatively checking their activity in online discussions.

Table 15. Emergent Profiles from Cluster Analysis

Profile	Profile Level of complexity	Description
Activity leaders	4 to 8	Highly active in profile pages, projects created by themselves, as well as projects created by others. They are also high Helper points givers and collectors. Many of them also join competitions
Low-activity multi-project creators	1	Create more than one project but are generally less active and their projects don't attract much attention
Low-profile long-timers	1	Are generally less active yet consistent in the community
Focused project owners	2 or 3	Have one or multiple projects and are highly active in them, but do not participate in projects owned by others
Popular project owners	1 or 2	Have only one project but has succeeded in attracting activity to their projects despite not being as active themselves
Rewarded Collaborators	3	Highly active in projects owned by others but not in their own projects. These members have gained Helper points out of their collaboration efforts
Socializers	1 or 2	Active members, not in project pages but in profile pages. They either socialize with others, share general information, or discuss ideas that they think are too rudimentary to make a project
Low Activity, Reward Receivers	1	Collected Helper points (though less than activity leaders) but are not much active in the community
Reward Seekers	1	Mainly engage in activities such as freelancing work, hackathons, and working for funds but are minimally active otherwise

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Bridging Between Chapter 4 and Chapter 5

In Chapter 3, we focused on the emergence of the sustainability of a sponsored online community. We highlighted the central role of the sponsoring organization in creating and influencing tensions internal and external to the online community. We have also discussed sponsor-community tension and argued that the sponsor and the online community adapt to each other and attempt to influence each other as they navigate these tensions.

In Chapter 4, we dig deeper into the relational tension between the sponsoring organization and the online community. Through an empirical investigation, we theorize how adaptation in the sponsor-community relationship occurs and how such a relationship changes over time. We show that the sponsor and the online community negotiate their legitimacy with each other. We also show that when the sponsor gains a legitimate position, people representing the sponsoring organization gain leadership roles, and their resources gain increased value. This is where Chapter 5 fits in, as it investigates the influence that a member of the sponsoring organization has on the online community's network formation.

Chapter 5 also fits in the overall model of Chapter 3. It studies the outcomes of directly interacting with the online community as a management intervention conducted by the sponsor. While we argue that directly interacting with community members can shift the distribution of resources, Chapter 5 explains how such redistribution manifests in members' adaptation through connection formation or avoidance. We describe how the interaction of a sponsor-representing employee influence the activity of the target member as well as the attractiveness of that member to the rest of the community. We also differentiate between forms of sponsor interaction, being directive or collaborative.

CHAPTER 5

The Role of Online Community Sponsor in Member Activity and Peer Interactions

Introduction

Online communities have proved to be of high economic and strategic value for firms (Dahlander et al. 2008). In 2015, the online community market reported to be over 1 billion dollars (Thompson 2015), and companies are increasingly seeing the value of integrating online communities into their business model and customer engagement strategies. A recent survey indicates that 87% of companies view communities as critical to their mission, more so after the push towards digital transformation post-pandemic (CMXHub 2022). Online communities continue to prove their utility for firms in crowdsourcing customer support, data generation (Barrett et al. 2012; Lu et al. 2015), as well as knowledge creation and innovation (Dahlander et al. 2008). This paper focuses on the specific case of online innovation communities. These are communities where members share ideas and collaboratively create innovative knowledge products such as engineered prototypes, artwork, or other artifacts.

Hosting online innovation communities allows firms to exchange knowledge with a collaborating pool of volunteers, who together can create innovations that a firm is not capable of creating internally (Piller and West 2014). This also allows firms to base their activities on a community business model primarily based on open innovation and creation (Dahlander and Magnusson 2005). Examples include sponsored open-source communities, open ideation communities such as Dell IdeaStorm, and other forms of user sharing communities (Di Gangi et

al. 2010; Reischauer and Mair 2018; Spaeth et al. 2015). While much research on this topic focuses on how firms can internalize innovation, less is done to tackle the issue of interaction strategies for sustaining user collaborations (Dahlander et al. 2008). Indeed, community managers report that their main frustration with managing online communities is member engagement (CMXHub 2022). To tackle this issue, many companies employ community managers or pay moderators to help motivate participation and manage participation trends. While keeping activity completely voluntary may risk divergence from firm goals, trying to exert too much control can drive volunteers away and bring the community to a halt (Dahlander and Magnusson 2005). It is thus crucial for a sponsoring firm to know *how* to engage with online communities.

Earlier research presents mixed results with respect to how a sponsor's engagement influences an online community. Some studies show that a sponsor's participation in knowledge sharing forums can stimulate activity, as knowledge seeding is viewed as a form the sponsor shows its respect of the norm of reciprocity (Shah 2006). Even in open-source communities, some studies have shown that practices such as recognition of effort and quality control can have positive results (Ho and Rai 2017). On the other hand, there is also scholarship that suggests that when the sponsor gets involved in knowledge work it is viewed as unwanted control (Balka et al. 2014; Medappa and Srivastava 2020), and members become more strategic and participate short-term (Shah 2006). Much of earlier research either assessed members' motivation for individual participation or the overall level of activity of the community. Nevertheless, we propose that examining the development of interactions between members is a better measure of the activity of an online community as it is interaction, not motivation, which comprises the basic unit of collaboration and community formation (Lu et al. 2015; Nan and Lu 2014; Von Krogh et al.

2012). Even in communities where participants are more need driven than hobbyists, we assume that a sponsor's activity which triggers more connections between members is better able to trigger long-term activity than an activity which triggers short-term individualistic activity. We therefore suggest that examining how different forms of sponsor engagement influence peer interaction gives us a better perspective on how sponsor engagement influences an online community. We therefore formulate our research question as such: *How do different forms of sponsor interaction with individual online community members influence those members' connection with the community?*

We consider two forms of sponsor interaction: collaboration and direction. Drawing on Leader-Member Exchange (LMX) and signaling theories, we hypothesize that sponsor interaction in general increases the activity of members whom the sponsor interacts with as well as the attention of the online community towards those members. Alternatively, we propose that a sponsor's collaborative interaction with a member is more likely to trigger the formation of denser peer networks than a sponsor's directive interaction, which may explain why collaborative interaction can have a longer effect on members' increased activity than directive interaction.

Empirically, we use a 35 months' data of a sponsored online innovation community where the sponsor was highly involved in the day-to-day activities of the community. We use a fixed-effects panel regression model to test the general effect of sponsor interaction on a receiving member's activity and the community's attention towards that focal member. We also used exponential random graph model to test the specific effect of sponsor collaborative and directive interaction on the collaborative potential of a focal member's connections. The results support our hypotheses and suggest that it is indeed important to consider not only the effect of a sponsor

on members' activity in general, but to also look at the indirect effect a sponsor can have on the formation of the collaborative network. It is a rich network, not aggregate individual activity, that helps propagate sponsor efforts and sustain member activity for longer.

This study contributes to the online community literature by clarifying some of the contradictory results present in past literature. By investigating the sponsor's effect on the network formation of an online community and differentiating between the effects different forms of interaction with the community can have of the network, we look past aggregate participation and instead take community overall participation as a non-linear complex emergence of a network structure. We reveal that while a sponsor's involvement can look positive or negative at the first glance if only individual motivation or activity is considered, it is only through the investigation of how these interactions aid or hinder the formation of community-building ties that we can have a better image of the sponsor's effect. This study takes a relational approach and acknowledges that even motivated individuals can only act within the constraints and opportunities afforded to them by their social structure (Dahlander and Frederiksen 2012; Faraj and Johnson 2011). To our best knowledge, this is the first study that examines how a sponsor's activity influences the structure surrounding targeted members. Having a clear understanding on how sponsor interaction influence online communities directly and indirectly allows us to provide more actionable insights to managers as to how to encourage participation and inter-user collaboration.

Background

This research draws on Leader-Member Exchange (LMX) and signaling theories to support our hypotheses. *Leader-member exchange theory (LMX)* takes a relationship-based approach to leadership and assumes that leaders and members base their relationship on the exchange of resources, such as positional resources under the control of the leader, and initiative and

proactive behavior from the side of the subordinate (Graen and Uhl-Bien 1995). LMX assumes that the exchange between a leader and a member is a social rather than an economical process, creating a fertile ground for the development of trust, respect, liking, and support. (Graen and Uhl-Bien 1995; Liden et al. 1997). The theory suggests that a leader may adopt different leadership styles to form relationships with subordinates based on individual differences (Herman et al. 2018). In traditional organizations a strong LMX is found to be associated with low employee turnover and high commitment (Graen and Uhl-Bien 1995; Harris et al. 2011). Similarly, LMX can also be useful in explaining a leader's influence on member participation in online communities (Oh et al. 2016; Yu and Chu 2007).

Signaling theory assumes that there is always information asymmetry in social groups between those that hold the information and those that could make better decisions if they had that information (Connelly et al. 2011). This information is of two types: information about quality and information about behavioral intentions (Stiglitz 2000). The theory has been widely employed in management studies to understand how parties resolve information asymmetries about unobservable quality (Connelly et al. 2011). Here, it is assumed signalers (a person or firm) communicate signals of quality or of future action that may influence receivers of the signal to act in a favorable fashion. This, however, depends on how receivers interpret these signals and what form of feedback they choose (Connelly et al. 2011). Signaling theory can be useful in explaining the effect a sponsor's interaction with a member can have towards an online community and why the online community would choose to interact with one member over another and how their interaction would look like.

Theoretical Model

We wish to investigate how the different forms of sponsor intervention in an online community influence the participation of online community members and the subsequent connections members can make with others. Our argument considers that if a sponsor's intervention is successful, it does not only need to trigger short-term participation, but it should also motivate inter-member connections to form such that participation can be sustained even when the sponsor is not directly involved. This means that a sponsor's interaction needs to trigger indirectly some form of collaborative behavior for target members and their connections such that participation cascades through the online community. This is crucial because no matter how involved a sponsor is, with the increasing size of the online community the sponsor would not be able to interact with all members. Thus, interacting with only few members should be enough to trigger community-wide participation. Aiming to motivate members individually is also more costly and risks keeping activity dependent on sponsor actions. Therefore, the development of a network of collaboration is essential.

General Sponsor-Member Interaction

In many cases, the sponsoring firm would present itself as the formal manager or provider of the online community platform and appoint employees with formal roles of authority to do the management and moderation activities. Earlier research has observed that employees who hold formal roles of authority in an online community are perceived as community leaders (Johnson et al. 2015). When formal leaders are highly active and embedded in the community, they gain high status (Johnson et al. 2015). These roles of authority also provide an advantage for those employees in terms of visibility and influence. Moreover, the sponsor also has control over the online community in many aspects including the design of interaction features and underlying

technology, governing of knowledge production, and moderation (Ho and Rai 2017). The sponsor can change platform features including interaction features between members, which can influence the social mesh of the community whether members acknowledge it or not (Levina and Arriaga 2014). The structuring of participant interactions is also considered a leadership behavior (Reicher et al. 2005).

The role of authority and the control of technology reflect the power in the form of control of resources that the sponsoring firm can have over its online community (Levina and Arriaga 2014). This power in many cases can help the firm gain leadership status in the community (Magee and Galinsky 2008). Being in a position of leadership, sponsor employees who interact frequently with community members may develop strong social exchange relationships which can trigger proactive behavior from community members such as increased activity, quality knowledge sharing, and commitment to supporting other fellow members (Bateman et al. 2011; Yu and Chu 2007). Earlier work has shown that online community members who take a leadership position have a positive influence on members' participation (Oh et al. 2016). We suggest that an employee of a sponsoring firm would also hold a leadership position, and that the effect of the sponsor interaction on member participation is positive, given the direct attention a member receives.

H1: A member is more likely to increase participation if receiving interaction from the sponsor.

While it is important to look at the level of participation of individual members, it is even more important to investigate how well they can assimilate with their surrounding social structure. We therefore suggest that the benefit potentials of a sponsor's interaction lay more in the ability of this intervention to trigger peer-to-peer exchange.

The community is constantly evaluating activity and content that deserves its limited attention (Levina and Arriaga 2014). Highly resourceful individuals in knowledge or status may thus be prioritized by fellow members. We suggest that a community would prefer connecting to a fellow member who receives sponsor interaction as that would reduce distance between them and the sponsor as well as connect them to a member who potentially has high worth, signaled by the sponsor's choice. The sponsor may be seen as a source of desirable resources that are not available elsewhere such as insider information, access to feature updates and design changes of the platform, financial power, or the ability to contact the whole user base at once (Wilson et al. 2010). Those members that become associated with the sponsor become attractive interaction choices themselves as they become an indirect link towards the sponsor (Blau 2017; Burt 2000; Von Rueden et al. 2008).

However, the indirect link to the sponsor is not the only reason why online community members may decide to connect to members who receive sponsor interaction. Sponsor employees as leaders do not equally connect with all members, especially because online community membership is usually very large. Instead, because of limited resources and time, leaders develop stronger relationships with selected members who are distinguished with higher trust, interaction, support, and rewards. This is called differential LMX (Dienesch and Liden 1986; Graen et al. 1982). Moreover, according to signaling theory, a signal needs to have a high cost associated with generating it as well as high observability for it to be effective (Connelly et al. 2011). The smaller number of employees compared to community members translates into scarce time and effort. At the same time, employees are usually highly identifiable with profile pages, titles, or badges that identify them as such. Not only that, but they may be able to create highly visible

announcements or changes in the online community. All of this translates into costly yet highly observable signals.

According to signaling theory, observable attributes can serve as a signal of quality (Connelly et al. 2011; Spence 1978). Consequently, when a member receives a direct connection from a sponsor leader, this sends a signal to the rest of the community suggesting the high value of the member deserving of the sponsor's attention.

H2: A member is more likely to receive connections from peers if they receive connection from the sponsor.

Role-Specific Sponsor-Member Interaction

While receiving interaction from the sponsor may trigger positive activity, it is also important to consider the type of interaction the sponsor engages in. The mixed results evident in earlier research suggest that the role the sponsor takes influences whether consequences are favorable or not with respect to the online community.

The attention that a sponsor gives a focal member provides a signal of the quality of the resources available with that member. This could consequently attract other members to participate in discussions or connect with the focal member (Ho and Rai 2017). Therefore, we suggest that no matter what type of interaction a member would receive from the sponsor, the fact that the member was chosen by the sponsor may trigger attention and curiosity from the community. However, short-term attention does not necessarily mean increased collaborative activity. Without collaborative activity innovation is not possible and neither sustained activity. Collaboration is characterized by relatively dense connections between individuals. Recurrent interaction increases the chance for indirect relationships to evolve into direct ones, which could

then increase activity (Ingold and Leifeld 2016). The development of relationships between members who are attracted towards the focal member stabilizes resource exchange and embeds members into the social mesh (Blau 2017).

According to signaling theory, two entities can act as signalers: high-quality entities and low-quality entities. While the entity itself might know its true value, outsiders that receive the signal do not. The difference in the payoff that the entity would receive is equal to the difference between the quality communicated by the signal and the true quality experienced by the receivers of the signal when they act on the information they receive (Connelly et al. 2011; Kirmani and Rao 2000). Drawing on this logic, we assume that online community members may have higher-quality knowledge and better access to sponsor resources, or lower-quality knowledge and limited access to sponsor resources. When the sponsor interacts with a focal member, this sends a signal of better access to sponsor resources which can by itself attract the community's initial attention. However, an initial attention is not enough for creating new collaborative ties between attracted members. Depending on how the sponsor interacts with the member, a signal of high-quality or moderate-quality knowledge of the member is also sent to the community. While the sponsor interaction may trigger increased attention of other community members, if those members experience low-quality activity around the member, there is a high chance they would direct their attention elsewhere.

A higher-quality relationship between the sponsor and the member can greatly increase the quality of resources that a member has (Sias 2005). According to LMX, a leader develops stronger relationships with only a selected number of followers (Graen and Uhl-Bien 1991). Relationships high in LMX result in stronger communication and higher work autonomy, which can also improve creativity and exchange between coworkers (Dansereau et al. 1975; Omilion-

Hodges and Baker 2013). Alternatively, the relationship with low LMX employees is characterized by formal authority, task direction, and contractual behavior exchange (Omilion-Hodges and Baker 2013) (Fairhurst 2001). In the online community context, a high LMX relationship would be characterized by a supportive and collaborative sponsor interaction. The sponsor would engage in discussions and provide feedback or encouragement while still maintaining the work autonomy of members and while allowing for a two-way interaction with respect to how knowledge work would progress (Harris et al. 2011).

Alternatively, members with low LMX would have a different form of exchange with the sponsor. The relationship would be much more formal with minimal mutual influence (Omilion-Hodges and Baker 2013). Research in formal organizational contexts suggests that low LMX superior–subordinate relationships are characterized by the use of formal authority, contractual behavior exchange, and role bound relations (Fairhurst 2001). In the online community context, having a formal authority relationship that translates into giving a member direction as to how to develop an innovation would establish a stricter superior–subordinate relationship rather than a partnership relationship. This would ultimately reduce peer exchange in the form of peers participating in discussions (Anand et al. 2018; Omilion-Hodges and Baker 2013). When conversations become closer to directions, attracted community members are discouraged from sharing their ideas either because of an increased perception of control or because of the lack of space of participation provided to them (Jeppesen and Frederiksen 2006; Medappa and Srivastava 2020). The participation is more likely to be short-term so that peer connections between attracted members to the focal member are less likely to form (Shah 2006). We therefore hypothesize the following:

H3: A focal member's peers are more likely to connect with each other when the focal member is active and receives interaction from the sponsor taking a collaboration role.

H4: A focal member's peers are less likely to connect with each other when the focal member is active and receives interaction from the sponsor taking a direction role.

Methodology

Data

The data we use for this study comes from a sponsored open innovation community with high involvement from the sponsor. Members built personal projects as a hobby or as an ambition to build a prototype for a possible future product. All projects were started openly, and members exchanged advice or formed groups to work on projects together. The sponsor was a start-up organization with five employees who were actively involved in the community, especially the two co-founders. The employees participated in projects with members but also moderated the community. In addition, the online community formed the organization's main business model and thus the sponsor was highly motivated to get members to participate and innovate. Successful projects received public attention and were sometimes crowdfunded for further development. Firms also used the online community to start open innovation contests that members formed teams to participate in. The online community went through phases of high and low participation levels and its nature meant that the sponsor interacted with members sometimes as fellow members and sometimes as management. Sponsor employees were highly respected as leaders by community members which was evident in members' communications. We use public discussion data from the online community for the periods Feb 2016 to Dec 2018 with the total of 37,967 members messages and 7,312 sponsor messages. The online community had an average of 1,325 messages per month from an average of 342 members per month.

The unit of analysis in this study is an individual member and the time period used for sampling observations is a single month. We use a fixed-effects panel regression model to test hypotheses 1 and 2 and an exponential random graph model to test hypotheses 3 and 4. We describe the measures used for each method below.

Measures For Panel Regression Model

While we do not include the effect of time in our theorizing, we test our hypotheses over multiple time periods to increase our sample size as well as to control for unobservable heterogeneity over time. Using a fixed-effects panel regression model can also help us eliminate unobserved inter-member heterogeneity such as region, specific preferences of topics, or background. Because we have repeated member observations over an extended period of time, we can control for variations within members. The general model that accounts for individual and time heterogeneity is

$$y_{it} = \alpha + \beta^{\mathrm{T}} x_{it} + \mu_i + \epsilon_{it}$$

where $i = 1, \ldots n$ is the individual, $t = 1, \ldots T$ is the time index, and μ_i is the individual error component which is assumed to be correlated with the independent regressors x_{it} and thus would be estimated as set of individual and time parameters in a fixed-effect model. Alternatively, ϵ_{it} is assumed to be well behaved and independent.

We first remove all members with sporadic activity, specifically, those that were active in only 1 of the 35 months. This left us with 1182 members out of 9440. This greatly reduces the skewness of data. We also log transform multiple of the below variables after testing for the degree of skewness.

Dependent Variables

Individual activity (Activity$_{xt}$). This is the number of messages that a member *x* contributes in the online community during time *t.* The value remains 0 when the member is not active for any particular month.

Betweenness centrality (*Betweenness$_{xt}$*). We operationalize the online community's attention towards a member *x* as the betweenness centrality of that member at time *t*. Betweenness centrality in social networks is defined as the level of intermediacy of an individual along indirect relationships linking other individuals (Marsden 2002). Therefore, the higher the betweenness centrality of a member, the more this member connects other members of the online community. We take the direction of the ties into consideration as the incoming rather than the outgoing ties are of theoretical importance to us. This is also consistent with previous studies that used betweenness centrality to measure a member's embeddedness in an online community (Johnson et al. 2015). We decided to use betweenness centrality rather than indegree centrality because while both measures are highly correlated (Marsden 2002), we found that indegree centrality is highly correlated with individual activity which could cause collinearity in our estimation of the model.

Independent Variables

Sponsor level of interaction with member (*SponsInteract$_{xt}$).* This is the total number of interactions that a member *x* receives from a sponsor employee at time *t.* An interaction is any way a sponsor could initiate an action towards a member in the public space. This includes initiating a thread in a page associated with the member, responding to a thread started by the member, tagging the member or a page associated with the member, or using platform features that highlight the member such as Contribution points or Sponsorship features. For simplicity we

assume that all these forms of interaction weigh equally towards the total sponsor level of interaction with the member.

Control Variables

Occurrence of a community-wide event ($CommEvent_t$). It is possible that a community-wide event such as a hackathon or the establishment of a "special program" by the sponsors could motivate members to increase activity or interconnect more. We read all sponsor public messages for announcements of community-wide events and identified months with these events. This is a binary variable.

Announcement of a new changes or features in the platform ($PlatformChange_t$). The addition or change of a new platform feature may change the use experience of members and thus influence the activity level and the ability and preferences of members to connect to each other. New features, major platform errors, and changes are either announced or responded to by the sponsor. We therefore read all sponsor messages to identify months with relevant platform changes. This is a binary variable.

Announcement of the joining of an important organizational member ($NewOrgMember_t$). There were periods where the sponsors invited a journalist, an entrepreneurial agency, or other formally represented agent. This could change the motivation mix of online community members and thus we also took this into consideration. This is a binary variable.

Level of activity in a project that the focal member is a part of ($ActSideProjects_{xt}$). It is possible that a member's activity or embeddedness changes because of changes in activity in a project that he or she is associated with. This may not be directly related to the actions of the focal member or the sponsor but a spillover effect of other members.

Member registered as freelancer (Freelance$_{xt}$). The sponsor awarded certain paid tasks to competitive members. Winning paid tasks may directly influence a member's activity as well as how the rest of the community views the member. While many of the paid tasks are announced publicly, we could not be sure if all activity was done publicly. Therefore, instead of counting the number of tasks a member takes, we consider as proxy a member's registered status as verified freelancers. This title is marked on members' profile pages. However, it does not change over time. As long as the member is active in the community, they hold a verified freelancer status.

Overall activity of the online community (OCactivity$_t$). The total number of messages produced by the online community at time *t*.

Eigenvector centrality (Eigenvector$_{xt}$). Eigenvector centrality is the measure of influence of an individual in a network. It is usually used as a measure of structural status. The more a member is connected to highly central others, the higher his/her eigenvector centrality. Being connected to a highly central members increases the chance that the focal member is triggered to participate by other indirectly connected members. It also increases the change that the member him/herself gets more connections.

Increase in member's status through Contribution points (Points$_{xt}$). The online community awards Contribution points that are accumulated by members and visible on their profiles. The more a member helps others, the higher the chance those he/she helps award him/her with points. Points are usually related to intellectual status.

In addition to the above control variables, we also control for other unobservable member specific and time specific differences. Member specific differences may include region, interests,

or educational level. Time specific differences include holiday seasons, academic semesters, and employment seasons.

Measures For ERGM Model

We use ERGM to test network changes between connections of members that received sponsor interactions. ERGM is a stochastic network method for estimating the likelihood of a network forming from all the possible structures that could have formed randomly. It predicts the probability of a pair of nodes forming a tie between them by comparing the observed network to exponential random graphs. ERGMs are more suitable for testing tie formation than standard regression models because they allow for dependence among ties and tolerate endogenous processes such as reciprocity and homophily. The general model is as follows:

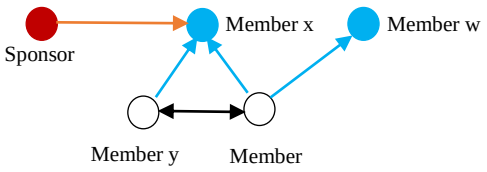
$$P(Y = y|X) = \frac{\exp\left(\theta^{\mathrm{T}} g(y, X)\right)}{k(\theta)}$$

where Y is a random set of relations in the network and $y|X$ is a specific set of relations y given a set of nodal attributes X. θ^{T} is a set of coefficients and $g(y, X)$ *i*s a vector of network statistics. Finally, $k(\theta)$ is a normalizing coefficient so that the probability equals to 1. The ERGM model permits both network and attributional variables as covariates. Below we describe the measures we use in our model. While we do calculate the measures for every time period, an ERGM model cannot take temporal data. Therefore, we run multiple ERGM models for each time period. Unlike the panel regression analysis where each time period represents a month, we assume a single time period to be a period of 4 months. We do this to reduce the sparsity of networks since values are usually very skewed with online communities.

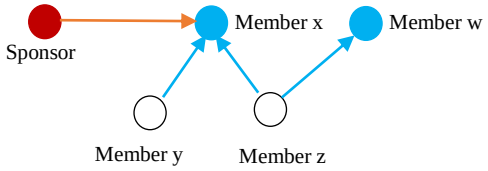
Independent Variables – Connection Similarity Matrices

We hypothesize that two members are more likely to connect with each other if both are connected to a member who receives collaboration from the sponsor and less likely to connect if both are connected to a member who received direction from the sponsor. We are therefore interested in assessing the likelihood of a network tie forms between those indirectly connected members in these two different situations. Figure1 presents an illustration

Figure 6. The Indirect Effect of Sponsor Interaction by Role Taken



Indirect effect of Spǿnsor's Collaborative Role



Indirect effect of Sponsor's Directive Role

The two independent variables of the ERGM model are two network binary matrices that indicate 1 if both members are connected to a member that received sponsor's interaction and 0 otherwise. Figure 2 illustrations the matrix representations of the networks in Figure 1.

Figure 7. Matrix Representation of Connection Similarity – Only members y and z are indirectly connected to a member (x) that received sponsor interaction

	w	x	y	z
w		0	0	0
x	0		0	0
y	0	0		1
z	0	0	1	

To construct these matrices, we first had to code the interactions of sponsor employees with online community members. We read all messages posted by sponsor employees and coded messages where they join a discussion with an opinion, piece of knowledge, or request to take on a task as Collaborative messages. Alternatively, we coded all messages where an employee acts

as an advisor or mentor and asks members to go or not go into a certain direction with the project, ask for updates on a previously given task, or ask members to follow a specific sample project as Directive messages. All other messages such as moderation messages, technical support, or encouragement messages were coded as "Other" and excluded from further steps. We then summed the number of sponsor messages of each coded type and created two variables: $SponsCollab_i$ indicates the number of collaborative messages a member *x* received, and $SponsDirect_i$ indicates the number of directive messages a member *x* received. Next, we created a directed communication network between members and identified those that are connected to members receiving sponsor interaction. We created two matrices $ConnectedSponsCollab_{ego}$ and $ConnectedSponsDirect_{ego}$ to identify those members. $ConnectedSponsCollab_{ego}$ *and* $ConnectedSponsDirect_{ego}$ are two ego effect matrices meaning that they consider only the value of the "From" nodes in a directed network.

The final step was to create binary similarity matrices for members to identify which members are indirectly connected to the same member. To do that, we first calculated the alter effect matrices, which are matrices that consider only the value of the "To" nodes in a directed network. The alter effect matrices are calculated by taking the transpose of the ego effect matrices.

$$ConnectedSponsCollab_{alter} = ConnectedSponsCollab_{ego}{}^{T}$$

$$ConnectedSponsDirect_{alter} = ConnectedSponsDirect_{ego}{}^{T}$$

Figure 8. Illustration of Calculating Connection Similarity Matrices. Ego matrix x Alter matrix = Positive Similarity Matrix

	w	x	y	z
w		0	1	1
x	0		1	1
y	0	0	1	1
z	0	0	1	1

x

	w	x	y	z
w		0	0	0
x	0		0	0
y	1	1	1	1
z	1	1	1	1

=

	w	x	y	z
w		0	0	0
x	0		0	0
y	0	0	1	1
z	0	0	1	1

Finally, we calculate the connection similarity matrices by unit-multiplying the ego and alter effect matrices. This will yield a binary matrix where 1 indicates that both the ego and alter members are connected to a member interacted with by the sponsor and 0 otherwise. $ConnectedSponsCollab_{ij}$ and $ConnectedSponsDirect_{ij}$ represent our two independent variables.

Dependent Variable – Online Community Interactions Network

The dependent variable is a matrix Y_{ij} which represents the interactions network of the online community. Nodes represent members and sponsor employees, and ties represent communication messages between members. We operationalize the network as a directed unweighted network as we only want to test if a tie is established from member *i* to member *j*.

Control Variables

To eliminate the effect of other factors that could influence tie formation, we include three controls: reciprocity, similarity in tenure and similarity in activity. We chose these controls based on previous work that indicated the presence of positive association between tie formation and reciprocity (Faraj and Johnson 2011; Johnson et al. 2014). Moreover, users may have more time and opportunity to interact with others when they have longer tenure or are more active.

Results

Table 1 shows the descriptive statistics of the key variables used for the fixed-effects panel regression model. This table allows us to examine any possible multicollinearity between

variables. Table 2 reports the results of the regression analysis. Because we have two different dependent variables, Model 1 and Model 3 present the base models with only the control variables. Model 3 and Model 4 present the main effect SponInteract with a positive significant effect of sponsor interaction at p<0.01 on a member's activity as well as a member's embeddedness in the online community.

Table 16. Descriptive Statistics of Key Variables

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11
1.Activity	0.63	6.76											
2.Betweenness	31.68	542.3	0.65**										
3.Indegree	0.56	5.37	0.80**	0.54**									
4.SponsInteract	0.21	1.62	0.63**	0.40**	0.68**								
5.ActSideProjects	0.11	1.08	0.85**	0.57**	0.67**	0.51**							
6.Freelance	0.01	0.09	0.37**	0.14**	0.33**	0.32**	0.32**						
7.Eigenvector	0.01	0.05	0.66**	0.42**	0.56**	0.51**	0.69**	0.43**					
8.Points	0.12	2.47	0.39**	0.13**	0.35**	0.26**	0.36**	0.42**	0.51**				
9.CommEvent	0.63	0.48	0.04**	0.01	0.05**	0.07**	0.04**	0.03**	0.04**	0.02**			
10 PlatformChange	0.40	0.49	0.06**	0.05**	0.07**	0.09**	0.07**	-0.01	0.04**	-0.01	0.16**		
11.NewOrgMember	0.26	0.44	0.05**	0.04**	0.06**	0.09**	0.06**	0.01	0.04**	0.01	0.33**	0.49**	
12.OCactivity	1216	1116	0.08**	0.06**	0.10**	0.11**	0.08**	0.01^{+}	0.06**	0.01	0.45**	0.74**	0.62**

Significance here means that a correlation is not random, n = 40549, $^{+}p < .10$ * $p < .05$ ** $p < .01$

Hypothesis 1 posits that the extent to which a focal community member receives attention from the sponsor's employees in the form of directed interactions has a positive impact on the activity level of the member in the online community. Our findings reveal that the coefficient for member activity is indeed positive and significant (0.38, p<0.01). Hence, the results support Hypothesis 1.

Hypothesis 2 proposes that a member's embeddedness in the online community resulting from the community's attention towards a member would be impacted positively by the interaction from the sponsor's employees. To test this hypothesis, we operationalized a member's embeddedness as the betweenness centrality. Results show that sponsor interaction has a positive

and significant impact on a member's betweenness centrality (0.68, $p<0.01$). This supports Hypothesis 2.

Regarding the controls, community activity in projects that a member is a part of (not leading) is one of the highest positively significant factors for increasing both a member's level of activity and the community's attention towards the member. This is not surprising since an increased activity in projects that a member is related to may trigger the member's interest and provide a window from which the member can connect to other project members. Surprisingly, however, the overall online community level does not seem to be influential on results. This may be the case because other factors such as ActivitySideProjects as well as time effects could have absorbed the significance.

Table 17. Fixed-Effects Panel Regression Results

	Dependent variable			
	Activity		Betweenness	
	(1)	(2)	(3)	(4)
ActivitySideProjects	1.02** (0.01)	0.95** (0.01)	0.53** (0.02)	0.67** (0.02)
Freelance	0.22** (0.02)	0.17** (0.02)		
Eigenvector			2.69** (0.10)	2.14** (0.10)
Points			0.12** (0.02)	0.02 (0.02)
OCactivity	0.0000** (0.0000)	0.0000** (0.0000)	-0.0000 (0.0000)	-0.0000 (0.0000)
SponsInteract		0.38** (0.005)		0.68** (0.01)
Betweenness	0.18** (0.002)	0.11** (0.002)		
Activity			0.99** (0.01)	0.69** (0.01)
Observations	40,549	40,549	40,549	40,549
R2	0.64	0.69	0.49	0.53
Adjusted R2	0.63	0. 68	0.48	0.51
F Statistic	17,702.22** (df = 4; 39329)	17,751.30** (df = 5; 39328)	7,631.45** (df = 5; 39328)	7,299.03** (df = 6; 39327)

$^{+}p<0.1$; *p<0.05; **p<0.01

Next, a member's activity level and betweenness centrality both have positive significance towards each other. This makes sense since more active members have a higher chance of receiving attention from the community and highly embedded members may be more motivated to participate. In addition, eigenvector and points member scores also increase the community's attention towards a focal member. This may be to the increased attention higher status members receive. Finally, it is surprising to find that a member's receipt of paid tasks also has a positive effect towards the member's activity level. One would think that a member's attention towards a paid task would reduce the energy spent in the online community. However, the results we see suggest that receiving paid tasks can trigger a member to increase participation either to receive most of such tasks or to give back to the sponsor as a reciprocal behavior. Despite that, we note that our results show short-term effects only.

We tested Hypothesis 3 and Hypothesis 4 using an ERGM model. An ERGM model allows us to test whether ties that form between community members are random or are significantly influenced by a certain factor. Table 3 presents estimation results from a series of ERGM models for different time periods (4 months each). Because of space limitations, we present the results from 2 out of the 6 time periods we tested. The other ERGM models confirm the results we present here.

Model 1 and Model 3 represent the basic models with only the control variables. Models 2 and 4 present the results testing Hypotheses 3 and 4. Our results show that the coefficient for $ConnectedSponsCollab_{ij}$ is positive and significant at ($p<0.001$) for the different time periods. This indicates that two members who are both connected to another whom the sponsor interacted with collaboratively are more likely to also be connected in that time period. The coefficient for $ConnectedSponsDirect_{ij}$ is also positive and significant at ($p<0.001$) and significantly lower than

that of *ConnectedSponsCollab*$_{ij}$ which supports Hypotheses 3 and 4. Note that coefficients in ERGMs need to be interpreted differently from those of regression models. As a non-parametric method with no population mean, the level of significance denoted by the *p*-value does not test how far the coefficient is from the mean, but how far it is from being random. So the difference between the coefficients here is the important details to note here.

A positive coefficient here means that members are more likely to connect with each other when they are connected through another member interacted with by the sponsor than they would do so randomly. The results in Table 3 indicate that even through members who connect through *ConnectedSponsDirect*$_{xy}$ would have a higher chance of meeting each other than if they would do randomly, they are still significantly less likely to connect than if they would through *ConnectedSponsCollab*$_{xy.}$ Results for periods 2, 3, and 6 are also consistent with the presented results.

Table 18. Exponential Random Graph Model Results

	Time Period 1		Time Period 4	
Covariates	(1)	(2)	(3)	(4)
Edges	-9.21 <1e-04 **	-6.39 <1e-04 **	-6.36 <1e-04 **	-6.46 <1e-04 **
Reciprocity	7.74 <1e-04 **	4.46 <1e-04 **	5.71 <1e-04 **	5.66 <1e-04 **
Similarity in Tenure	-0.41 0.437	0.21^{+} 0.44	0.54 0.066	-0.37 0.13
Similarity in Activity	0.57 0.279	-0.95 <1e-04 **	-1.19 <1e-04 **	-0.17 0.50
Connected through member receiving SponsCollab		1.29 <1e-04 **		1.79 <1e-04 **
Connected through member receiving SponsDirect		0.76 <1e-04 **		0.79 <1e-04 **
AIC	23278	22889	42861	42622
BIC	23324	22947	42912	42698
Number of members	924	924	1543	1543

+p<0.01; *p<0.005; **p<0.001

Discussion and Conclusion

The accelerating growth of online communities have led many organizations to seek them as solutions for innovation. Yet unlike internal innovation efforts, the sponsor is unable to control activity in online communities and is left with the option of motivating members' activity through interventions. Earlier research showed mixed results with regards to the influence a sponsor's intervention would have on members' participation and the online community's overall activity. Taking collaboration rather than individual participation as the factor influencing long term activity and innovative productivity (Lu et al. 2015; Nan and Lu 2014; Von Krogh et al. 2012), we aimed in this research to clear out this disparity present in earlier research. We investigated the effect of a sponsor's interaction on a member's embeddedness in an online community. We also investigated the different effects sponsor interactions can have on collaborative network formations when the sponsor assumes different roles.

Before discussing the contributions of this study, it is important to acknowledge the limitations that present useful opportunities for future work. First, this work focuses on short-term effects of sponsor interaction. There could thus be other long-term effects not seen in our results. Although we tested for autocorrelation in the panel regression model and we do not suspect the direction of effects to change with time, other factors unmentioned in the model may be present. The ERGM model is also done at a cross section. Other network methods for longitudinal analysis are available but are very expensive in terms of computer power. Second, we only tested two sponsor roles: collaborative and directive. Future research could investigate other roles that a sponsor could take such as moderation or encouragement and resource distribution. Third, our ERGM models were modeled using directional binary networks. Future work could investigate weighted networks. Fourth, our analysis is based on a single online innovation community.

Generalization to other types of online communities should be made while taking contextual differences into consideration.

Results reveal that, overall, when an employee from the sponsoring organization interacts with an online community member, that member is more likely to increase activity and the community is more likely to increase its attention towards that member. This suggests that a sponsoring firm with actively involved employees takes on a leadership position in the online community. This also means that the activity of those employees is highly influential to community members. It is important for a sponsor to take part in daily community activity. Earlier work has shown that participation of a sponsoring firm is viewed positively by the online community. This is especially the case when the firm uses the output of the online community for profit, as its participation is viewed as a respect of the norm of reciprocity (Dahlander and Magnusson 2005; Shah 2006).As leaders, it is important for sponsor employees to create strong exchange relationships with community members, as even with a differential LMX, overall effects are positive. This, however, involves that not all members would be motivated to increase their participation equally (Oh et al. 2016). However, this should not be a problem if the exchange effect cascades to indirectly connected online community members through highly active members. Indeed, this is what we see in our study when we investigated the effect of the sponsor's collaborative role on network formation.

Our study illuminates that sponsor interventions are not all equal. While sponsor interactions increase activity and attention overall, the sponsor is more likely to trigger peer-to-peer collaboration when sponsor employees are themselves collaborative with the community. A collaborative leader raises the value of a member and establishes the member's position as a partner rather than a subordinate (Omilion-Hodges and Baker 2013). This allows the member to

take leadership in innovation with positive influence towards those that join the project. Collaboration also establishes rich exchange channels that can create opportunities for other members to join in the form of discussions or debates. This creates a fertile ground for new connections to form between community members, leading to a denser and more resilient social structure.

On the contrary, a directive leader, despite providing guidance and clarity into a work process, also reflects a leader-subordinate image, lowering the position of the member as compared to the leader (Omilion-Hodges and Baker 2013). A sponsor's interaction taking a directive role may still attract the attention of the community towards a project, but members may be less likely to see this as an opportunity to collaborate. This is because top-down instructions may be challenged less by fellow members. Earlier work has shown that members are less likely to share their knowledge when there are others whom they see as more knowledgeable as this may influence their knowledge self-efficacy (Chen and Hung 2010; Hsu et al. 2007; Wasko and Faraj 2005). When a sponsor claims a higher status in the online community by interacting with members as a leader, specialist, or mentor, this may inhibit other members from sharing any contradictory opinions. Moreover, because the sponsor also controls many resources necessary for the online community, the possibility of members participating in discussions where ideas are proposed and challenged is reduced. Consequently, while peers may be attracted to a member, this would be more in the form of passive learning through observation or encouragement.

This study makes several contributions to scholarship. To the best of our knowledge, this is the first study that examines the influence of a sponsor's interaction on network formation among online community members. Previous work investigates direct effects towards of sponsor intervention on the activity levels of individuals (Ho and Rai 2017) or the total effect on

community participation (Porter et al. 2013). By investigating the indirect effect of sponsor interactions on peer interactions, this study explains *how* sponsor interactions can cascade into community-level effects. We explain and show that members who receive sponsor interactions gain attention from fellow peers, but this attention can transform into collaborative ties only if the sponsor acts as a fellow collaborator. Members who are attracted to a member receiving direction rather than collaboration from a sponsor could be targeting the sponsor rather than the member for access to resources or may avoid building connections with those members as they seem to have less control over their innovations. A sponsor that collaborates with a member sends a different signal to the community about the value of the member than a sponsor that gives directions and advice to a member. The first signals the high quality of a member and a project while the second may signal the inability of the member to manage or lead their innovation (Connelly et al. 2011). Moreover, this study highlights that importance of studying network formations as indicators of the potential of an online community for innovation. Having strong ties between members is the first essential element for collaboration and innovation (Ahuja 2000), yet more needs to be done with respect to the formation and maintenance of networks that nurture collaboration and innovation.

This research takes one step towards better understanding how organizations can enhance their management of online communities. Our findings yield implications for organizations that host or manage online communities, especially those that use online communities in their innovation strategies. Interacting with members is a sensitive matter and many organizations face the challenge of member engagement. Despite the short-term positive results that a directive approach can have, we suggest that community managers minimize this activity and use it only to trigger participation when members seem lost or unsure how to begin. Using direction more

frequently would prevent the community from the knowledge-rich discussions that are essential for innovation. Instead, taking a collaborative role would trigger more members to connect as participants in innovation creation. The sponsor could decide to invest some resources in working on certain promising innovations of members and allow networks around these innovations to grow among members. The more a social structure of an online community matures and deepens, the easier it is to create further connections. Innovation is a long-term process and thus needs to be nurtured to emerge from member interactions.

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CHAPTER 6

Thesis Discussion and Implications for Research

Through the chapters of this thesis, we aimed to discover how an online community's sustainability develops and evolves through the interactions of its sponsoring organization and community members. We aimed to identify how an online community could evolve to become more sustainable or less sustainable, hoping to shed new light on this less studied type of online community. We first reviewed online community literature to clarify what we mean by a sponsored online community. We then drew from social exchange theory to develop a typology of online communities. We then identified sponsored online communities as two out of six types of online communities and "Sponsored Collaborative Communities" as the subject of our investigation.

The typology we develop, while a preface to the following three essays, has unique contributions to literature. While the literature on online communities is rich and diverse, one would directly notice the large variety of online communities studied. Examples include electronic networks of practice (Meservy et al. 2014b), online feedback forums (Phang et al. 2015), online health communities (Mein Goh et al. 2016), online innovation communities (Stanko 2016b), and online brand communities (Hildebrand et al. 2013) to name a few. This variety poses a challenge for theoretical parsimony and can also cause generalization issues. Another issue is that existing literature considers open-source software communities a unique phenomenon, while they are considered online communities in other instances (Faraj et al. 2011). This typology, thus, highlights how forms of online communities are different and similar, allowing future research to better position special-purpose online communities by the nature of their agents, exchange, and

governance. Finally, online communities have generally been considered an amalgam of volunteering individuals connecting around a common interest (Sproull and Arriaga 2007). This definition causes problems when considering a new form of online communities that include paid workers or are populated by multiple organizations (Alexy and Leitner 2011; O'Mahony and Karp 2022; Reischauer and Mair 2018). Our work expands the scope of online communities to include multiple stakeholders. This allows us to lay a foundation for better investigating inter-stakeholder dynamics and would help us provide an agenda for future research on online communities in the work that follows this thesis.

Beyond the typology, the three articles of this thesis investigate the challenging relationship between a sponsoring organization and its online community. The sustainability of a sponsored online community entails that a sponsor remains the underlying governor or supporter of the online community while the community maintains favorable energy and productivity (West and O'mahony 2008). These two collectives have different goals (Bonaccorsi and Rossi 2006) and different ways of organizing work (Lee and Cole 2003), and a sponsor has no authority over the online community (Reischauer and Mair 2018). Nevertheless, this difference creates a unique opportunity for formal organizations to tap into the benefits of crowd knowledge and innovation (Dahlander et al. 2008). Having said that, high risks precede high returns. The openness and volatility of an online community makes it difficult for a sponsoring organization to manage and control its activity. This also poses an interesting research puzzle, especially since online communities have mostly been studied as standalone, homogenous groups. This study responds to calls for more research that considers online communities an amalgam of heterogeneous stakeholders (Barrett et al. 2016; Levina and Arriaga 2014b; Mindel et al. 2018b). By

considering such richness, we uncover new dynamics that can be the key to better understanding online communities and managing them to fruition.

Earlier work has talked about the tensions and paradoxes that sponsors of online communities face as they try to control and benefit from the work online communities produce (Dahlander and Magnusson 2005; Shah 2006; Spaeth et al. 2015a; Stewart et al. 2006; West and O'Mahony 2005). However, literature remains silent about how these tensions manifest, how they are resolved, and what consequences tension resolution has. Another stream of literature views firm affiliations as positive triggers for participation as sponsors help seed knowledge and engender a sense of trust in the quality of knowledge work (Huang et al. 2017; Spaeth et al. 2015a). This work highlights that the trajectory an online community takes depends on the sponsor's interaction activities and the earlier states of the online community. Therefore, we stress the contextuality of management practices, considering the contextual factors and avoiding general claims of causality.

The first essay provides a multi-level theoretical explanation of how sustainability emerges from lower-level interactions and how it plays a significant role in not only maintaining the online community as an organized collective of activity but also serving to regulate sponsor activity. The model itself can motivate future research on many fronts. At the individual level, future studies can look at how resource redistribution influences the coping activities of members, which may include changes in interacting with other members, changes in presenting oneself, and changes in interacting with technology (Ma and Agarwal 2007). Earlier research on IT coping identified that people's emotions and perceptions change and that they engage in different forms of coping (Beaudry and Pinsonneault 2005). This literature, however, has not been

extended to venues when IT use is in the context of user representation and connection with other social actors through technology.

We have also mentioned that micro-tension resolution can take positive or negative turns when emerging to the collective level. As different members have different goals, divergence in behavior will be visible by the rest of the community, which may lead to confrontation and conflict. While the literature on conflict and conflict management is rich (Carton and Tewfik 2016; Leidner and Kayworth 2006; Likert and Likert 1976; Montoya-Weiss et al. 2001), it has yet to be extended to new forms of organizing in general and to online communities in specific. Future work can investigate how an online community resolves conflict through emergent order and how agreements form between members. It may be that certain members with specific characteristics engage in role-taking to act as referees between micro-conflicts (Majchrzak et al. 2013). It may also be that repeated conflict resolution mechanisms would teach the community how to quickly solve certain problems, paving the way for the surfacing of practice for conflict resolution. Moreover, it would be interesting to see how a sponsor would attempt to participate in conflict resolution and how that would change the trajectory of events.

The model presented in Chapter 3 also motivates research at the collective level. We discussed that the sponsor uses different methods to intervene in the communal activity, creating movement in resources. Each of these interventions presents opportunities for further research. For instance, research investigates how financial compensation influences the participation of employed community members (Alexy and Leitner 2011; SL Daniel et al. 2018). Yet, we still do not know how it affects the motivation of other members who participate voluntarily and view and interact with paid members. More remains to be understood about the differences between

employed and voluntary members concerning participation behavior, commitment, role taking, and what management practices can be applied to manage each type of member.

Further research is also needed concerning the actions of modifying technology in online communities and digital platforms in general. As digital technology usually represents the views and goals of the designer (Klein and Kleinman 2002), changes in platform technology as a result of changing designer goals can change the pool of affordances and constrains perceived by users in ways unexpected by the designer (Hallerbach et al. 2013). When past affordances are replaced by constrains for action because of automation or redirection of activity, users may start resisting the new features and eventually resist the sponsor as they collectively develop a feeling of being controlled through algorithms (Kellogg et al. 2020; Lapointe and Rivard 2005). More research needs to be done to better understand algorithmic control in crowd platforms and how the consequences of such control differ between pooled crowdsourcing and social crowdsourcing through online communities. We conjecture that resistance in crowdsourcing platforms of unconnected workers manifests differently from platforms where members are closely connected with each and have rich exchanges of information.

The third sponsor intervention we discuss in Chapter 3 also motivates future research. Studies of online community leadership have mainly focused on emergent influential leaders (Faraj et al. 2015b; Johnson et al. 2015). Studies on open source communities have also discussed different forms of communal leadership, when the rest of the community delegates a group to execute governance decisions and manage voting (O'mahony and Ferraro 2007; O'Mahony 2007; Shaikh and Henfridsson 2017), yet not much is known about successful formal leadership by an external organization. One reason may be due to the focus of most studies on open-source communities,

which might have idiosyncrasies that are not present in other forms of collaborative online communities.

Our second essay, presented in Chapter 4, attempts to extend the literature on formal leadership in online communities. We also use a collaborative online community that is not an open-source software development community, allowing us to extend theory beyond that specific context better. We present a case in which the sponsor representatives acted as community leaders. We show that to gain a leadership position, a sponsor works its way into legitimacy by offering attractive resources to the members and being supportive and collaborative. When members see the value in those resources, they will be motivated by them. However, we also show that constant resource extraction after gaining legitimacy and switching to directive leadership can cause online community members to resist silently by leaving. Our empirical case shows that online community management is a continuous process. It also shows that control in one phase can lead to developing an online community that can neither perform productively nor resist constructively.

Our second essay also provides an example of how the sponsor creates internal micro-tensions between online community members, as described in the first essay. The essay describes how within-community negotiation is influenced by how the tension between the sponsor and online community is resolved. Because the sponsor-community tension resolution redefines the importance of resources, the sponsor causes a redistribution of resources within the community when it controls the socially agreed important resources. We conjecture that the reason may be due to the short time the online community had to develop as a collective entity or to the design that separated communal discussions. Both are reasons that limited the establishment of generative feedback loops. More research is needed concerning the relationship between online

community maturity and sustainability. There is minimal research on this issue, with the few that were done suggesting that the online community's maturity influences knowledge contribution and consumption (Kane and Ransbotham 2016a). Not much, however, is done concerning how a mature online community is different from a developing online community dealing with external pressures from a sponsor or other online social networks and how that translates into a different capacity to sustain itself. Another reason why the online community might have resisted silently could be due to the sense of indebtedness developed in members, making members unable to voice their concerns to the sponsor. Future research may investigate how strong social bonds between volunteers and sponsor employees can influence the online community's activities and stability.

Chapter 4 also adds to the literature on incentivizing participation in online communities. Previous research has identified basic intrinsic and extrinsic motivations of individuals who join online communities (Von Krogh et al. 2012; Wasko and Faraj 2005) and suggested ways to design the hosting platform in such a way that these motivations are answered. For instance, social distinction features are used to answer social needs such as reputation and status (Levina and Arriaga 2014b), and connection and association features answer needs for connection (Treem and Leonardi 2013). Scholars have argued whether intrinsic and extrinsic motivations can co-exist and whether extrinsic rewards can drive away intrinsic motivation (Alexy and Leitner 2011; Ostrom 2000). This has led several scholars to argue against financial and other tangible methods for motivation (Alexy and Leitner 2011; Shah 2006). Nevertheless, just as studies identified that in some cases providing financial awards does not threaten the survival of the online community nor the intrinsic motivation of members (Huang et al. 2017; Jeppesen and Frederiksen 2006; Spaeth et al. 2015a), so do we add that the effect of tangible awards is only

defined by how the online community social understands these resources. If a resource becomes important to the social group, its uneven distribution between people will cause a need to readapt the social structure accordingly (Bourdieu and Wacquant 1992). In our study, members saw financially rewarded tasks as signs of high trust and professionalism. Paid tasks are differentiated between amateurs and professionals. They differentiated between members who are willing to work for free and learn and those who work with “real” projects and can teach others. Financial compensation was thus not sought after for its economic value as much as for its social value. We argue that it is the changing value of resources that causes a shift in the social structure, and we argue against the deterministic assumptions of resources and user participation.

Notwithstanding the above, we do not know yet whether different types of economic, intellectual, or social resources can influence social structures in different ways. Theories of resources and social distinction differentiate between the different forms of resources, suggesting that different forms of resources divide and move between people differently (Bourdieu 1989; Dorsch et al. 2017; Levina and Arriaga 2014b). One would assume that knowledge and social capital would move differently to money between people, and each of these unique resources can be activated differently. Nevertheless, we still have to understand how resources influence online social structures in different contexts and how they cause social structures to behave depending on collective goals.

The third essay presented in this thesis, in Chapter 5, focuses more on the direct effects of sponsor-member interactions. It focuses on the individual level and studies how direct interaction between a sponsor representative and a community member influences that member's activity and social desirability. The study shows that the sponsor can influence social connections in the online community by interacting with community members. Not only do we show that a member

increases their activity and desirability when a sponsor representative interacts with them, but the potential for collaboration also changes based on how the sponsor interacts with that focal member. The scope of the study is limited to only directive and collaborative interactions. Still, future research can investigate the influence of other forms of interaction, such as encouragement and motivational words, rewards and gifts, disciplinary words, and moderation messages.

This study suggests that even when the sponsor attempts to act collaboratively, its identity causes unique responses from the online community. Nevertheless, we found collaborative sponsors, those that share knowledge, lead knowledge work, and join other members as collaborators, greatly influence the possibility of members collaborating. This may be due to the vicarious learning of members (Bandura 2001). When members observe leaders, they are more likely to follow with similar actions (Fleming and Spicer 2014; Huffaker 2010). We find it interesting for future research to investigate if such influence propagates into the network. That is, whether emergent community leaders, members with more leadership traits, or those with a more central structural position have the same influential effect on other members' collaborative potential. An alternative explanation to vicarious learning would be that collaborative conversations can be more involving than directive messages. Directive messages suggest that a leader would ask a member to act a certain way and the member responds with an action, which might require individual effort or start conversations. However, collaboration requires the start of conversations which can take longer, but also attract other members to join, creating a higher chance for two uninvolved members to connect.

Another insight we conclude from the study is that some directive communication might also be beneficial. Giving direction may reduce task ambiguity, reduce the possibility of conflicts, and trigger more activity from members that are less involved or invested (Rahmani et al. 2018).

However, how much direction an online community needs might be subject to different factors, including its maturity, reaction to direction, and the amount of internal tension it experiences.

We also note that in the study we present in Chapter 5, the online community we study had its sponsor representatives interact with members both collaboratively and defectively during the same periods. While we ensure the analytical division of both actions, it is possible that when a sponsor combines both forms of member interaction, a combined effect will occur. For instance, a directive interaction may lead to a positive influence when the sponsor is also collaborative in other instances. Future research is needed to study online communities that have sponsors who only work as collaborators or only work as directors. Such a study would help better detangle the effects of both forms of interaction. Another interesting study would investigate collaborative direct interaction with algorithmic direction. Here, the sponsor could use technology to govern members' activity, correct certain activities, or identify needed actions, while actively collaborating with members. It would be interesting to see the difference between algorithmic and communicative action.

In this thesis, we strived to expand the literature on online communities sponsored and managed by formal organizations. While our work is not free from limitations, we tried to account for other possible explanations, and we used our work to motivate an agenda for future research. We aim to expand knowledge in this important yet understudied area, especially since work is becoming more and more distributed, and the internet is becoming more and more social.

Concluding Thoughts

In conclusion, we raise a call for research that considers that an online community is an entity that influences and is influenced by other entities around it. We highlight the role of the sponsoring organization as salient in shaping the online community and the paths it takes throughout its lifetime. We stress the critical role of technology in allowing the sponsor to have a technology-enabled form of control, whether verbal about the online community or not.

We stress the importance of research in this less studied area as social technologies are becoming increasingly sophisticated and organizations, whether for-profit or non-profit, are increasingly engaging with crowds. Notwithstanding the significant contribution that research on autonomous online communities has, it is harder to extract practical advice from such research, as assumed conclusions may not hold when an organization attempts to intervene with the online community. Instead, when we better understand how an online community could react, we become better at developing management advice that is directly applicable to community managers.

Online social groups have an excellent potential for economic and social well-being, and we hope that, through this work, we help pave the way for better realizing such potential.

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